Michigan Breeding Bird Atlas II

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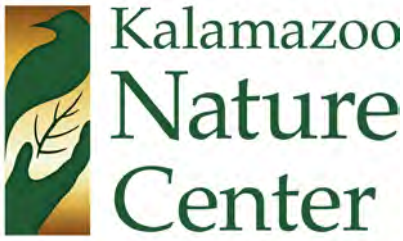
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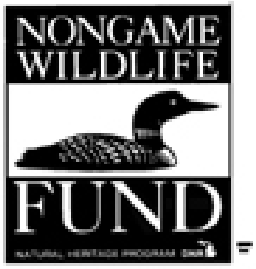






















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Reference Listing and Appendices

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Appendix 3: Township Totals.... Appendix3.pdf
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Preface

M*ichigan Breeding Bird Atlas II* is a 20-year follow-up to *The Atlas of the Breeding Birds of Michigan*, the first breeding bird atlas effort, published in 1991. Each of the chapters provides updated information and an examination of the results of seven years of data collection. The field methods are described for those interested. The maps are all newly developed using current geographic information systems and software. You will find that this Atlas includes additional information examining new bird conservation-related initiatives and a complete discussion of results. The book is supported by the online version, www.mibirdatlas.org, which allows for even more extensive map analysis and comparison between the two Atlases.

Roger Tory Peterson said, "Birds are an ecological litmus paper." *Michigan Breeding Bird Atlas II* has widespread implications for our current and future world of climate change. Since publication of *The Atlas of the Breeding Birds of Michigan* in 1991, the National Audubon Society estimates a northward shift of nearly 60% of the 305 bird species in North America. Although the research and publication of *Michigan Breeding Bird Atlas II* does not begin to answer all of the questions related to climate change and other factors impacting distribution of birds and their breeding grounds, it clearly points to the need for further studies to address questions of concern.

Continued monitoring of bird populations and their distribution can have a profound impact on our understanding of global climate change and the issues associated with changes in habitat and other environmental factors. Professional ornithologists, as well as volunteer citizen scientists, have a strong role to play in this effort. There are 8.5 million birdwatchers in the United States. This number is slightly higher than the number of Americans in book clubs and close to the total population of the state of Michigan. If professionals and amateurs alike continue their efforts of engaging in thoughtful collection of data on birds, we will be better equipped to understand and deal with the changes that are sure to come in the distant and not-too-distant future.

In addition to doing large-scale comparisons to the first Atlas, this Atlas provides a thorough literature review of each species, including new research. The information gathered and analyzed relates to species distribution, nesting patterns, unique habitat requirements, and assemblages of species and is providing new insight and direction to better manage our avian natural heritage. It is our hope that this Atlas will be used as a new tool for conservation as society addresses such issues as continued habitat loss and fragmentation. This book can serve as an important resource in the exciting and expanding field of habitat restoration.

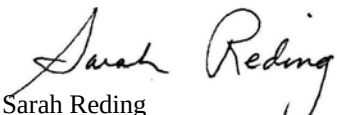
Together, the two Atlases underscore the dynamic nature of Michigan's biota as it responds to changing environmental conditions. Some major changes observed since *The Atlas of the Breeding Birds of Michigan* publication include the expansion of Common Ravens southward, Carolina Wrens northward and Peregrine Falcons throughout our larger cities. Declining species include Whip-poor-will, American Bittern, and Henslow's Sparrow.

We welcome the use of the two atlases together or separately to help uncover many more trends, both in Michigan and regionally. Many groups in other areas, such as Wisconsin and Ontario, have completed their own breeding bird atlases using similar protocols. Combined, these data provide a Statewide and Great Lakes Regional view of bird distribution and abundance.

The *Michigan Breeding Bird Atlas II*, in print and in electronic form, along with the underlying database, is a culmination of over a decade of effort by hundreds of professional and amateur bird surveyors. Working together they have compiled this set of useful and high quality information. This work would not have been possible without the support and effort of the Kalamazoo Nature Center staff, Michigan Department of Natural Resources staff, and the organizations listed in the acknowledgements, including many individuals who may not be listed by name. We are also deeply grateful to the generous donors, partners, and supporters who provided the financial resources to complete this large project. We thank you all.

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Finally, we hope that this book inspires an emotional connection to birds and the environment. This inspiration can encourage bird watchers of all skill levels to apply their observations toward scientific endeavors that will ultimately provide the answers to the complex issues and challenges facing our ever-changing natural world. Don't keep your knowledge and passion to yourself. Continue to share your observations and research now, and with future generations.



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Whitefish Point Bird Observatory

Abbreviations

AOU – American Ornithologists' Union
BBS – Breeding Bird Survey: the roadside counts giving an index to bird abundance and coordinated by the U.S. Fish and Wildlife Service.
BCR – Bird Conservation Region
cm – centimeter(s)
Co. – County
DNR – Department of Natural Resources
Fed – Federal
IBA – Important Bird Area: Global, Continental, or State designated area which meets certain criteria in order to be determined important for bird populations.
IFMAP – Integrated Forestry Monitoring Assessment and Prescription
ISS – International Shorebird Surveys
KNC – Kalamazoo Nature Center
LCC – Land Conservation Cooperative
LRU – Land Resource Unit
MBBA I - refers to the data, time period 1983-1988, or writings within *The Atlas of Breeding Birds of Michigan*, Brewer et al. 1991.
MBBA II – refers to the data, time period 2002-2008, or writings within *The Michigan Breeding Bird Atlas II*, Chartier et al. 2013.
MBRC – Michigan Bird Records Committee
MDNR – Michigan Department of Natural Resources
MDNRE – Michigan Department of Natrual Resources and Environment, the combination of Michigan Department of Natural Resources (DNR) and Department of Environmental Quality (DEQ), which were united under a single name from 2010 to early 2011
Mich. – Michigan
MIRIS – Michigan Resource Information Systems
MLRA – Major Land Resource Area
MNFI – Michigan Natural Features Inventory
NABCI – North American Bird Conservation Initiative
NAS – National Audubon Society
NASS – National Agricultural Statistics Service
NLP – The northern half of Michigan's Lower Peninsula
NOAA – National Oceanic and Atmospheric Administration
NWR – National Wildlife Refuge
PIF – Partners in Flight
PLSS – Public Land Survey System
PRISM – Program for Regional and International Shorebird Monitoring
SGA – State Game Area
SLP – The southern half of Michigan's Lower Peninsula
SOM – State of Michigan
Thumb – Area with extends from Saginaw Bay to Pt. Huron, resembling a thumb in Michigan's mitten shape.
Twp(s) – Township(s)
UMVGL – Upper Mississippi Valley/Great Lakes
UP – Michigan's Upper Peninsula
USDA – United States Department of Agriculture
USFS – United States Forest Service
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Survey
WNV – West Nile Virus

Methods

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Introduction

The second Michigan Breeding Bird Atlas (MBBA II) had two major goals: to document the current distribution of the state's breeding birds and to provide a comparison with results from the first Michigan Breeding Bird Atlas (MBBA I). In order to accomplish the second goal it was necessary to conduct MBBA II in a manner consistent with the methodology used in MBBA I. A tertiary goal of MBBA II was to collect abundance data. This was accomplished through development of a point count system throughout the state, and recording the number of breeding pairs or their equivalent in each block survey. Data on abundance have not been considered in this publication.

The timing of this second Atlas was based on recommendations by the North American Ornithological Atlas Committee that Atlas projects be repeated at approximately 20-year intervals (McGowan and Corwin 2008). Field work for MBBA I was carried out from 1983 to 1988 while the field work for MBBA II extended primarily from 2002 through 2008. For both Atlases, the Kalamazoo Nature Center served as the headquarters, provided the Atlas coordinator, organized the volunteers, collected and analyzed the data, and hired additional staff.

A statewide Atlas project requires the labor and commitment of many people. In addition to paid field staff, over 800 volunteers submitted bird data, 73 authors wrote species accounts, 37 photographers donated their pictures, and 17 individuals reviewed data or articles. Additionally, several staff of the Michigan Department of Natural Resources (MDNR) reviewed data, chapters, and species accounts for this publication or contributed through participation on committees. This project would not have been possible without the financial and logistical support of the Michigan Department of Natural Resources and the numerous other supporters and contributors listed in the acknowledgements. Additionally, advances in technology - particularly Geographic Information Systems (GIS) - greatly increased the efficiency of analyzing and mapping the data.

Survey Period

As indicated above, field work for MBBA II was conducted primarily from 2002 through 2008. During a pilot year (2001), a small number of surveys were done to fine-tune the protocol, evaluate methodology, and develop field data forms. Field work was extended into 2008 to fill in remaining coverage gaps and achieve coverage levels comparable to those of MBBA I.

Grid and Sampling Design

As Michigan was opened to settlement, surveyors working for the General Land Office used the Rectangular Public Land Survey System (PLSS) to create a grid of township, range, and section lines across the state (Webster and Leib 2011); these survey lines are regulated by the U. S. Bureau of Land Management. In Michigan, private ownership of some lands predates the implementation of the PLSS; these lands are commonly referred to as the French Claims and are not included in the PLSS. Within this system a typical geographic township consists of 36 one-mile-square sections arranged in a 6 mile x 6 mile square (Figure 1: A typical township showing Atlas blocks

It is important to note that the boundaries of political townships do not necessarily follow the underlying geographical township boundaries, which can cause confusion. Partial townships occur along the edges of physical or political boundaries, land survey correction lines, and the Michigan Meridian, the state's central north-south line. The Atlas block (Figure1) is the only spatial unit that is not inherent in the PLSS system. A block is one quarter of a township, each being comprised of nine sections of a standard square township. The PLSS grid, with the addition of quarter-township "blocks," was used in MBBA I (McPeek and Adams 1991).

Methods

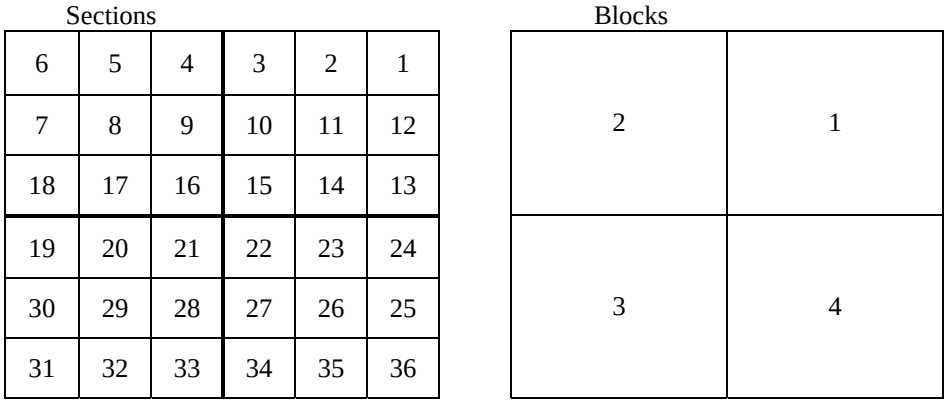


Figure 1: A typical township showing Atlas blocks

The MDNR provided the historical GIS files that formed the basis of MBBA I's grid. Advances in GIS technology allowed staff at the Kalamazoo Nature Center to extend the grid for MBBA II to include all land area, such as remote islands and coastal areas. The Great Lakes were six feet lower during the MBBA II survey period compared to lake levels during the MBBA I survey period (GLERL 2010) but the lake level differences had a minimal impact on the number of townships and blocks. The extension of the grid resulted in 1,927 townships and 7,192 blocks for MBBA II, an increase of 1%. The small difference between the two Atlases in total number of townships and blocks does not appear to impact comparisons of results or affect statements of trends within this publication. Failure to extend the grid would have affected results for species limited to the shores of the Great Lakes.

The PLSS grid is useful for four reasons. First, it employs the familiar township-range-section designation used in plat books and most county maps. For example, the bulk of the city of Lansing is located in T-04-N R-02-W. Second, many of the state's roads follow section boundaries, giving observers identifiable boundaries for Atlas blocks. Third, the recommended grid size for bird atlases is a multiple of 5 km or "a close English equivalent" (Robbins and Geissler 1990); one side of a block is 3 miles, equivalent to 4.8 km. And fourth, using the same grid system allowed easy comparisons with results from the first Atlas.

Michigan encompasses a large mass of land and water, making it impractical to survey every block with limited human and financial resources. Consequently priority blocks were established so that coverage would be adequate to accomplish the project's goals and objectives. During the first Atlas, all blocks in each township in the SLP were chosen as priority blocks; in the NLP, two of the four blocks in a township were randomly selected; and only one block was randomly selected in the UP. These decisions were based primarily on the availability of volunteers in the different regions of the state. Because of the difficulty of achieving coverage goals in MBBA I, fewer priority blocks were used in MBBA II: A single priority block was chosen in each township, regardless of the region. To facilitate comparisons between the Atlas projects, the MBBA II priority blocks are a subset of those used in MBBA I. Therefore, while a priority block was randomly selected out of the four possibilities per township in the SLP, there were only two possibilities per township in the NLP and one possibility per township in the UP. A secondary block was selected in each township for MBBA II in roughly the same fashion.

Observers were directed to survey the priority blocks first. If they were unable to travel to a more distant priority block, the secondary and non-priority blocks could be surveyed. Thus, data from all blocks were accepted, regardless of priority status, with the additional coverage expanding our knowledge of species-specific distributions. Because block coverage was unequal in MBBA II and MBBA I, results have been compiled by township to facilitate comparisons within and between Atlases.

Coverage Goals

A major objective of the field work portion of MBBA II was to adequately cover each priority block. As in MBBA I, a minimum count of 50 species was used to signify an adequate level of coverage (McPeek and Adams 1991). This was an internal quality control measure and surveys were never cut short at this number. While blocks in some habitats (urban centers, agricultural areas, and deep forest) might not reach 50 species, this measurement was useful in identifying locations in need of additional coverage. In addition to number of species, coverage can be described by field hours (effort) and by the number of records obtained. While these metrics had no defined goal, they provide a useful summary of coverage information for MBBA II. The standard Atlas forms are the casual card, the point count form, and the survey checklist form. Effort was collected on two forms: The point count protocol stipulated that observers spend five minutes at each point, so a standard 25-point survey counted as approximately two hours, while the survey checklist asked for hours spent in the field. Each species listed on a form was considered a record.

While effort seems a very straightforward measurement, the number of hours needed to cover a block varies with the

skill of the individual observer. How observers recorded and perceived their time spent in a block also varied. Surveys from volunteers which did not include time were assigned field hours at the rate of one hour per 30 species reported. Because data on hours were not available from MBBA I, no comparisons can be made in terms of hours of effort with MBBA II.

Survey Procedures

The state was divided into 26 regions, each with two to four counties (Figure 2). Regional Coordinators helped with recruiting volunteers, distributing information, and monitoring coverage. If a region did not have a coordinator, MBBA II staff at KNC organized observers for that area.

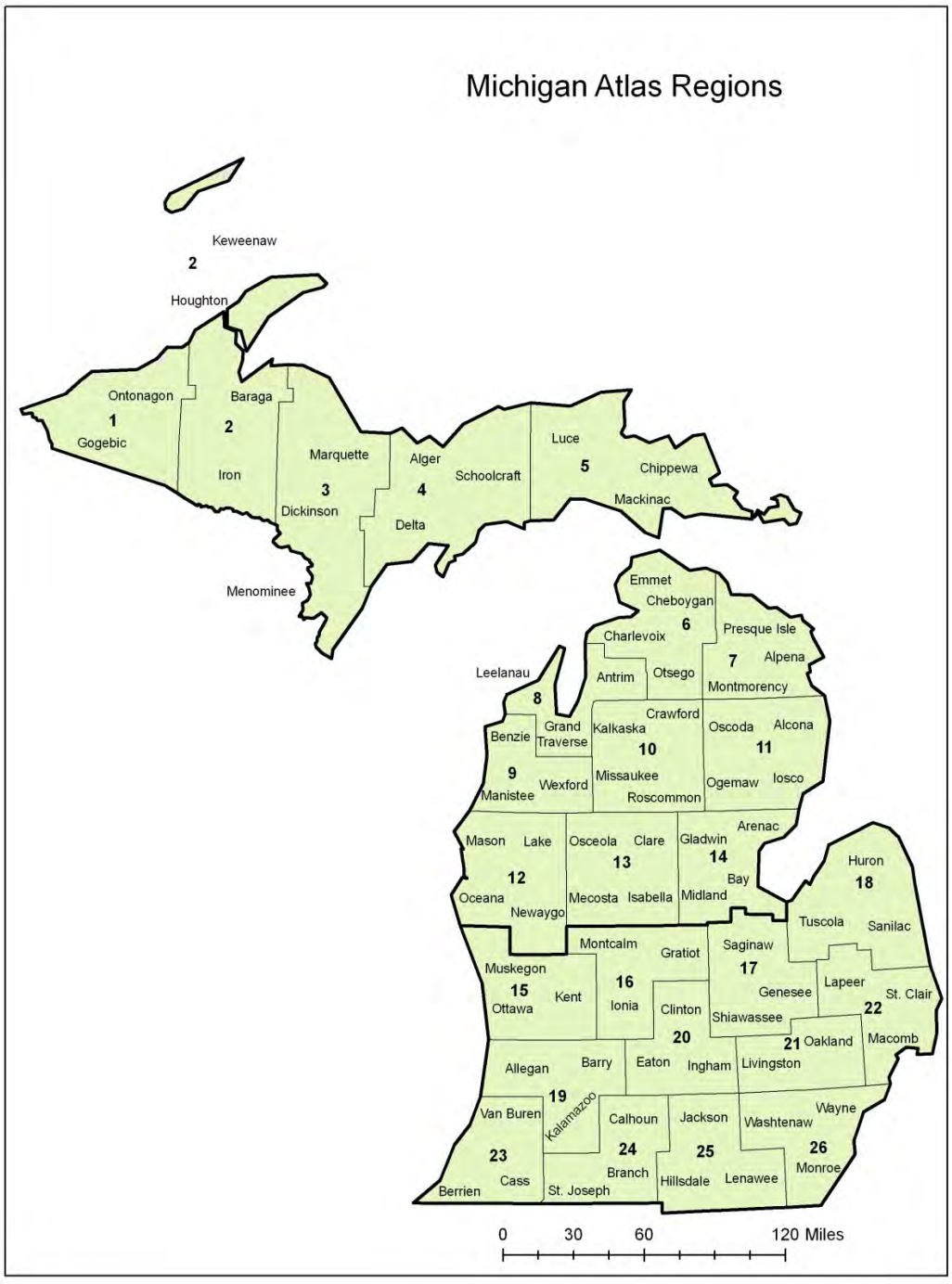


Figure 2: Michigan Atlas regions

Methods

Atlas participants were assigned blocks typically near where they lived or visited (e.g., a cabin up north). Some volunteers were willing to travel to do MBBA surveys. Each participant was given a packet with supplies and information including a participant handbook, other instructions, maps, data collection forms, and pertinent information about local species. Newsletters and workshops provided by Atlas staff and direct communication with regional coordinators and other participants were the main avenues for field work coordination and distribution of information. Participants were encouraged to survey priority blocks first and to visit all habitats within that block. Once the priority blocks were surveyed, they could visit other areas known to have unique or rare ecological communities. While priority blocks were emphasized, data were accepted from any area of the state. When a priority block was inaccessible (e.g., roadless, flooded, or private property) or a poor representation of the habitat within that township, a secondary or non-priority block could be substituted. During MBBA II, maximizing species counts in each block was encouraged over spending extra time to confirm breeding (KNC 2004).

Paid field staff used the "blockbusting" survey method to cover more area in less time. Blockbusting consisted of covering all habitats in a block in a three- to five-hour period, with a goal of more than 50 species. Most field staff could cover two to four blocks per day using this method. Staff recorded the number of pairs observed in each block and were asked to visit each of their blocks twice at least a week apart.

A subset of participants conducted MBBA II point counts. The goal was to obtain point count data for at least 25% of priority blocks. Observers were supplied with the point count handbook, maps, and data forms. Participants were asked to survey 25 points, 20 on-road and five off-road (where conditions permitted). Initial maps contained 150 points from which to choose; later maps contained fewer points, selected from the original 150 using a stratified random sample provided by the MDNR. Using either map, participants chose 25 points that resulted in uniform distribution within their block (KNC 2005).

Breeding Codes

Breeding codes used in MBBA II were changed only slightly from those used in MBBA I (McPeek and Adams 1991) and closely follow standards set by the North American Ornithological Atlas Committee (Laughlin et al. 1990). The 20 criteria fall into four categories: observed, possible, probable, and confirmed. These codes and their explanations were on the back of the survey checklist forms and casual cards and in the Atlas Handbook.

OBSERVED:

O—Species observed during its breeding season but no evidence of breeding in block. Individual birds in unlikely breeding habitat, flying over, or out of their normal breeding range without any indication of breeding belong in this category.

POSSIBLE:

#—Species observed in suitable nesting habitat during its breeding season.

X—Singing male present in suitable nesting habitat during its breeding season.

PROBABLE:

S—Singing male present at same location on at least two dates at least seven days apart or multiple (five or more) singing males on the same date during the breeding season.

P—Pair observed in suitable nesting habitat during breeding season.

T—Territorial behavior (chasing individuals of the same species).

C—Courtship behavior or copulation.

N—Visiting probable nest site.

A—Agitated behavior or anxiety calls from adult.

B—Nest building by wrens or excavation of holes by woodpeckers.

CONFIRMED:

NB—Nest building by all except woodpeckers and wrens.

PE—Physiological evidence of breeding or brooding based on bird in hand. Banders or biologists actually handling the birds are to use this code.

DD—Distraction display or injury feigning.

UN—Used nests or eggshells found. Caution: These must be carefully identified.

FL—Recently fledged young (of altricial species) incapable of sustained flight, or downy young (of precocial species) restricted to the natal area by dependence on adults or limited mobility.

ON—Occupied nest: Adults entering or leaving a nest site in circumstances indicating occupied nest (includes high nests or nest holes, the contents of which cannot be seen) or adult incubating or brooding.

FY—Adults with food for young (carrying food) or feeding young. Use caution as some species will continue to feed young for a number of weeks after leaving the nest and may move some distance.

FS—Adult carrying fecal sac.

NE—Nest with eggs.

NY—Nest with young seen or heard. Presence of a Brown-headed Cowbird egg or young is confirmation for both the cowbird and the host species.

Data Collection

Atlas participants collected data using standard forms supplied by MBBA II staff and regional coordinators. Observers could also enter their sightings using a web-based form designed and maintained by Keith Saylor of Northern Michigan Birding; the forms at <www.michiganbirds.org> were available during the second half of MBBA II.

Methods

The survey checklist form was used when observers surveyed an entire block (Figure 3). Observers recorded location (down to section, if needed), date(s), hours, and contact information on the front panel. Every species potentially breeding in Michigan was included in the checklist. Species requiring additional documentation were marked in bold, with an asterisk and an explanatory code. For each species, the highest number of pairs seen, highest breeding evidence code, and date were recorded. The back panels listed the breeding codes and the Atlas ethics.

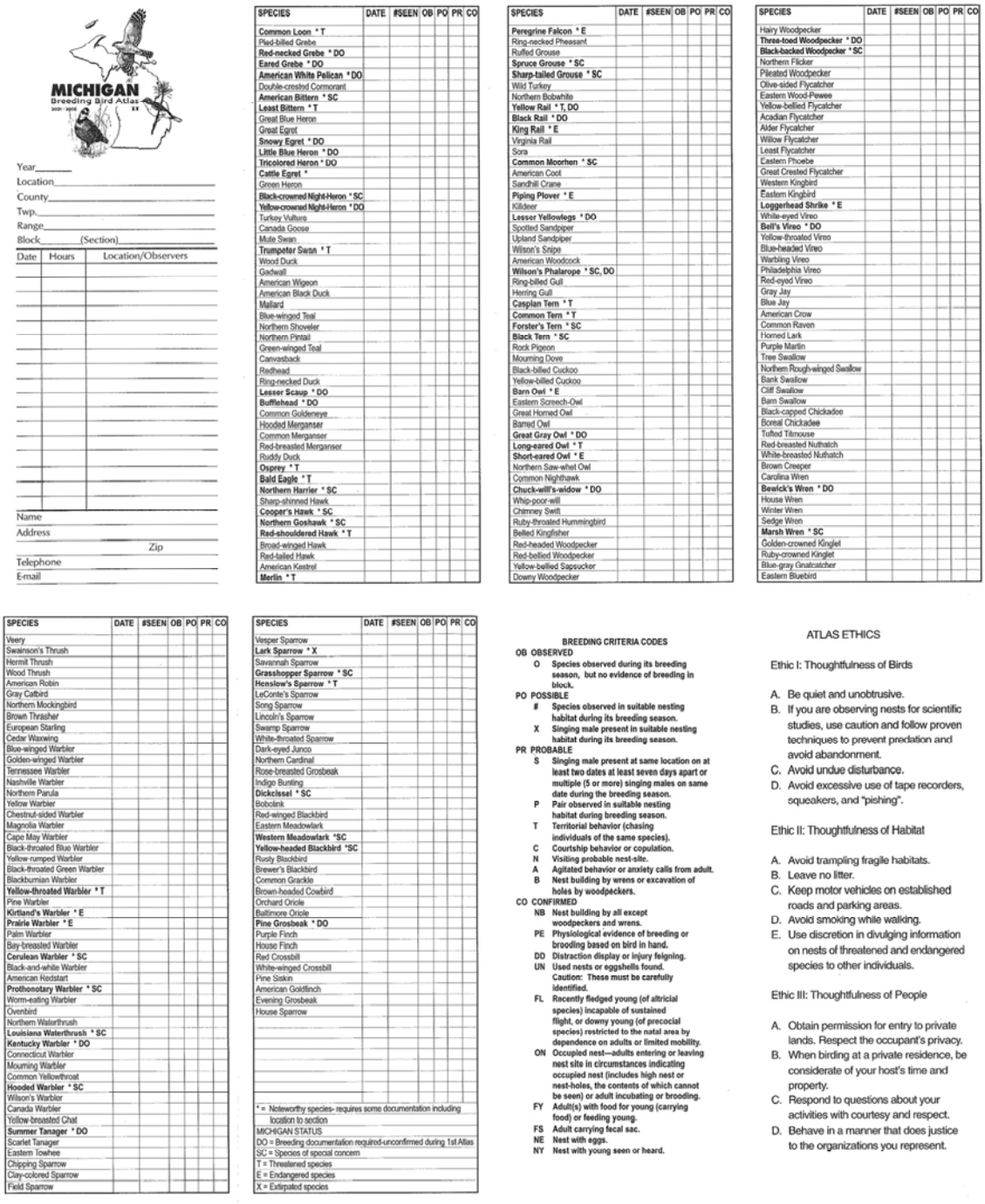


Figure 3: Atlas survey checklist form

Methods

Additional documentation was recorded on Michigan Natural Features Inventory (MNFI) rare bird observation form. Documentation was required for all Michigan listed species (including special concern) and any species that had not been confirmed during MBBA I (Figure 4).

Casual bird observation cards were used to collect incidental observations (Figure 5). Birds encountered during the course of other activities (e.g., driving to work, at the dog park) could be easily reported using the casual card.

MICHIGAN STATE UNIVERSITY EXTENSION

RARE BIRD OBSERVATION FORM

Michigan Natural Features Inventory

BIRD SPECIES OBSERVED

COMMON NAME:

LOCATIONAL INFORMATION

DIRECTIONS: Provide detailed directions to the observation (rather than the survey site). Include landmarks, roads, towns, distances, compass directions.

TOWNSHIP/RANGE:	SECTION:	QUARTER-SECTION:
COUNTY:	OWNERSHIP: ☐ Public ☐ Private If Public, list managed area name:	
WAS GPS USED? ☐ Y ☐ N	TYPE OF UNIT: ☐ Garmin ☐ Trimble ☐ Other	LATITUDE/LONGITUDE:
APPROX. DISTANCE OF GPS POINT FROM BIRD LOCATION (feet):	COMPASS DIRECTION OF BIRD LOCATION FROM GPS POINT:	

TOPOGRAPHIC MAP

1. Send a photocopy of the appropriate part of a USGS topographic map (1:24,000 scale if available) or other suitable map, and write the map scale on the photocopy. Please do NOT enlarge or reduce the map. USGS maps can be printed for free at the following website: www.topozone.com. Please mail the map with a copy of this form to: MNFI, P.O. Box 30444, Lansing, MI 48909-7944.
2. Indicate on the map the exact location of the observation(s):
   a. When the observed area is ***no larger than a pen point*** on the map (i.e., only a small number of individuals or extremely small area), place small points on the map indicating the location(s) of the individuals or area, and label each point with an arrow so they are more easily seen.
   b. When the observed area is ***larger than a pen point*** on the map, (e.g., several individuals, foraging birds, rookeries, colonial nesting birds), draw a thin solid boundary line showing the extent of the observed area occupied by the individuals. Where needed, add notes to the map with instructions on where the boundary line is located or if the boundary is shared with other observations.
3. A hand drawn sketch may be included for finer details.

SURVEYOR INFORMATION

SURVEY DATE (Mo./Day/Year): _____ TIME from: ____ to: ____ ☐ AM ☐ PM

SURVEYORS (principal surveyor first, include first & last name, address, and phone number):

IDENTIFICATION

Photograph/slide taken? ☐ Y ☐ N If yes, please submit copy to MNFI.

Identification problems? ☐ Y ☐ N If yes, please describe:

DESCRIPTION OF OBSERVATION

TYPE OF OBSERVATION: ☐ Sight ☐ Song/Vocalization ☐ Road Kill ☐ Trapped ☐ Other (explain):

ABUNDANCE (number of pairs, chicks, nests, adults, juveniles, hatchlings, etc.):

Actual number observed:

Estimated Number (describe method of estimation):

CONDITION OF OCCURRENCE

HABITAT DESCRIPTION: Describe the specific habitat where the bird was observed. Convey a mental image of the habitat and its features including: land forms, aquatic features, vegetation, slope, aspect, soils, associated plant and animal species, natural disturbances. Also describe the condition of the surrounding landscape (e.g., farmland, residential area, pristine forest).

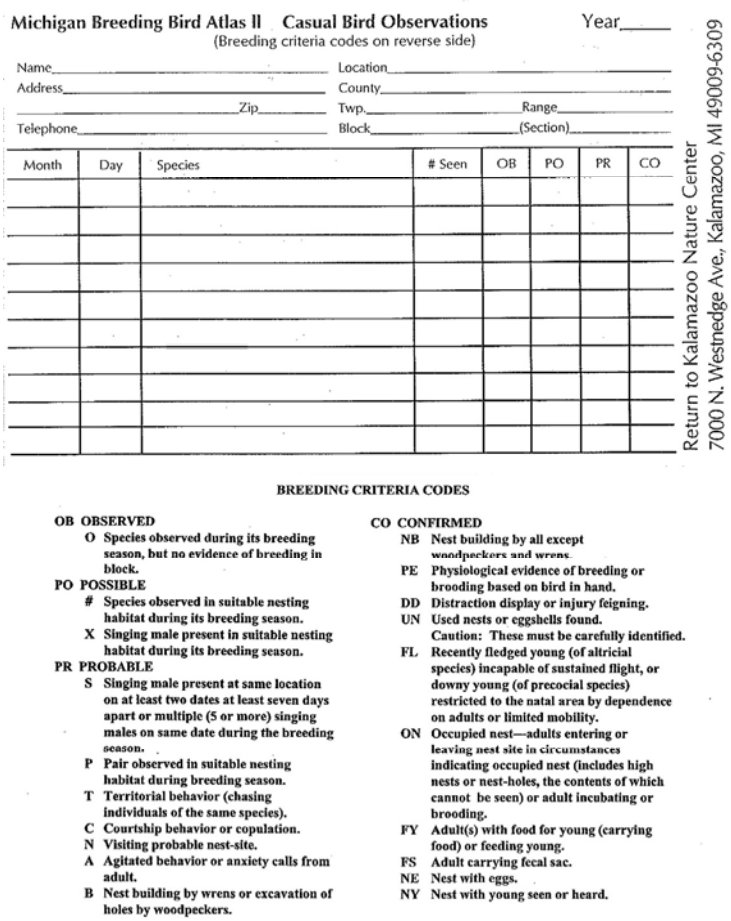
THREATS: Check all current or potential threats that apply.

☐ Grazing ☐ Logging ☐ Mining ☐ ATVs ☐ Dumping ☐ Drainage ☐ Exotic Species (specify below) ☐ Other (explain below)

P:\nfi\field forms\MBBAII_bird_form
Rev. 04/30/2002

Figure 4: Rare bird observation form

Methods



Michigan Breeding Bird Atlas II Casual Bird Observations Year_____

(Breeding criteria codes on reverse side)

Name_____ Location_____

Address_____ County_____

_____ Zip_____ Twp._____ Range_____

Telephone_____ Block_____ (Section)_____

Month	Day	Species	# Seen	OB	PO	PR	CO

Return to Kalamazoo Nature Center
7000 N. Westnedge Ave., Kalamazoo, MI 49009-6309

BREEDING CRITERIA CODES

OB OBSERVED
- **O** Species observed during its breeding season, but no evidence of breeding in block.

PO POSSIBLE
- **#** Species observed in suitable nesting habitat during its breeding season.
- **X** Singing male present in suitable nesting habitat during its breeding season.

PR PROBABLE
- **S** Singing male present at same location on at least two dates at least seven days apart or multiple (5 or more) singing males on same date during the breeding season.
- **P** Pair observed in suitable nesting habitat during breeding season.
- **T** Territorial behavior (chasing individuals of the same species).
- **C** Courtship behavior or copulation.
- **N** Visiting probable nest-site.
- **A** Agitated behavior or anxiety calls from adult.
- **B** Nest building by wrens or excavation of holes by woodpeckers.

CO CONFIRMED
- **NB** Nest building by all except woodpeckers and wrens.
- **PE** Physiological evidence of breeding or brooding based on bird in hand.
- **DD** Distraction display or injury feigning.
- **UN** Used nests or eggshells found. Caution: These must be carefully identified.
- **FL** Recently fledged young (of altricial species) incapable of sustained flight, or downy young (of precocial species) restricted to the natal area by dependence on adults or limited mobility.
- **ON** Occupied nest—adults entering or leaving nest site in circumstances indicating occupied nest (includes high nests or nest-holes, the contents of which cannot be seen) or adult incubating or brooding.
- **FY** Adult(s) with food for young (carrying food) or feeding young.
- **FS** Adult carrying fecal sac.
- **NE** Nest with eggs.
- **NY** Nest with young seen or heard.

Figure 5: Casual bird observation card

MBBA II POINT COUNT DATA FORM

Observer:				Town:		N/S	Range:		E/W	Block: 1/ 2/ 3/ 4			
Point #:		Date:		Time:		Latitude:		N	Longitude:			W	
Habitat type: a)						b)							
Temperature:				Wind:					Sky:				
				__ none					__ <10% cloudy				
				__ 1-3 mph (smoke drifts/leaves rustle)					__ partly cloudy				
				__ 4-7 mps (wind felt on face)					__ mostly cloudy				
				__ 8-12 mph (flags extended/leaves move)					__ overcast				
				__ >12 mph (dust and small branches move)					__ raining				

Species	1-3 MIN				4-5 MIN					Comments/
Code	< 50 m	50-100m	> 100 m	Flyovers	< 50 m	50-100m	> 100 m	Flyovers	TOTAL	Breeding Criteria

Figure 6: Point count data form

Methods

Participants who conducted MBBA II point counts used the point count data forms (Figure 6). Each five-minute count period was broken into three-minute and two-minute intervals. Birds were recorded in four distance categories: within 50 m, 50-100 m, more than 100 m, and "flyover". The latitude and longitude of each point, weather conditions, and the dominant habitat were also recorded. For inclusion in the maps, point count data from each block were compiled onto survey checklist forms.

Other Data Sources

Data from other sources were included when feasible. Many organizations and independent biologists were conducting species-specific avian research, population inventories, or geographically restricted studies of birds and many were willing to share their data. They are acknowledged in the Atlas Participants section. Published information was also used when it was relevant and could be located to the block level. Appropriate breeding codes were assigned by MBBA II staff (e.g., courtship behavior was assigned at leks). These studies seldom followed MBBA II protocols and often took place in unique biological communities. These data greatly improved the distribution maps for certain species.

In particular, the MDNR provided MNFI with funding to support the MNFI mission, which also furthered the goals and objectives of MBBA II. These projects included surveys for secretive marshland and grassland birds, including Yellow and King Rails and Henslow's Sparrow, a three-year owl survey, and surveys of Northern Goshawk and Red-shouldered Hawk. Other surveys provided data for federally listed species (Piping Plover and Kirtland's Warbler), other Michigan listed species (Trumpeter Swan, Common Loon, Peregrine Falcon, Caspian and Common Terns, Prairie and Yellow-throated Warblers) and game species (Northern Bobwhite, Ring-necked Pheasant, Ruffed and Sharp-tailed Grouse, Wild Turkey, and American Woodcock). Data for colonial nesting birds were submitted by the Great Lakes Colonial Waterbird Survey, a project conducted by the University of Minnesota for the U.S. Fish and Wildlife Service and Canadian Wildlife Service. Data on Eastern Bluebirds and other cavity-nesting species were obtained from NestWatch, a project of the Cornell Lab of Ornithology. Most Purple Martin information was obtained from the website <www.michiganmartins.com>. Breeding records noted in the Michigan Bird Survey, published in *Michigan Birds and Natural History*, were cross-referenced with Atlas data and new records were added for less common species.

KNC provided additional data from a variety of related surveys including an avian inventory of the Four Townships area in Barry and Kalamazoo Counties, a long-term survey of the birds of the Fort Custer Military Training Center, Kalamazoo Breeding Bird Surveys, and other projects of the Conservation Stewardship Department.

Data Processing and Analysis

Most Atlas volunteers submitted their data forms directly to KNC, the Atlas headquarters, and printouts of the data were later provided to regional coordinators. A few regional coordinators received the data directly, checked it, and forwarded it to KNC. As indicated, some volunteers entered the data on-line. Data from the North American Breeding Bird Survey were provided by the USGS Patuxent Wildlife Research Center. All data received were then entered into a Filemaker Pro™ database. To allow integration with ESRI-compatible GIS data sets, these data were later transferred to a Microsoft Access™ database.

Each winter, data were summarized by block and species, allowing MBBA II staff to set objectives and assign areas in need of coverage for the coming season.

Editing and Verification

It took about a year to edit all the collected data. The records were verified by double-checking for field and data entry errors. Some species' breeding criteria codes were edited for proper use and consistency. Breeding codes of some colonial nesting species (i.e., Double-crested Cormorant, Ring-billed and Herring Gull, Caspian and Common Tern) were downgraded from possible to observed since many of these birds can be non-breeding wanderers. Various species-specific filters, customized to the published migration periods and breeding seasons, were also applied to the data to separate possible early or late migrants from possible breeding birds. Preliminary maps were sent to species account authors and others experienced with those species; these people looked for observations occurring outside the known range.

Observers were required to submit written documentation to support reports of rare species. This documentation was sent to the Michigan Bird Records Committee (MBRC) for verification. The MBRC was formed in 1987 to maintain a comprehensive list of birds occurring in the state and to review records of species classified as "casual" or "accidental" based on defined criteria (Granlund 1988). MBRC decisions determined whether specific records of casual or accidental species were entered into the Atlas database. Many atlas projects take this same cooperative approach with their state records committees (e.g., New York; McGowan and Corwin 2008).

Mapping

Species occurrence and all other maps were created using ArcMap™ 9.2 from queries generated from the main dataset in Microsoft Access™. Information was compiled at the township level for increased visibility and comparison to MBBA I. Township-level mapping also offset the differences resulting from intensive block coverage in SW Michigan. Using a PLSS data layer provided by MDNR, MBBA II staff built a township/ block layer and extended it to cover all land areas in the state. MBBA II staff also extended shoreline townships to full 36 square mile areas to balance the visual weight of the final product. The creation

of new blocks was necessary in a few areas that were not in the original file; this included small unpopulated islands.

Occurrence maps for each species indicated the highest breeding category recorded for that township: confirmed, probable, or possible. Records in the observed category were not mapped.

Limitations and Biases

Inherently, there are limitations and biases when conducting a statewide survey of birds. These include observer skill and experience, the amount of effort, and the number and distribution of observers. All of these influence the quality of the final data set, especially for analysis at the block level. Summarizing results by township mitigates some of the effects caused by observer-related inconsistencies as well as regional sampling differences.

For MBBA II, 1,733 blocks were designated as priority for coverage. This was a more attainable number than the 4,300 attempted during MBBA I. One limiting factor was the number of volunteers during MBBA II, which was less than in MBBA I. As in MBBA I, there was an observer bias toward surveying popular birding areas and habitats and less effort expended surveying on private land or land that would yield a low species count. Industrial, agricultural, and urban areas were less likely to be surveyed while forests, coastlines, parks, marshes, and edge habitat drew more attention. There was also limited success covering some Great Lakes islands due to their remote nature.

Most Atlas field work took place from late May to mid-July and during the early morning hours. Therefore, the data tend to be biased against species that nest early or late in the season. The data also tend to be biased against crepuscular, nocturnal, and marshland birds; MNFI surveys for these species groups greatly improved coverage for Atlas II.

The inclusion of data from species-specific surveys, such as gamebird counts or raptor nesting studies, also biased the data. These studies were often focused on public lands while much of Michigan's land is in private hands; effort may have been less concentrated on private land, even when permission was granted by landowners. More specific references to limitations and biases can be found in the individual species accounts.

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Introduction

Michigan is one of only a few states or provinces which have completed a second Breeding Bird Atlas and have now published the results. Ontario, New York, Maryland and the District of Columbia also have completed their second publications. Michigan now has two complete Atlases documenting the state's breeding birds over a twenty-year interval. Field work for MBBA I extended from 1983 through 1988, while MBBA II field work extended primarily from 2002 through 2007, with preliminary setup beginning in 2001 and wrap-up concluding in 2008.

In MBBA II, there were 237 species reported with 221 of these confirmed, 10 listed as probable and another 6 as possible. This compares with 233 breeding species in MBBA I of which 215 were confirmed, 12 were probable, and six were classified as possible. Surprisingly, only 205 were confirmed in both Atlases. Of the 12 confirmed in MBBA II not confirmed in MBBA I, 4 were new to the state as breeders, including Black-necked Stilt, Eurasian Collared-Dove, Blue Grosbeak, and Eurasian Tree Sparrow.

The amount of change which took place in the distribution of breeding birds between MBBA I and MBBA II as evidenced by the individual species maps is greater than might be expected. However, it is not clear how much of the change can be attributed to environmental factors such as climate change, yearly weather factors, habitat alteration, or factors on the wintering grounds which impact presence and how much to the level of coverage and other human factors that impact species detection.

The advantage of having the two Atlas projects cannot be overstated. Comparisons between the Atlases not only allow a concise picture of the current status of each of Michigan's breeding bird species, but also provide hints to possible factors impacting each species' distribution. This second Atlas allows the Michigan conservation community to address the implications of the dynamic changes taking place and consider potential strategies for managing species and or communities in greatest need.

Despite a major adjustment in regard to the number of priority blocks requiring coverage between MBBA I and MBBA II, the effort in the projects was remarkably similar. The effect of the differences in effort was minimized by making comparisons between townships instead of blocks. Overall, there was less than a 7% change in any of the

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parameters of effort, with each of these having declined between MBBA I and MBBA II. The following synopsis of the results provides an interesting picture of recent breeding bird patterns in Michigan.

Assessment of Effort

As indicated in the chapter on methods, the primary purposes for repeating the Michigan Breeding Bird Atlas were to document the current status, map the present distribution of the state's breeding birds and provide a comparison to monitor range changes over a finite period of time. To that end, it was best to minimize differences in methods and effort, although it was impossible to eliminate variation entirely. Differences in effort between MBBA I and MBBA II are described here to provide perspective to the results and especially changes in bird distribution observed.

The major differences between MBBA I and MBBA II were the alterations made to priority block coverage for MBBA II. In MBBA I, all blocks in the Southern Lower Peninsula (SLP) were given priority block status; in the Northern Lower Peninsula (NLP) two out of four blocks in each township were priority; and in the Upper Peninsula (UP) only one block per township was priority (McPeek and Adams 1991). In MBBA II only one block in each township across the state was given priority status. This change was made so that all subsequent Atlas projects could be based on the same coverage regime.

Effort can be assessed on several parameters (hours of field observation, number of records, number of participants, and mean number of species recorded). Most frequently, effort level is based on hours spent in the field conducting surveys. Hours of observations were not readily available for MBBA I, so comparisons with MBBA II are based on estimates. Field hours in MBBA I were estimated by taking the number of records per hour in each county during MBBA II, which ranged from five to 41, and using this to convert the number of MBBA I records per county to hours of effort (MBBA I records/MBBA II records per hour). This was considered to be a reasonable estimation between Atlases due to the relatively high correlation 0.74,(square root of R^2 value, 0.544) of number of records to hours of effort among the 83 Michigan counties (Figure 1: Graph of records obtained vs. hours of effort in MBBA II).

In Figure 1, Kalamazoo and Wayne Counties are both outliers. Observers in both counties tallied roughly equal amounts of time, much greater than that for other counties. The additional effort resulted in few additional records in Wayne County (which contains metropolitan Detroit) and more than 40,000 additional records in Kalamazoo County, a much less urban area. A major factor in the disparity of records between these two counties was that Kalamazoo County data were recorded by section as part of a third Kalamazoo County Breeding Bird Atlas (1973-1975, 1983-1988, and 2002-2008).

In MBBA II, the reported hours of field effort totaled 36,286, which is 6.7% less than the estimated 38,907.2 hours of field effort from MBBA I. That reduction related directly to the cut-back in priority block coverage in the LP and SLP. Improved coverage of priority blocks in the UP in MBBA II produced about 9.6 % more hours of effort in the UP. The overall impact of the changes was an increase in the extent and quality of coverage in the UP with a concomitant reduction in the extent of coverage in the SLP and NLP (Table 1a: Comparison of effort (number of hours), MBBA I and MBBA II).

Whether Michigan's breeding bird Atlases are compared by hours of effort, number of records submitted, number of species documented per block, or number of participants, the results are similar. Each of these measurements varies only in size of change, not in direction of change. The number of breeding records **(**Table 1b: Comparison of number of breeding records, MBBA I and MBBA II) increased 16.4% in the UP, declined 8.6% in the NLP, and declined 7% in the SLP.

In the UP, where hours and records increased, 4% more species were documented per township (Table 1c: Comparison of average number of species documented, MBBA I and MBBA II). In the NLP, where the number of priority blocks was reduced by half, hours of effort declined and the number of species per township decreased by 6.1 %. Finally, in the SLP, where the number of priority blocks was reduced by 75%, hours of effort declined by only 10%, resulting in 7% fewer records and 4 % fewer species per township. Because hours of field work are frequent measures of effort used for comparisons in other atlases, number of hours is used consistently as effort throughout this publication.

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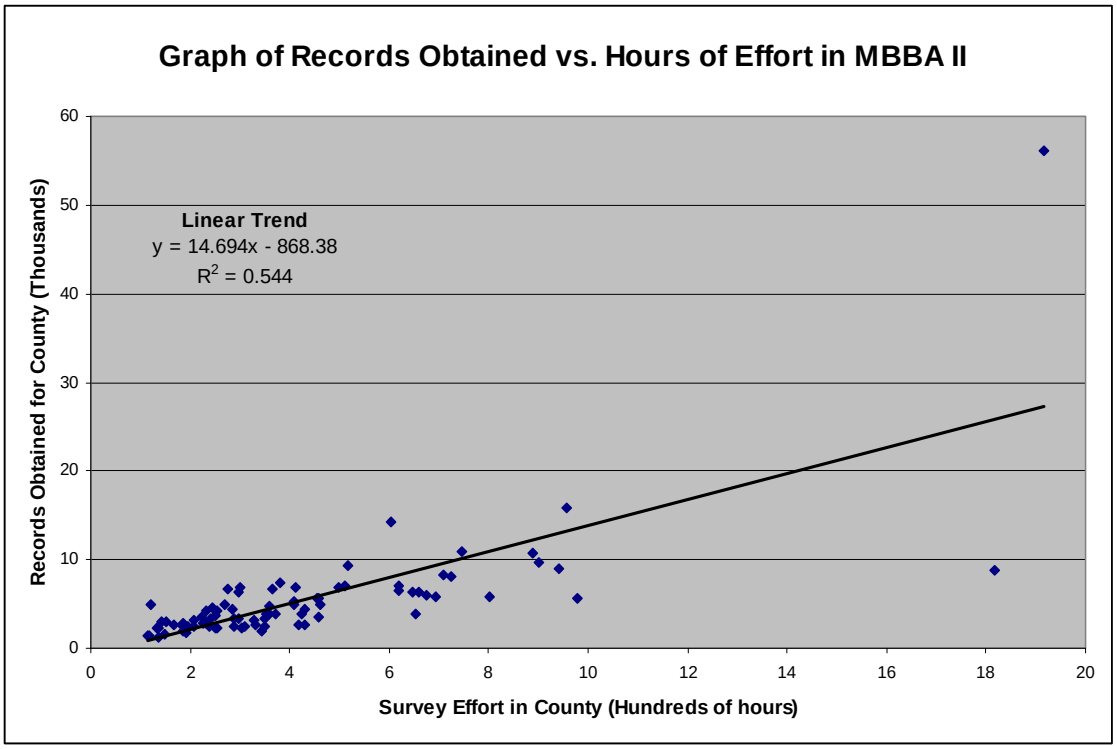


Figure 1: Graph of records obtained vs. hours of effort in MBBA II

The distribution of survey effort during MBBA II is mapped in Figure 2. Most townships that reported no effort are partial townships, on outlying islands or along coastal areas. The two interior townships without effort were in Alpena and Delta Counties; these townships had only casual sightings data and no formal survey. Most townships fall within the "less than 15 hours" range because an Atlas priority block could be adequately covered in about 10 hours by an experienced observer. The highest concentration of effort was in Kalamazoo, Wayne, Washtenaw, Monroe, Isabella, and Grand Traverse counties. Kalamazoo County data were collected by section, which greatly increased the amount of effort per township. The other five counties were well surveyed by dedicated volunteers. Figure 2 is a conservative estimate for total effort as it includes only the hours from the standard survey forms.

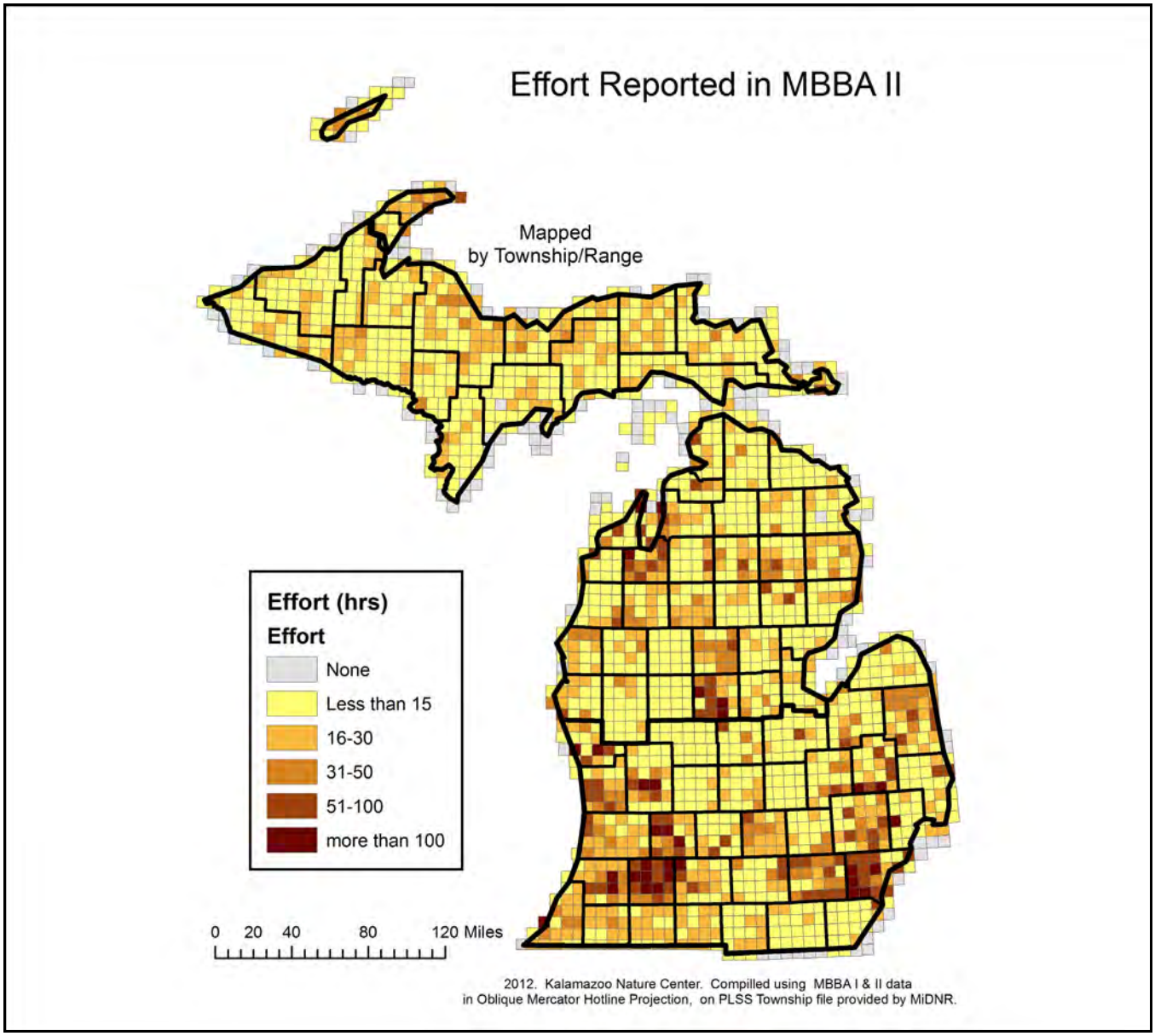


Figure 2: Effort (hours reported on standard survey forms) in MBBA II

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Table 1: Comparisons between Atlases by three metrics of effort
Table 1a: Comparison of effort (number of hours), MBBA I and MBBA II

Region	MBBA I Hours *(Estimation)*	MBBA II Hours *(Reported)*	Change in Hours	% Hours Change
UP Total	6,811.8	7,463.6	651.8	9.6%
NLP Total	11,699.8	10,194.6	-1,505.2	-12.9%
SLP Total	20,395.6	18,628.8	-1,766.8	-8.7%
Michigan Total	38,907.2	36,286.0	-2,621.2	-6.7%

Table 1b: Comparison of number of breeding records, MBBA I and MBBA II

Region	MBBA I Records	MBBA II Records	Change in Records	% Records Change
UP Total	86,373	100,541	14,168	16.4%
NLP Total	122,789	112,237	-10,552	-8.6%
SLP Total	283,031	263,099	-19,932	-7.0%
Michigan Total	492,193	475,877	-16,316	-3.3%

Table 1c: Comparison of average number of species documented, MBBA I and MBBA II

Region	MBBA I Species per Twp	MBBA II Species per Twp	Change in Species	% Species Change
UP Total	67.8	70.6	2.8	4.1%
NLP Total	78.6	73.8	-4.8	-6.1%
SLP Total	83.6	80.3	-3.3	-4.0%
Michigan Total	77.0	75.2	-1.8	-2.3%

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Table 2: Metrics of coverage by year during MBBA II

Metric	2001	2002	2003	2004	2005	2006	2007	2008	Total
Casual card records	1,061	7,247	7,441	3,694	7,621	7,407	7,849	5,310	47,630
Casual cards	291	1,850	1,937	1,450	2,146	2,089	2,293	1,717	13,773
Point count form records	12,016	9,979	19,132	25,711	22,924	19,263	18,433	17,651	145,109
Point count forms	537	424	1,558	1,369	1,283	1,075	862	787	7,895
Survey checklist form records	5,982	24,255	26,437	31,233	43,358	57,089	79,784	42,500	310,638
Survey checklist forms	621	1,309	1,644	1,600	2,087	2,410	2,262	1,236	13,169
Total records	19,059	41,481	53,010	60,638	73,903	83,759	106,066	65,461	503,377
Total cards/ forms	1,449	3,583	5,139	4,419	5,516	5,574	5,417	3,740	34,837
Hours estimated – casual	35	242	248	123	254	249	262	177	1,590
Hours reported – point count	78	86	180	181	192	230	229	227	1,403
Hours reported – survey checklist	479	2,794	2,403	3,476	5,666	7,052	8,886	3,401	34,157
Total effort (hours)	592	3,122	2,831	3,780	6,112	7,531	9,377	3,805	37,150

Data taken to refine the methodology during the pilot year (2001) are included in the analyses and maps.

It is of interest to examine the historical progression of a project from initiation to completion. In Table 2, the number of records and the hours of effort have been broken down by year and source. A delay in fund-raising during the early years of the project affected the timing of some activities including the onset of the MBBA II point count program. As a result of this and other factors, the hours of effort during 2002 and 2003 were below expectations, and fewer records were submitted those years**.** Continuous and dramatic improvement in effort and number of records reported can be seen from 2004 through 2007, peaking in 2007. As indicated, 2008 was an opportunity to target areas with inadequate coverage. Michigan birders clearly rose to the challenge during the final years of coverage.

Participation

About 800 people registered and participated in MBBA II or simply submitted records. This does not reflect the total number of people that provided records since data were also received from organized surveys and events (e.g., Audubon club outings, bird-a-thons). Table 3 provides the number of participants reporting each year of the project, which increased through 2007. Paid field workers were hired each year of the project to increase the number of blocks and thus townships which could be surveyed. Volunteer participation was lower than in MBBA I, which boasted 1300 people (McPeek and Adams 1991).

There are several possible reasons for the decline in volunteers. One known factor was the change in the way some casual observations were recorded. In MBBA I anyone reporting observations was given a registration number and added to the mailing list. In MBBA II, individuals reporting only one or two observations or providing verbal observations were not identified personally. In addition, there seemed to be fewer volunteers from southeastern Michigan outside of Wayne and Washtenaw Counties. Generally, there also seemed to be fewer birders with extra free time to donate to the Atlas. Higher gasoline prices undoubtedly prevented some volunteers from traveling as extensively. Nonetheless, MBBA II participants collected 503,377 records of breeding birds, very similar to 506,000 records collected during MBBA I.

Table 3: Participation by year

	2001	2002	2003	2004	2005	2006	2007	2008
Observers	67	148	169	168	270	306	327	155
Paid Staff	0	7	9	5	4	12	18	8
Survey Cards	1,449	3,583	5,139	4,419	5,516	5,574	5,417	3,740
Records	19,059	41,481	53,010	60,638	73,901	83,759	106,066	65,461

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Block Coverage

MBBA II participants reported breeding birds from 5,787 (80%) of the total 7,192 blocks located within the state. By region, data were submitted for 2242 SLP blocks (82%), 1,838 NLP blocks (82%), and 1,707 UP blocks (77%). The number of blocks with 50 or more species is comparable to that in MBBA I (Table 4).

Block coverage was highest in southwest Michigan and in Washtenaw, Wayne, and Isabella counties. Outside of these areas, coverage was fairly uniform across the state, as shown by the distribution of blocks with 50 or more species documented (Figure 2). The nine counties in southwest Michigan – Allegan, Barry, Berrien, Branch, Calhoun, Cass, Kalamazoo, St. Joseph, and Van Buren – were surveyed as part of KNC's unofficial Kalamazoo area breeding bird atlas. All blocks were surveyed in these counties, allowing analysis on a finer spatial scale as time permits.

Throughout the state, 99% of priority blocks had some degree of coverage. In the SLP, data were submitted for all 667 priority blocks. The NLP did not have any data for eight of the 552 priority blocks; six of these blocks were located on islands in Lake Michigan. Only 14 of the 514 priority blocks in the UP did not have data.

Table 4: Blocks with 50 or more species, MBBA II and MBBA I

	MBBA II	MBBA I
UP	679 (28%)	557 (26%)
NLP	726 (32%)	855 (39%)
SLP	1,380 (51%)	1,488 (55%)
Michigan	2,785 (39%)	2,900 (41%)

Figure 3 maps the breeding species per block for MBBA II. The map clearly indicates the extent to which level of effort drives species totals. In southwestern Michigan as well as Wayne and Washtenaw counties, most blocks received upwards of 10 hours of effort. As a result, the majority of these blocks list 50-74 species and many exceed 75 species. Blocks in Isabella County and Grand Traverse County were also well covered and show a similar pattern. Elsewhere, species totals per block are markedly reduced in metropolitan areas, parts of the Thumb, the greater Saginaw Bay area and much of the NLP where forest dominates the landscape.

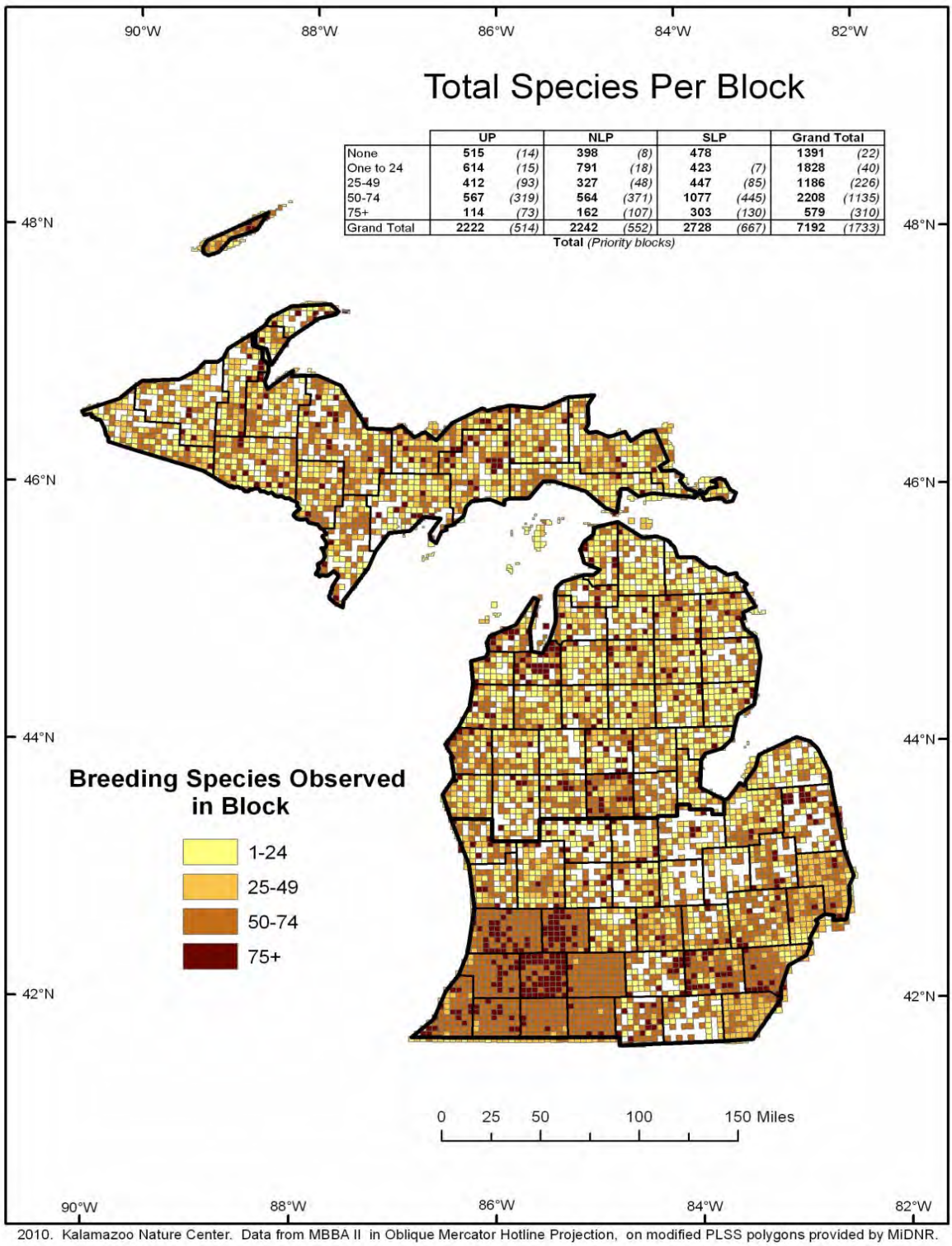
Township Coverage

Maps were produced at township-level resolution for this publication in order to compensate for the uneven block coverage in many areas. However, the township format also results in uneven comparisons because surveys from additional blocks improve overall coverage. In areas, like southwestern Michigan where all the blocks were surveyed, the coverage is better than in many other areas of the state.

Breeding birds were reported in 1,855 (96%) of the 1,925 townships in Michigan. The 69 townships without a report were either very small or partial townships, located along the lakeshore or state boundary. Figure 4 shows the total number of species reported as possible, probable or confirmed breeders for each township. These results are related to observer quality, survey effort and habitat diversity among other factors. Lower avian diversity (1-50 species/ township) is associated with urban areas, islands, homogenous forest, and agricultural areas. Examples of these are: the Detroit metropolitan area, extensive areas around Saginaw Bay and the shoreline extending to Port Huron (Thumb area), and smaller islands in the Great Lakes.

The mean number of species reported per township in MBBA II was 73. This is down from a mean of 77 species in MBBA I. This partly reflects the effect of the three-tiered system of priority blocks in MBBA I, compared to the single priority block assigned per township throughout the state in MBBA II. The species count also reflects changes in the total number of townships covered: 77 species per township in MBBA I are the equivalent of 75.7 species per township in MBBA II. Thus, there were only minor changes in the mean number of species per township between Atlas projects.

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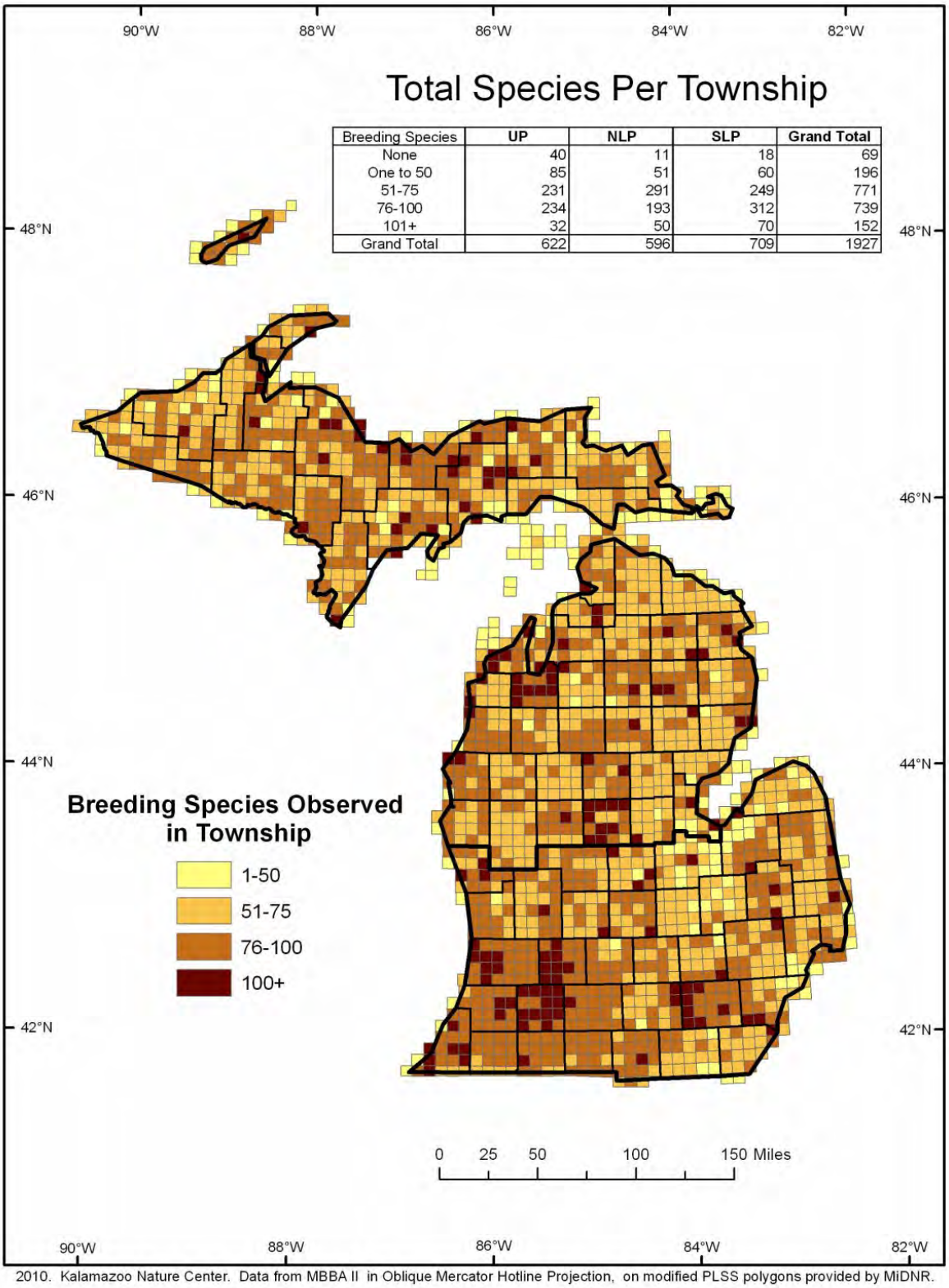
	UP		NLP		SLP		Grand Total	
None	515	(14)	398	(8)	478		1391	(22)
One to 24	614	(15)	791	(18)	423	(7)	1828	(40)
25-49	412	(93)	327	(48)	447	(85)	1186	(226)
50-74	567	(319)	564	(371)	1077	(445)	2208	(1135)
75+	114	(73)	162	(107)	303	(130)	579	(310)
Grand Total	2222	(514)	2242	(552)	2728	(667)	7192	(1733)

Total *(Priority blocks)*

Figure 3: Total breeding species per block in MBBA II

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Breeding Species	UP	NLP	SLP	Grand Total
None	40	11	18	69
One to 50	85	51	60	196
51-75	231	291	249	771
76-100	234	193	312	739
101+	32	50	70	152
Grand Total	622	596	709	1927

Figure 4: Number of breeding species detected per township in MBBA II

Results and Highlights

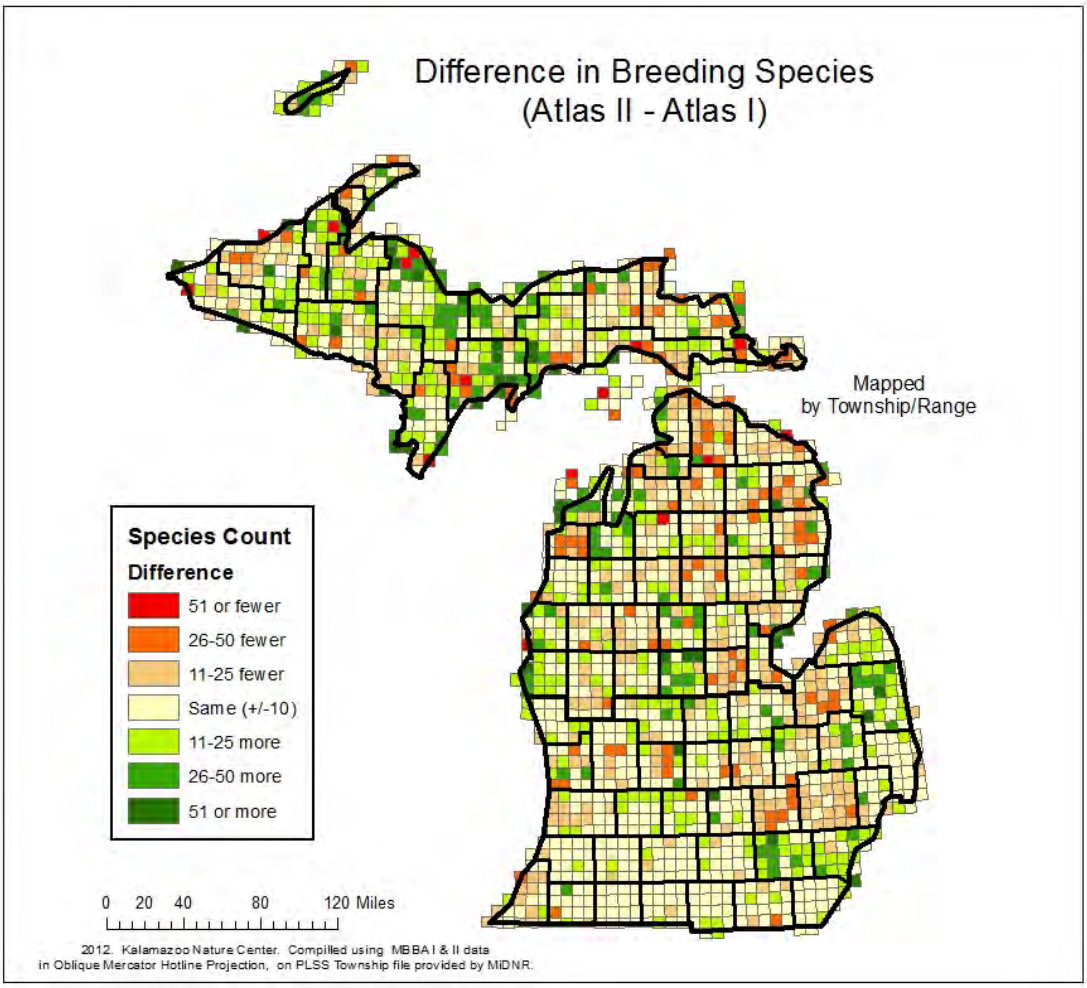


Figure 5: Change in number of breeding species per township, MBBA I vs. MBBA II

Figure 5 is notable because it demonstrates the change in number of breeding species per township between MBBA I and MBBA II. Despite the reduction in priority blocks in the SLP, the townships in this region continued to be well covered. Only a few townships showed major increases or decreases in species totals in the western SLP. The areas in the SLP with consistent declines were in the northeast in five counties including Oakland, Livingston, Genesee, Tuscola, and Saginaw. These declines may relate to issues with coverage and the volunteers rather than major reductions in species diversity.

Major changes can be seen in Figure 5 in the NLP and UP. In the northeastern NLP, species totals for several townships declined by 11-25 or 26-50 species. By contrast, few townships in this area registered more species. Decreases across the UP are not concentrated, but scattered throughout the region. The most conspicuous improvements in the UP occur in the central part of the peninsula where species counts were frequently 11-25 and even 26-50 above counts for the same townships in MBBA I. These increases are noticeable in southern Ontonagon, southern Houghton, Baraga, and Iron counties and again in Marquette, Alger, Delta and western Schoolcraft counties where the increases are especially large. Both of these areas benefited from quality coverage by paid field workers in MBBA II.

It would be useful to determine the exact factors driving the changes in township species totals between Atlas projects. As mentioned earlier, Figure 2 maps the number of hours of effort by township for MBBA II. Since, MBBA I effort is not available by township, there is no way to compare the difference in effort. As an alternative, species totals by township were compared for 15 counties to determine if the changes were a result of poor coverage in one Atlas or the other. Apparently only about 10% of the differences were a result of poor coverage in one of the Atlas periods. The rest of the differences seem to be related to the number of blocks surveyed in the township reflecting effort, the habitats visited (demonstrated by species lists), and undoubtedly observer skill level.

Results and Highlights

Table 5: Species with improvements in breeding status, MBBA I to MBBA II

Species	MBBA I	MBBA II
Trumpeter Swan	Observed	Confirmed
Greater Scaup	Observed	Possible
Red-necked Grebe	Observed	Confirmed
Peregrine Falcon	Possible	Confirmed
Eared Grebe	Probable	Confirmed
American White Pelican	Observed	Confirmed
Little Blue Heron	Observed	Probable
Yellow Rail	Probable	Confirmed
Black-necked Stilt	Not present	Confirmed
Wilson's Phalarope	Probable	Confirmed
Eurasian Collared-Dove	Not present	Confirmed
Great Gray Owl	Probable	Confirmed
Chuck-will's-widow	Possible	Probable
Bicknell's Thrush	Not present	Observed (hypothetical*)
Lark Sparrow	Observed	Possible
Summer Tanager	Probable	Confirmed
Blue Grosbeak	Not present	Confirmed
Pine Grosbeak	Possible	Probable
Eurasian Tree Sparrow	Not present	Confirmed

**Observation was not submitted for official approval by the Michigan Bird Records Committee*

The Species List

The MBBA II list of breeding species totals 237 compared to 233 from MBBA I. Of these, 221 species were confirmed as breeding while nine were ranked as probable and seven as possible. A total of 208 species were confirmed in both Atlases with 13 additional species confirmed as breeding during MBBA II and the status of another 5 raised to possible or probable (Table 5). For descriptions of breeding status, please see Methods.

Four of the 13 newly confirmed species were not present during MBBA I: Black-necked Stilt, Eurasian Collared-Dove, Blue Grosbeak, and Eurasian Tree Sparrow. Prior to MBBA II, vagrant Black-necked Stilts had been recorded twice in Michigan, two from 6-13 June, 1980 in Saginaw County and again on 13 June 1988 in Iosco County (MBRC 2010). In 2003, two pairs successfully bred at Pte. Mouillee in Monroe County remaining from 11 May to 30 August (MBRC 2010). Additional birds were found in 2004, 2006, 2007 and 2008. These remarkable occurrences are less surprising in the context of similar breeding records in the past decade (Robinson et al. 1999) and from Wisconsin (Cutright et al. 2006), Illinois (McKee and Fink 1995) and Indiana (Brock 2006). The Eurasian Collared-Dove was first documented in Michigan in June 2002 (MBRC 2010). This species has been expanding its range west and north across the country and it was only a matter of time before it arrived in Michigan. The Blue Grosbeak is a rare spring migrant, with a total of 14 accepted records from 1991 to 2010 (MBRC 2010). Breeding was confirmed in 2004 by a pair carrying food to an unseen nest in St. Joseph County; adults present during the summer of 2007 in Monroe and Washtenaw counties provided evidence of possible breeding. Blue Grosbeak pairs have since been reported in 2011 and 2012. Michigan's first record of Eurasian Tree Sparrow occurred in late 2005 in Cass County (MBRC 2010). Breeding was confirmed when three Eurasian Tree Sparrow × House Sparrow hybrids were documented at the same location in fall 2006 (Putnam in prep.).

Three of the 13 newly confirmed breeding species previously had only observed status in MBBA I: Trumpeter Swan, Red-necked Grebe, and American White Pelican. Trumpeter Swan reintroduction efforts began in 1986, but did not yield success until 2002 (Johnson 2011). During MBBA II, nesting was confirmed in 85 townships which represents 8% of the total townships. Prior to MBBA II, the single historical breeding record for Red-necked Grebe came from Mackinac County in 1975 (Payne 1983). Confirmation of American White Pelicans breeding in Delta County during MBBA II follows many years of summer records scattered throughout the state, including five out of six years during MBBA I. Only Peregrine Falcon increased from possible to confirmed, thanks to its rapid colonization of Michigan's cities over the past 20 years.

Results and Highlights

Five species were listed as probable during MBBA I and were confirmed during MBBA II: Summer Tanager, Yellow Rail, Eared Grebe, Wilson's Phalarope, and Great Gray Owl. Summer Tanager was present in 7 counties in MBBA I with a single probable observation in Hillsdale County near the Ohio state line. The first confirmed nesting was recorded in Berrien County in MBBA II, although a pair of Summer Tanagers had been observed in June of 2000 at the same location as the probable record from MBBA I. While Yellow Rail have historically bred in the state (Walkinshaw 1939, Bookhout and Stenzel 1987), they were not confirmed in MBBA I. Among the observations in MBBA II was a confirmation in 2006 at Seney NWR.

Eared Grebe occurrence in Michigan begins with an observation in 1955 in Berrien County. By MBBA I the species was reported during summer in four of the six years. The species was found at three locales in MBBA II with nest building found in Bay County at the Crow Island SGA in 2008. The number of observations of Great Gray Owl increased somewhat between MBBA I and MBBA II. Most notably, Baetsen et al. (2005) documented the first confirmed Michigan breeding record for this owl in 2004 in Seney NWR. A second confirmed nesting was found in an adjacent block during MBBA II. Although, Wilson's Phalarope may not have nested in the state since 1934 (Wood 1951), there were at least three confirmed nesting records in MBBA II.

One of the most intriguing reports was of a Bicknell's Thrush which was heard singing on 25 June 2008 in Montmorency County with Hermit Thrush, Swainson's Thrush, Veery, and Wood Thrush all singing nearby. The song was compared to a tape of the Bicknell's song and was deemed to be that species. Unfortunately, it was not possible to make a recording and it was not relocated the following day. Because it does not fit the criteria for a first state record, it was not submitted to the Michigan Bird Records Committee and is only listed here as hypothetical. Since it is possible that Bicknell's Thrush occurred in the state in 2008, observers should be on the lookout for this species.

The breeding status for 5 other species improved but did not reach confirmation. Greater Scaup and Lark Sparrow improved from observed to possible. Variable numbers of Greater Scaup, including males and females, were reported during the summer months from 1993 through 2008, mostly at Pte. Mouillee State Game Area in Monroe County (Chartier 2011*a*). Lark Sparrow was last confirmed as a breeding species in Michigan in 1952 although Zimmerman and Van Tyne (1959) considered it a rare and local summer resident, after which it became a scarce to casual migrant (Payne 1983). Increasing numbers of sightings in recent years (MBRC 2010) culminated in one individual found singing in appropriate breeding habitat in Monroe County during late May 2008, the criteria for a possible breeding record. Little Blue Heron improved from observed to probable. A single Little Blue Heron was documented holding territory in a heronry in Bay County in 2008. Chuck-will's-widow and Pine Grosbeak improved from possible to probable. A calling Chuck-will's-widow was documented at a Berrien County location each summer from 2005 to 2008. Pine Grosbeak were heard singing on Isle Royale in 2005 and a pair was seen in 2007; another pair was documented in June 2008 in Gogebic County, evidence of probable breeding.

Declines in breeding status were noted for 12 species (Table 6), of which nine were confirmed in MBBA 1. Five of these declines, while interesting are not directly a conservation concern for Michigan, being either of exotic species or species on the edge of their range. Monk Parakeet not only lost confirmation status, it was dropped from the list of Atlas species altogether. While this South American species maintains a population in Chicago (Kleen et al. 2004), the birds sighted during MBBA I failed to establish (Adams 1991) and none were reported during MBBA II. Cattle Egret and Western Kingbird declined from confirmed to observed. Cattle Egret is an Old World species now well established in the United States (Telfair II 2006); while nesting was confirmed in Bay County during MBBA I (Chu 1991), no evidence for breeding was found during MBBA II despite several records of multiple individuals. In 2011 at least 3 nests were documented at Pte. Mouille, Monroe County (Dombroski 2012). Western Kingbird is native to western North America from Canada to northern Mexico (Gamble and Bergin 1996); one individual was found attending a nest with an Eastern Kingbird in Isabella County during MBBA I but the species had no breeding records in MBBA II. Lesser Yellowlegs, a species well outside its regular breeding range in Michigan (Granlund 1994) declined from possible to observed.

Table 6: Species with declines in breeding status, MBBA I to MBBA II

Species	MBBA I	MBBA II
Northern Pintail	Confirmed	Probable
Lesser Scaup	Probable	Possible
Bufflehead	Probable	Possible
Cattle Egret	Confirmed	Observed
Black Rail	Probable	Possible
Lesser Yellowlegs	Possible	Observed
Monk Parakeet	Confirmed	Not present
Barn Owl	Confirmed	Possible
Western Kingbird	Confirmed	Observed
Worm-eating Warbler	Confirmed	Probable
Yellow-throated Warbler	Confirmed	Probable
Wilson's Warbler	Confirmed	Probable

Lesser Scaup, Bufflehead, and Black Rail all declined from probable to possible. Lesser Scaup has been confirmed as a breeding species only once in Michigan, in Dickinson

County in 1941 (Payne 1983). Summering individuals, including males and females, were found throughout the state during both Atlases. Five possible records of Bufflehead were collected during MBBA II while only two probable records were submitted in MBBA I. Black Rail had a single probable record submitted during MBBA I and two observations during MBBA II including a probable migrant in 2007 and a possible record in Chippewa County 3-4 June 2004, with no observations in the intervening years MBRC 2010). Barn Owl dropped from confirmed to possible. Since MBBA I, when the last confirmed breeding attempt was documented, Barn Owl has become casual in occurrence (MBRC 2010). The single possible breeding record submitted during MBBA II was an individual present for two days in Washtenaw County in July 2002. A handful of other observations have been reported since then including most recently in spring of 2012. Four species dropped from confirmed to probable: although all of these may have bred during MBBA II. Of these Northern Pintail occupied fewer blocks during MBBA II and no broods were located. During MBBA I, Worm-eating Warbler was confirmed in Ottawa County and documented as probable in Kalamazoo County. Between Atlases, breeding was confirmed in Allegan County in 1994 and 1996 (Weeks 1997). This inconspicuous nester was not confirmed during MBBA II but was more widespread, documented in 13 blocks in six counties (five probable, eight possible). Yellow-throated Warbler was confirmed in two townships in MBBA I (Berrien and Branch counties) but none in MBBA II. However, the number of townships with probable breeding increased from one to four and those with possible breeding increased from four to eight. Less emphasis was placed on breeding confirmations in MBBA II (KNC 2004), which may explain the lack of confirmation for this and other species. This species nests in the canopy which also makes it difficult to confirm. Wilson's Warbler was located in three times the number of townships in MBBA II, but unlike in MBBA I (Evers 1991*a*, McPeek 1994*a*) was not confirmed. Its preference for wilderness shrub-swamps in the UP makes it difficult to confirm nesting for this species (Haas 2011).

Table 7 lists 16 species which were not confirmed during MBBA II for which possible and probable breeding observations were reported. Of these, eight also appear in Table 6 because of a reduction in status in MBBA II. Bell's Vireo, American Three-toed Woodpecker, and Kentucky Warbler are discussed here because of concern for their Midwestern conservation status. American Three-toed Woodpecker continues to be a possible breeder in Michigan. The few Atlas records clearly indicate the possibility that a breeding pair could be located, especially after the occasional fall or winter incursions (Youngman 2011). Bell's Vireo was noted as a probable breeder in the southwestern LP in MBBA I and a single probable breeding record was submitted for Wayne County during MBBA II. This species has never been confirmed nesting in the state, but it certainly could occur since it is a casual spring migrant and less frequent summer visitor (Chartier 2011*b*). Kentucky Warbler has maintained its status as an infrequent breeder and rare but regular spring visitor which tends to overfly its normal breeding range in Ohio and Indiana (McPeek 1994*b*). The species has been most frequent in the Lost Nation State Game Area in Hillsdale County (Reinoehl 2011).

Table 7: Possible and probable breeding species in MBBA II

Probable	Possible
Northern Pintail	Greater Scaup
Little Blue Heron	Lesser Scaup
Chuck-will's-widow	Bufflehead
Bell's Vireo	Black Rail
Worm-eating Warbler	Barn Owl
Kentucky Warbler	American Three-toed Woodpecker
Yellow-throated Warbler	Lark Sparrow
Wilson's Warbler	
Pine Grosbeak	

Table 8 lists a few other observed species without breeding status. There was no breeding evidence for these species during MBBA I or MBBA II, but these species are worth mentioning here. Great Black-backed Gull was confirmed as breeding in Michigan for the first time between Atlas periods (Evers 1991*b*, Ewins et al. 1992, McKearnan et al. 1999) but no breeding activity was documented during MBBA II. After an expansion in the 1990s, the Great Lakes Waterbird Survey from 2007-2009 found no nesting Great Black-backed Gulls in the American waters of the Great Lakes (Seefelt 2011).

Efforts to restore Whooping Cranes in Wisconsin and train them to migrate to Florida resulted in several off-course individuals in Michigan which remained during summer and often into the fall, beginning with spring of 2004 (Chartier 2011*c*). If the Wisconsin population becomes self-sustaining, it is likely that Whooping Crane would eventually become established in Michigan. Among other species observed in Michigan during MBBA II were Snowy Egret and Tricolored Heron. Snowy Egret is most interesting because of the number of birds which reach Michigan in some years and its tendency to nest on West Sister Island, Ohio (Cuthbert and Wires 2008). Up to 14 individuals were present at Pte. Mouillee State Game Area in the summer of 2003, and another 14 in Bay County in the fall of 2006. However, no breeding activity was documented for the individuals seen. The proximity of the nesting Ohio Snowy Egrets still makes this a candidate for breeding in Michigan. The Tricolored Heron by contrast occurred only seven times during MBBA II and does not nest in any of the adjacent states (Frederick 1997)

Results and Highlights

Not present during this Atlas period were Bewick's and Rock wrens. Bewick's Wren has two historic breeding records, in 1894 and in 1922 (Wood 1951) and is now considered casual to accidental in occurrence (Nelson 1994). Bewick's Wren was included in MBBA I based on a bird clearly seen and consistently heard singing on three consecutive days at the Fort Custer Recreation Area campground in Kalamazoo County 4-6 June 1983. Based on anecdotal reports it had been present "prior to the reported dates." Rock Wren is clearly a vagrant in Michigan and was mentioned in MBBA I because a singing male lingered from 9 July to 4 August 1988 in Houghton County. Extralimital records such as these are problematic since it is unlikely, but not impossible, that the singing male would find a mate and the Atlas definition states clearly that code X applies to a "singing male present in suitable nesting habitat during its breeding season." There were five Michigan records outside the breeding season during MBBA II

Table 8: Species without breeding status during MBBA I and MBBA II

Species	MBBA I	MBBA II
Snowy Egret	Observed	Observed
Tricolored Heron	Observed	Observed
Whooping Crane	Not present	Observed
Great Black-backed Gull	Not present	Observed
Rock Wren	Observed	Not present
Bewick's Wren	Observed	Not present

Common species statewide

There was little change in the most common species, as ranked by the number of townships in which they were recorded for the state (Table 9: Top 20 species by number of townships statewide in MBBA I and MBBA II). In this table, the number of townships for MBBA I are revised slightly from the first Atlas, because new GIS technology allowed a more accurate count of townships with data. Of the top 20 species reported in MBBA II, 19 of them are the same as in MBBA I, although the order changed. American Robin again ranked first, reported in 93% of townships during both Atlases. Mourning Dove replaced Tree Swallow, which dropped from 12th most common to 21st. Three introduced species often considered common did not make the top 20 species: European Starling ranked 28th, Rock Pigeon 76th, and House Sparrow 50th. These rankings are similar to those in MBBA I.

Table 9: Top 20 species by number of townships statewide in MBBA I and MBBA II

Species	MBBA II		MBBA I		
	Number of Twps	% of Twps	Number of Twps	% of Twps	Rank
1. American Robin	1,790	92.9%	1,762	92.9%	1
2. Song Sparrow	1,771	91.9%	1,747	92.1%	2
3. Black-capped Chickadee	1,765	91.6%	1,719	90.7%	6
4. Chipping Sparrow	1,762	91.4%	1,726	91.0%	3
5. Red-eyed Vireo	1,755	91.1%	1,671	88.1%	10
6. American Goldfinch	1,753	91.0%	1,672	88.2%	9
7. Blue Jay	1,747	90.7%	1,705	89.9%	7
8. American Crow	1,731	89.8%	1,698	89.6%	8
9. Northern Flicker	1,721	89.3%	1,720	90.7%	5
10. Cedar Waxwing	1,720	89.3%	1,722	90.8%	4
11. Common Yellowthroat	1,715	89.0%	1,645	86.8%	14
12. Indigo Bunting	1,697	88.1%	1,597	84.2%	16
13. Mourning Dove	1,663	86.3%	1,446	76.3%	25
14. Red-winged Blackbird	1,637	85.0%	1,669	88.0%	11
15. Eastern Wood-Pewee	1,620	84.1%	1,589	85.0%	18
16. Common Grackle	1,601	83.1%	1,644	86.7%	15
17. Rose-breasted Grosbeak	1,588	82.4%	1,569	82.8%	20
18. Downy Woodpecker	1,552	80.5%	1,574	83.0%	19
19. Great Crested Flycatcher	1,552	80.5%	1,597	84.2%	16
20. Eastern Kingbird	1,546	80.2%	1,658	87.4%	13

Slight differences in some original MBBA I values are due to improved mapping accuracy.

Results and Highlights

For the SLP, the 20 most widespread species remained largely the same, although the order was shuffled moderately (Table 10). The difference between the most common species and the 20th now is only 21 townships: this is the tightest grouping for any region. Both Indigo Bunting and Black-capped Chickadee were reported in 12 additional townships. This small gain was enough for them to replace Eastern Kingbird (reported in 10 fewer townships) and Downy Woodpecker (which lost eight townships). Species such as Killdeer and Northern Flicker are interesting, because at first glance they don't seem as widespread as for example, Northern Cardinal, American Goldfinch, American Robin, European Starling, and Red-winged Blackbird.

Table 10: Top 20 species by number of townships in the SLP during MBBA II

Species	Number of Townships in MBBA II	Number of Townships in MBBA I	Rank in MBBA I
1. Northern Cardinal	685	678	9
2. American Goldfinch	685	681	5
3. Mourning Dove	684	685	1
4. American Robin	684	685	2
5. Chipping Sparrow	682	674	14
6. Song Sparrow	682	680	6
7. European Starling	681	677	10
8. Red-winged Blackbird	681	679	8
9. Barn Swallow	679	680	7
10. House Wren	678	664	19
11. Brown-headed Cowbird	677	676	11
12. Common Grackle	676	684	4
13. Blue Jay	673	673	15
14. House Sparrow	672	685	3
15. Gray Catbird	670	671	17
16. Killdeer	669	675	12
17. American Crow	669	675	13
18. Indigo Bunting	667	655	24
19. Black-capped Chickadee	666	654	25
20. Northern Flicker	664	671	16

Slight differences in some original MBBA I values are due to improved mapping accuracy.

Results and Highlights

The most widespread species reported in the NLP also exhibited very little change (Table 11). Only two species changed, although there was a moderate change in the order. To gain their spots on the list, Common Yellowthroat appeared in 15 additional townships and Ovenbird in 10. They replaced Tree Swallow which was reported in 33 fewer townships, coincident with a national trend of decline in aerial foragers (Nebel et al. 2010) and Brown-headed Cowbird which was seen in 26 fewer townships. The species listed here are both widespread and common.

Table 11: Top 20 species by number of townships in the NLP during MBBA II

Species	Number of Townships in MBBA II	Number of Townships in MBBA I	Rank in MBBA I
1. American Robin	561	557	1
2. Song Sparrow	558	552	7
3. American Goldfinch	556	548	11
4. Black-capped Chickadee	555	554	4
5. Blue Jay	554	552	6
6. Red-eyed Vireo	554	535	16
7. Chipping Sparrow	554	549	10
8. Mourning Dove	552	544	13
9. Indigo Bunting	546	535	17
10. Red-winged Blackbird	545	550	9
11. American Crow	542	554	3
12. Common Yellowthroat	540	525	23
13. Ovenbird	539	529	21
14. Rose-breasted Grosbeak	539	539	15
15. Northern Flicker	538	551	8
16. Cedar Waxwing	538	555	2
17. Eastern Wood-Pewee	531	531	19
18. Great-crested Flycatcher	529	545	12
19. Common Grackle	525	534	18
20. Eastern Kingbird	522	553	5

Slight differences in some original MBBA I values are due to improved mapping accuracy.

Results and Highlights

The list of the 20 most widespread breeding species in the UP is most noteworthy in the changes found (Table 12). The increased effort in the UP resulted in an increase in the number of townships with observations. Thus, species in general were reported in more townships overall. For example, the most common UP bird was reported in 520 townships in MBBA I compared to 547 townships in MBBA II. Three species increased markedly to gain their spots on the top 20 list. Red-breasted Nuthatch increased by 95 townships, Black-throated Green Warbler by 76, and American Goldfinch by 69. They replaced the species which follow. The Tree Swallow decline noted in the NLP is more pronounced in the UP, with 111 fewer townships reporting this species. Measured another way, Tree Swallow distribution fell from 79% of UP townships to 60%. Least Flycatcher was reported in seven fewer townships while Chestnut-sided Warbler was reported in 14 additional townships.

Eight species were in the top 20 in all three regions: Northern Flicker, Blue Jay, American Crow, Black-capped Chickadee, American Robin, Chipping Sparrow, Song Sparrow, and American Goldfinch.

Seven species have breeding confirmation rates of 60% or higher. Piping Plover, Bald Eagle, Northern Goshawk, and Peregrine Falcon are species of concern at the state or federal level; their high confirmation rates come from species-specific surveys. American Robin and European Starling nest in highly visible areas and can be found in most urban neighborhoods. Canada Geese (and their highly visible young) are common in urban parks and waterways.

Table 12: Top 20 species by number of townships in the UP during MBBA II

Species	Number of Townships in MBBA II	Number of Townships in MBBA I	Rank in MBBA I
1. Red-eyed Vireo	547	509	5
2. American Robin	545	520	1
3. Black-capped Chickadee	544	511	4
4. Ovenbird	540	496	9
5. White-throated Sparrow	538	512	3
6. Song Sparrow	531	514	2
7. Chipping Sparrow	526	503	7
8. Cedar Waxwing	524	508	6
9. Black-throated Green Warbler	523	447	21
10. Hermit Thrush	521	454	19
11. Nashville Warbler	521	458	17
12. Blue Jay	520	480	11
13. American Crow	520	469	13
14. Yellow-rumped Warbler	520	457	18
15. Northern Flicker	519	498	8
16. American Redstart	519	453	20
17. Red-breasted Nuthatch	518	423	28
18. Common Yellowthroat	515	465	16
19. American Goldfinch	512	443	22
20. Common Raven	508	467	14

Slight differences in some original MBBA I values are due to improved mapping accuracy.

Results and Highlights

Listed species: Endangered, Threatened, and Special Concern

There were mixed results when comparing endangered, threatened, and special concern species (MNFI 2009) between the two Atlases. As shown in Table 13, 26 species showed significant or modest increases in the number of blocks in which they were reported, while 14 species showed significant or modest declines. Two species exhibited no change.

Surprisingly, 14 listed species were found in 50% or more additional blocks in MBBA II. Among these were six birds of prey. The Bald Eagle population improved to the degree that it has been delisted by the federal government and downgraded from threatened to special concern by the state (MNFI 2009). Merlin, Peregrine Falcon, and Osprey also showed considerable dispersion from the core of their ranges in Michigan. Common Loon was found breeding in 680 blocks, a remarkable 83% increase in 20 years (or better coverage in the UP). Spruce Grouse, Black-crowned Night-Heron, Caspian Tern, and Hooded Warbler also demonstrated considerable expansion among the listed species.

Two of the most satisfying improvements in the state's listed species have to be the substantial recovery of Kirtland's Warbler and Piping Plover. With the publication of The Atlas of Breeding Birds in Michigan (Brewer et al. 1991), there were only 16 Piping Plover pairs on the Great Lakes all in Michigan (Weise 1991). By the end of MBBA II, the species had expanded its range, having been recorded in 47 blocks with 52 pairs and 102 fledged chicks in the state in 2008 (Dombrowski 2009) and had colonized new beaches along Lake Michigan and Lake Huron, including the southern shore of the UP.

Loggerhead Shrike which originally bred from the Prairie Provinces in Canada south to Mexico (Yosef 1996) is confined to North America. While nine confirmed breeding pairs with 12 nesting attempts were documented during MBBA I (Little 1991) only a single confirmed nesting in Kalamazoo County in 2001 and an unsubstantiated nesting attempt for 2005 in Alpena County suggested breeding in MBBA II. Prior to these records a previous nest report came from Allegan County in 1997 (Reinoehl 1997). Loggerhead Shrike has been part of Michigan's Heritage like Passenger Pigeon and Greater Prairie Chicken. The substantial decline in Michigan echoes the overall decline over most of the northern part of its range (Chartier 2011*d*, Yosef 1996). Loggerhead Shrike is fast becoming only a lesson in Michigan History.

Of the 14 listed species exhibiting declines, eight were found in at least 20% fewer townships. Seven of these are predominately wetland species including King Rail, Black Tern, Common Gallinule, as well as American and Least bitterns. Six of the remaining listed species are associated with grasslands including Barn Owl for which there were no confirmed breeding records during MBBA II.

Rare species

Species documented in 20 or fewer townships are considered rare. These species may or may not be included on the list of endangered, threatened, or special concern species depending on whether Michigan is within their primary breeding range or at the periphery of their range. Table 14 lists the 18 confirmed breeding species that are classified as rare during MBBA II. While the list has changed a great deal, five species are basically unchanged: Canvasback, King Rail, Short-eared Owl, Loggerhead Shrike and Rusty Blackbird remain as extremely rare breeders in the state. Thirteen species are new to the list. Yellow-headed Blackbird and Redhead are the only species previously reported in more townships, 29 and 27 respectively. Six species were not observed in MBBA I: American White Pelican, Red-necked Grebe, Black-necked Stilt, Eurasian Collared-Dove, Blue Grosbeak, and Eurasian Tree Sparrow. Five species with possible or probable breeding status in MBBA I were confirmed during MBBA II: Eared Grebe, Summer Tanager, Wilson's Phalarope, Great Gray Owl, and Yellow Rail.

Results and Highlights

Table 13: Listed species and the increase or decrease in blocks between Atlases

Species	Mich. Status	Federal Status	MBBA I Blocks	MBBA II Blocks	% Change	MBBA II # Pairs
Trumpeter Swan	T		0	197	N/A	356
Spruce Grouse	SC		47	81	72%	286
Sharp-tailed Grouse	SC		68	71	4%	571
Common Loon	T		372	680	83%	1,143
American Bittern	SC		314	271	-14%	631
Least Bittern	T		102	96	-6%	190
Black-crowned Night-Heron	SC		55	94	71%	1,040
Osprey	SC		255	389	53%	460
Bald Eagle	SC		299	694	132%	832
Northern Harrier	SC		514	448	-13%	540
Northern Goshawk	SC		164	187	14%	211
Red-shouldered Hawk	T		315	504	60%	600
Merlin	T		57	232	307%	284
Peregrine Falcon	E		6	38	533%	57
Yellow Rail	T		6	9	50%	33
King Rail	E		11	10	-9%	13
Common Gallinule	T		116	56	-52%	230
Piping Plover	E	LE	19	47	147%	102
Wilson's Phalarope	SC		9	10	11%	17
Caspian Tern	T		45	127	182%	1,572
Black Tern	SC		172	94	-45%	926
Common Tern	T		63	72	14%	2,293
Forster's Tern	T		32	48	50%	859
Barn Owl	E		1	0	-100%	0
Long-eared Owl	T		20	23	15%	27
Short-eared Owl	E		15	6	-60%	6
Black-backed Woodpecker	SC		69	89	29%	119
Loggerhead Shrike	E		21	5	-76%	5
Marsh Wren	SC		275	319	16%	2,311
Louisiana Waterthrush	T		68	54	-21%	82
Prothonotary Warbler	SC		74	85	15%	300
Hooded Warbler	SC		70	158	126%	419
Kirtland's Warbler	E	LE	32	132	313%	1,421
Cerulean Warbler	T		155	178	15%	443
Yellow-throated Warbler	T		7	9	29%	23
Prairie Warbler	E		28	27	-4%	41
Lark Sparrow	X		0	1	N/A	1
Grasshopper Sparrow	SC		532	577	8%	1,503
Henslow's Sparrow	E		211	178	-16%	476
Dickcissel	SC		211	249	18%	740
Western Meadowlark	SC		126	64	-49%	82
Yellow-headed Blackbird	SC		29	11	-62%	60

Status: E - Endangered, T - Threatened, SC - Special Concern, X – Extirpated, LE - Listed Endangered

Table 14: Confirmed breeding species reported in 20 or fewer townships during MBBA II (Rare)

Species	Number of Townships in MBBA II	Number of Townships in MBBA I
American White Pelican	2	0
Red-necked Grebe	2	0
Rusty Blackbird	2	5
Black-necked Stilt	3	0
Eurasian Collared Dove	3	0
Blue Grosbeak	3	0
Eurasian Tree Sparrow	3	0
Loggerhead Shrike	3	21
Eared Grebe	5	4
Canvasback	6	8
Short-eared Owl (E)	6	15
Summer Tanager	6	8
King Rail (E)	9	11
Yellow-headed Blackbird (SC)	9	29
Wilson's Phalarope (SC)	10	9
Great Gray Owl	12	7
Yellow Rail (T)	14	6
Redhead	15	27

Michigan status: E - Endangered, T - Threatened, SC - Special Concern

Another 13 species are no longer on the rare breeders list. Eight were found in more townships: Gadwall, Northern Shoveler, Ruddy Duck, Piping Plover, Long-eared Owl, Worm-eating Warbler, Palm Warbler, and Yellow-throated Warbler. Wilson's Warbler was found in more townships in MBBA II but was not confirmed as breeding. Barn Owl has not been confirmed as breeding in Michigan since 1982 (MBRC 2010). No breeding evidence for Cattle Egret (despite multiple observations) or Western Kingbird was observed during MBBA II.

Changes in Distribution

Increasing distribution

Altogether, 122 of the 337 species recorded with breeding evidence in MBBA II increased at least two townships. The 40 species in Table 15 showed the greatest increases in distribution by township between MBBA I and MBBA II. The increases ranged from 105 to 623 more townships than in MBBA I. Eight species were found in at least 100% more townships and three of these in more than 200% more townships. Many of these are somewhat common species increasing as a result of the elimination of certain persistent pesticides, habitat modification or improvement, expansion into available habitat and amelioration of the severe winters which occurred in the 1970s over much of the Eastern United States. Many of the species in Table 15 are expanding and are covered in more detail under expansion.

Meanwhile, it is worth mentioning that a few species in this group have common factors--large size, limited breeding sites, and typically low reproductive rates which limit population growth. Consequently, population recovery often takes decades. Among this group, are Turkey Vulture, Sandhill Crane, Bald Eagle, and Pileated Woodpecker. They are just now recolonizing former breeding areas lost to pesticides, persecution, or habitat loss (see Expansion). Habitat improvement projects in Michigan from as far back as the 1930s with the Civilian Conservation Corps have led to an increase in mature coniferous, mixed coniferous-deciduous forest and deciduous forest over much of the state especially in public lands. The southern part of the state in particular has seen a regrowth of forest, despite all the development which has occurred there.

As mentioned in the discussion of listed species, several of the improvements in distribution are the result of intensive species-specific conservation efforts. Kirtland's Warbler, which fell just short of Table 15, was documented in 100 additional blocks and has expanded into the UP, Wisconsin, and Ontario. The Trumpeter Swan reintroduction effort has resulted in this swan now occurring in 8% of Michigan's townships. Hacking programs have established Peregrine Falcon populations within urban areas of much of the SLP. Wild Turkey restoration efforts over the past 40 years have markedly helped the spread of this species. Nest-box trails have benefited Eastern Bluebird, as have the recent moderate winters in the southern US. Eastern Phoebe is one of a few aerial foragers which increased in total townships. Prior to MBBA I, the Eastern Phoebe population was depressed as a result of the harsh winters in the 1970s. Relatively mild winters, most years in the eastern US during

MBBA II likely benefited Eastern Phoebe as well as Carolina Wren.

For some species, it is not as difficult to understand the factors behind the increases. For example, Yellow-billed Cuckoo numbers have been depressed and erratic for many years since massive outbreaks of caterpillars (primary food source) in the late 1970s. Minor caterpillar outbreaks during MBBA II helped bolster the population of Yellow-billed Cuckoos in the NLP (5.5%) and the SLP (10 %). For other species such as Brown Creeper, Hermit Thrush, Sedge Wren, and Alder Flycatcher, the factors behind the increases are not always quite so clear.

White-winged Crossbill was a unique case. An irruptive event began during the summer of 2008 “with territorial evidence suggestive of breeding” (Dombrowski 2009): More birds were reported in that year than all the other years combined. The irruption continued during the following winter when almost 1000 observations detailed birds in every county in the state (Wuepper 2009).

Results and Highlights

Table 15: Species showing the greatest increases between Atlases, based on number of townships

Species	Number of Townships in MBBA II	Number of Townships in MBBA I	Increase in Number of Townships	% Increase
1. House Finch	1,024	401	623	155.4%
2. Sandhill Crane	947	352	595	169.0%
3. Wild Turkey	1,098	504	594	117.9%
4. Pine Warbler	751	361	390	108.0%
5. Canada Goose	1,151	774	377	48.7%
6. Red-bellied Woodpecker	1,018	648	370	57.1%
7. Blue-headed Vireo	704	386	318	82.4%
8 .Turkey Vulture	1,320	1,006	314	31.2 %
9. Pileated Woodpecker	1,022	720	302	41.9%
10. Carolina Wren	282	33	249	754.6%
11. Bald Eagle (SC)	547	299	248	82.9%
12.Red-breasted Nuthatch	992	762	230	30.2%
13. Tufted Titmouse	957	729	228	31.3%
14. Hooded Merganser	371	149	222	149.0%
15. Mourning Dove	1,663	1,446	217	15.0%
16. Yellow-bellied Sapsucker	881	684	197	28.8%
17. Common Raven	820	623	197	31.6%
18. Black-throated Green Warbler	914	717	197	27.5%
19. American Redstart	1,442	1,250	192	15.4%
20. Clay-colored Sparrow	425	234	191	81.6%
21. Northern Parula	455	270	185	68.5%
22. Magnolia Warbler	552	367	185	50.4%
23. Alder Flycatcher	930	746	184	24.7%
24. Eastern Phoebe	1,439	1,255	184	14.7%
25. Ruby-throated Hummingbird	1,353	1,196	157	13.1%
26. Sedge Wren	557	400	157	39.2%
27. Trumpeter Swan (T)	153	0	153	N/A
28. Blue-gray Gnatcatcher	552	400	152	38.0%
29. Black-throated Blue Warbler	417	274	143	52.2%
30. Mute Swan	372	236	136	57.6%
31. Eastern Bluebird	1,420	1,284	136	10.6%
32. Merlin (T)	193	58	135	232.8%
33. Northern Cardinal	1,169	1,037	132	12.7%
34. Orchard Oriole	288	157	131	83.4%
35. Hermit Thrush	901	772	129	16.7%
36. Blackburnian Warbler	593	466	127	27.2%
37. Yellow-billed Cuckoo	705	584	121	20.7%
38. White-winged Crossbill	159	40	119	297.5%
39. Brown Creeper	628	516	112	21.7%
40. Black-and-white Warbler	951	846	105	12.4%

Federal Status: LE - Endangered; Michigan Status: E - Endangered, T - Threatened, SC - Special Concern
Ten species that were not found in MBBA I are excluded from this table.

Results and Highlights

Decreasing distribution

During MBBA II, no evidence of breeding could be found for four species included in the totals for MBBA I. These species mentioned earlier in Table 6 were Cattle Egret, Lesser Yellowlegs, Monk Parakeet, and Western Kingbird. Of the 237 species documented in MBBA II with breeding evidence, there were 104 species whose distribution decreased (down by two or more townships). Table 16 contains the 40 species with the greatest decline in townships between Atlas projects. In this list, Purple Martins were reported in 499 fewer townships with Field Sparrows present in 105 fewer townships. The decline in terms of percentage for this group ranged from 57.4% for Purple Martin to 6.6 % for Eastern Kingbird. Red-headed Woodpecker was the only other species which disappeared from over 400 townships between MBBA I and MBBA II. Of the remainder it is noteworthy that two other species, Common Nighthawk and American Kestrel, disappeared from more than 300 townships.

West Nile Virus (WNV) may have been a much more significant issue for decreasing species in Table 16 than the species accounts suggest. West Nile Virus first appeared in Michigan in 2001 "when 65 WNV positive corvids" were detected in 10 counties (SOM 2011). However in 2002 (ironically coinciding with the official start of the Atlas) hundreds of corvids and many other species died with positive WNV confirmations from 73 of the 83 Michigan counties (Michigan.gov 2003). In tables summarizing 2002 wildlife rehabilitator surveys, total suspected WNV raptors included 68 Red-tailed Hawks, 63 Great Horned Owls, 15 Cooper's Hawks, five American Kestrels, four Sharp-shinned Hawks and one Eastern Screech Owl. In Kalamazoo County in 2002, 15 Great Horned Owls were turned in to rehabilitators during late summer and early fall. The following winter, breeding Great Horned Owls in Kalamazoo County were very scarce and remained uncommon throughout the Atlas.

American Kestrel and Great Horned Owl (4th and 5th in Table 16) are raptors well known for WNV mortality (Gancz 2004, Rappole and Hubalek 2003, McLean 2006), and Medica et al. 2007). Since some of the other species on the list of greatest declines are also susceptible to WNV, it is possible that others in this group were impacted: House Sparrow, Rock Pigeon, Brown-headed Cowbird, and possibly even Ruffed Grouse in the SLP. Furthermore, even some of the species which increased might have been more widespread had it not been for WNV. Examples include American Crow, Common Raven, Blue Jay, and Tufted Titmouse.

The list of decreasing species in Table 16 is quite varied at first appearance, but on closer examination, several of the species have similar habitat affinities or belong to the same guild. In fact, many of these same species reappear in Table 17: Species with associated habitat/guild grouping demonstrating substantial loss of townships.

Results and Highlights

Table 16: Species showing greatest declines between Atlases, based on number of townships

Species	Number of Townships in MBBA II	Number of Townships in MBBA I	Change in Number of Townships	% Change
1. Purple Martin	371	870	-499	-57.4%
2. Red-headed Woodpecker	416	897	-481	-53.6%
3. Common Nighthawk	283	611	-328	-53.7%
4. American Kestrel	902	1203	-301	-25.0%
5. Great Horned Owl	410	660	-250	-37.9%
6.Chimney Swift	799	1047	-248	-23.7%
7. Bobolink	953	1188	-235	-19.8%
8. Northern Bobwhite	234	466	-232	-49.8%
9. Killdeer	1,312	1,534	-222	-14.5%
10. Blue-winged Teal	189	411	-222	-54.0%
11. Whip-poor-will	238	458	-220	-48.0%
12. Bank Swallow	672	888	-216	-24.3%
13. American Woodcock	718	923	-205	-22.2%
14. Upland Sandpiper	246	432	-186	-43.1%
15. Barn Swallow	1371	1555	-184	-11.8%
16. Evening Grosbeak	262	442	-180	-40.7%
17. Eastern Meadowlark	1,052	1,232	-180	-14.6%
18. Vesper Sparrow	1,059	1,235	-176	-14.2%
19. Horned Lark	724	895	-171	-19.1%
20. Belted Kingfisher	1,083	1,249	-166	-13.3%
21. House Sparrow	1,090	1,254	-164	-13.1%
22. Brown Thrasher	1,120	1,281	-161	-12.6%
23. American Black Duck	132	285	-153	-53.7%
24. Tree Swallow	1,510	1,662	-151	-15.2%
25. Ruffed Grouse	840	991	-147	-14.2%
26. Eastern Towhee	887	1,034	-141	-32.0%
27. Wilson’s Snipe	299	439	-140	-31.9%
28. Northern Harrier (SC)	379	516	-137	-26.6%
29. Golden-winged Warbler	260	394	-134	-34.0%
30. Spotted Sandpiper	592	724	-132	-18.2%
31. Cliff Swallow	561	686	-125	-18.2%
32. Rock Pigeon	833	955	-122	-12.8%
33. Green Heron	696	815	-119	-14.6%
34. Least Flycatcher	1,174	1,288	-114	-8.8%
35. Brown-headed Cowbird	1,441	1,554	-113	-7.3%
36. European Starling	1,520	1,408	-112	-7.4%
37. Black-billed Cuckoo	755	867	-112	-12.9%
38. Eastern Kingbird	1,548	1,658	-110	-6.6%
39. Great Blue Heron	1,052	1,159	-107	-9.2%
40. Field Sparrow	1,000	1,105	-105	-9.5%

Michigan status: SC - Special Concern

Results and Highlights

Table 17: Species with associated habitat/guild grouping demonstrating substantial loss of townships

Species	Percentage of Townships Lost	Number of Townships Lost
Aerial Foragers		
Purple Martin	-57.3%	-499
Common Nighthawk	-53.7%	-328
Whip-poor-will	-48.0%	-220
Bank Swallow	-24.3%	-216
Chimney Swift	-23.7%	-248
Grassland Species		
Loggerhead Shrike (E)	-90.5%	-18
Short-eared Owl (E)	-60.0%	-9
Western Meadowlark (SC)	-54.0%	-68
Red-headed Woodpecker	-53.6%	-481
Northern Bobwhite	-49.8%	-232
Upland Sandpiper	-43.0%	-186
Henslow's Sparrow (E)	-33.2%	-70
Brewer's Blackbird	-28.8%	-77
Northern Harrier (SC)	-26.6%	-137
Sharp-tailed Grouse (SC)	-26.5%	-18
American Kestrel	-25.0%	-301
Shrubland Species		
Yellow-breasted Chat	-41.3%	-45
Golden-winged Warbler	-34.0%	-134
Eastern Towhee	-14.2%	-147
Brown Thrasher	-12.6%	-161
Wetland Species		
Northern Pintail	-82.5%	-33
Yellow-headed Blackbird	-69.0%	-20
Common Moorhen (T)	-58.1%	-68
Black Tern (SC)	-55.8%	-97
Blue-winged Teal	-54.0%	-222
American Black Duck	-53.7%	-153
Redhead	-46.4%	-13
American Coot	-36.1%	-47
Green-winged Teal	-35.4%	-29
Wilson's Snipe	-31.9%	-140
Red-breasted Merganser	-30.4%	-42
American Bittern (SC)	-30.1%	-95
Canvasback	-25.0%	-2
Least Bittern (T)	-21.2%	-22

Michigan status: E - Endangered, T - Threatened, SC - Special Concern

Table 17 is informative even with many species associated with these habitats not included. Among the aerial forager guild all of the swallows were present in a minimum of 9.15% fewer townships in MBBA II, with major declines throughout the UP. When you add in Whip-poor-will, Common Nighthawk, and Chimney Swift, this group deserves serious conservation concern. Eastern Kingbird is another species from Table 16 which is a member of the aerial forager guild and found in fewer townships in MBBA II. The only Michigan woodpecker whose distribution declined dramatically (listed in Table 17 as a grassland species) spends much of the breeding season as an aerial forager. Its foraging behavior is such that birders would not overlook this species and consequently it is safe to conclude a major decline is underway. It has been indicated that declines by aerial foragers began in the mid 1980s during MBBA I and has continued into the 21st century (Nebel et al. 2010) with the decline following a geographic gradient to the northeast. Possible factors include acid precipitation tied to atmospheric pollutants, changes in breeding phenology related to climate change, or even unknown shifts in productivity of insects related to terrestrial systems (Nebel et al. 2010). It is notable that the change is most prevalent in neotropical migrants which suggests that even factors in the tropics could be involved. However, even the most casual Michigan birder has seen a corresponding decline in some insects in Michigan within the past 20 or 30 years.

Grassland species were at peak population levels in the southwest SLP in the early 1970s (Kalamazoo Nature Center, original data). Judging from Michigan BBS data from that period, grassland species were common and widespread throughout the Lower Peninsula. Data from MBBA I indicate that several of the species appeared to be declining by the 1980s. Prior to MBBA I, severe winter weather in the 1970s had already influenced short distance migrant grassland species. In addition, changing agricultural practices were thought to be having a negative impact on grassland bird populations in the 1980s. In Table 17 it is easy to see that grassland species were undergoing serious declines probably prior to and during MBBA II. If you add in other grassland species such as Ring-necked Pheasant (-151 twp., -15.2%), Vesper Sparrow (-175 twp.,-14.2%), Grasshopper Sparrow (-104 twp., -19.6%), Bobolink (-235 twp., -19.8%), and Eastern Meadowlark (-180 twp., -14.6%) grassland species are in trouble. The conservation reserve program has been shown to help (Veech 2006, Rahmig et al. 2009) as does increasing the size of grasslands on a landscape level.

The few primarily shrubland species in Table 17 are also characterized by declines in distribution having been found in 12.6 to 41.3 % fewer townships. Field Sparrow which is found typically as a species of shrubland and earlier successional habitat also occurred in fewer townships (-105 twp., -9.5%). These species are being impacted by an overall loss of appropriate habitat, but other factors may be involved. These species have often been considered edge specialists, but recent analysis of shrubland bird studies suggests that the small patches with increased edge can be detrimental (Schlossberg and King 2008). In Illinois, a study of nest predation suggests that mesopredators such as raccoons may be involved in declines (Schmidt 2003). This suggests that for most shrubland species larger patches of similar--aged shrubland would benefit conservation of this group.

Wetland species encompass a wide diversity of birds ranging from waterfowl, to rails, herons, loons, grebes to songbirds such as Sedge and Marsh wrens, to Common Yellowthroat, and Red-winged and Yellow-headed blackbirds. Because the habitats they inhabit are so dependent on water levels, populations of these species can fluctuate almost overnight. At any given time some will be on the increase and some will be in decline, depending on where they breed or winter and how they use the wetlands. By the start of MBBA II continental duck populations had declined 31 % from 45 million to 31 million birds (EPA 2001). By 2009, duck populations had rebounded and were estimated to be 25 % over historical averages (Peterson 2012).

From MBBA I through MBBA II, 55 % of the waterfowl had declined, but some species were doing well. This was not the case for most rails, some shorebirds, Black Tern, both bitterns and some of the other wetland species. It is necessary to read the individual species accounts to understand the various factors at work in the states wetlands. For example, the pattern of Great Blue Heron distribution in Michigan has changed. Statewide, this heron was prospering, but in southwestern Michigan the population collapsed and heronries containing up to 200 pairs started to fall apart. Also during MBBA II, American Black Duck and Blue-winged Teal declined throughout the state.

Range shifts

Range expansions and contractions between Atlases can be quantified by increases or decreases in the number of occupied townships or blocks. However, it is more difficult to detect trends in the pattern of change. Expansion of Sandhill Crane and Wild Turkey are most likely related to birds moving into available unoccupied habitat while declines of species like Common Nighthawk are seen statewide with no discernible geographic pattern. The information presented in this section is not intended to be exhaustive; readers are encouraged to examine the individual species accounts for more details.

Results and Highlights

Expansion

Several mainly southern species appear to be continuing their northward expansions. Carolina Wren increased percentage-wise more than any other species from MBBA I to MBBA II, being found in 755% more townships. Much of this is due to additional records in the southern two tiers of counties in the SLP, where most reports from MBBA I also occurred. The most significant northward movement of this species was an increase in the third tier of counties from only three townships in MBBA I to 58 townships in MBBA II. Further north in the SLP, the number of occupied townships increased from two to 30, in the NLP from three to 10, and in the UP from 0 to 1. The northward movement of Red-bellied Woodpecker in Michigan has been going on for several decades after some retraction in the last part of the nineteenth century and early part of the twentieth century as a result of deforestation (Adams and Wenger 2011). MBBA II data for Red-bellied Woodpecker show an almost complete occupation of townships in the SLP (91% vs. 72% in MBBA I). Occupied townships in the NLP increased from 23% to 55%, and in the UP from 1% to 7%.

House Finch, a native of the western US, was released on Long Island, New York in 1940 (Hill 1991) with the first reported House Finch reaching Michigan in 1972 (Payne 1983). Not surprisingly, occupied townships increased in the SLP from 49% to 92%, the NLP from 11% to 55%, and the UP from 0% to 7%. Despite this expansion, peak numbers of House Finches in Michigan seem to have occurred during the late 1990s, between Atlases, and the population has experienced a leveling off or slight decrease in the last decade (Sauer et al. 2008, KNC 1978-2011 unpublished data).

Several species experienced less dramatic expansions. Tufted Titmouse expansion was perhaps slowed by WNV (mentioned earlier) from the beginning of MBBA II. Still, north of its SLP stronghold, it increased from 25% to 54% of townships in the NLP and from zero to six townships in the UP. Northern Cardinal moved into Michigan more than a century ago so expansions have been more difficult to detect in the LP; occupied blocks increased from 58% to 70% in the NLP and from 3% to 11% in the UP.

Cooper's Hawk increased statewide by only about 4%, in contrast to the rapid increases following the elimination of DDT. WNV could have slowed recovery (SOM 2011). The number of townships in which it was found increased from 39% to 52% in the SLP and from 15% to 16% in the NLP while the UP showed a decline from 8% to 4%. Another classic southern species, Northern Mockingbird, remained fairly sparsely distributed; the number of townships in the SLP (mainly in the southeastern LP) increased from 9% to 11%. The NLP was essentially unchanged while the UP increased slightly from about 1% to 1.3% occupied townships. Other southern species, such as Summer Tanager, Worm-eating Warbler, and Blue Grosbeak were detected in small numbers during MBBA II.

Reclamation of historic range south of currently occupied territory, based on maturation of wooded areas, may be one of the best explanations for some, but not all, species that are expanding southward in Michigan. Pileated Woodpecker increased its occupied townships in the SLP from 12% to 35%, most dramatically in the eastern SLP from which it was nearly absent during MBBA I. However, it also increased in the UP, going from 55% to 71% of townships, where forest maturation is much less pronounced. Similarly, Common Raven expanded in the UP, going from 77% to 82%, and doubled its occupied townships in the NLP (26% to 52%). Recent fall and winter records in the northernmost SLP counties and a nesting record near the Kent-Newaygo County line in 2012 indicate Common Raven is starting to reclaim territory at the southern end of it's Michigan range. The Allegan State Game Area is a likely nesting site in coming years as occasional birds have already been reported there.

Barred Owl depends on larger tracts of woodland and showed increases in all regions of the state during MBBA II, with a slightly greater increase in the SLP. Because this species also nests south of Michigan, it is not really a northern species moving southward but it may be taking advantage of forest maturation statewide. Sharp-shinned Hawk is a more northern species, favoring coniferous and mixed woodlands, but it showed a notable increase of occupied townships in the SLP from 6% to nearly 10%. Many of these records were in the possible category; some could be early fall or late spring migrants or even misidentified Cooper's Hawks, although the data were vetted to minimize this. Ontario has also seen a southward expansion of breeding Sharp-shinned Hawks (Cadman et al. 2007). Merlin has increased dramatically as a breeding species in Michigan. It has also expanded in other parts of its range, including into urban areas (Sodhi 2005). While some of Michigan's expansion does include urban sites, much does not. The number of occupied townships in the UP increased from 9% of townships to 26%. The shorelines of Lake Michigan and Lake Huron provided a path for expansion in the NLP, although now there are nearly as many occupied townships away from the lakes as along the lakes. The NLP went from <1% occupied townships to 5%. The expansion of Osprey into the SLP, increasing its occupied townships from 2% to 9%, is clearly due to human assistance through hacking programs; the majority of the offspring of these pairs nest on top of the ubiquitous communication towers, particularly those with clustered antennas at their apex or nest platforms.

Some warbler species have shown southward expansion. The widespread American Redstart increased its occupied townships in the SLP from 47% to 58%. Northern Parula increased its occupied townships in the UP from 39% to 63%, with little change in the NLP and a slight increase in the SLP from ~1% to 4%. Northern Parula also breeds south of Michigan so factors affecting increases in the UP and the

SLP are likely different. A truly northern species, Palm Warbler, was detected in 3% of UP townships during MBBA I and 12% in MBBA II; it was detected for the first time in the NLP (2% of townships) during MBBA II. Increased effort in the UP is likely not the only explanation for this increase.

Two warblers that prefer coniferous and mixed woodland for breeding, Pine and Black-throated Green warblers also expanded to the south and southeast within the state. Pine Warbler increased its occupied townships in the UP from 24% to 49%. The increase in the NLP from 33% to 59%, occurred largely in the western half of the region while the increase in the SLP from 2% to 13% was rather widespread, with occupied townships along Lake Michigan and many inland locales. Black-throated Green Warbler increased slightly in the UP (73% to 84%) and NLP (37% to 45%) and more dramatically in the SLP (7% to 17%). The newly occupied townships in the SLP were significantly concentrated in the western half of the region. Two species often associated with this habitat, Blue-headed Vireo and Red-breasted Nuthatch, have shown more modest southward expansions. In the UP, Blue-headed Vireo increased from 42% occupied townships to 66%. In the NLP, occupied townships increased from 17% to 36%, with much of the increase in the western half of the region. Likewise, much of the increase in the SLP (4% to 12%) occurred in the west with slight increases in the east. Red-breasted Nuthatch increased from 69% to 84% in the UP and from 51% to 61% in the NLP. In the SLP, the occupied townships increased from 6% to 15% and were widespread, with many in the south-central and eastern portions. An increase and maturation of coniferous woodland, especially in the SLP, may have led to the increases of these species.

Contraction

The maturation and reforestation of many areas in the SLP, resulting in the southward expansion of some species, has not helped other species. During MBBA II, Ruffed Grouse was detected in 44% of townships statewide, compared to 52% during MBBA I. Despite this overall decrease, there was an increase in the UP from 57% to 67%. Occupied townships in the NLP decreased from 62% to 53% while they decreased from 40% to 15% in the SLP. Much of the decrease in the SLP was seen in the increasingly urbanized southeastern LP, but noticeably fewer Ruffed Grouse were detected in the southwest as well (i.e., no detections in Berrien County in MBBA II versus nine occupied townships in MBBA I).

Evening Grosbeak occupied townships in the NLP decreased from 15% to 4.5%. In its UP stronghold, it also decreased, from 58% to 38%. Various causes have been implicated in the decline of this species in Ontario (Cadman et al. 2007), which may or may not be factors in the declines in Michigan.

Whip-poor-will has declined statewide, from 24% to 12% occupied townships. The greatest declines have been in the NLP, where occupied townships went from 36% to 17%, and in the SLP, from 17% to 5%.

While not particularly a southern species, Purple Martin has retracted significantly from the UP, going from 22% to about 2% of townships occupied. In the NLP, declines were less drastic, 45% to 14%. Even the SLP showed a significant decrease, from 68% to 39%.

Yellow-breasted Chat is near the northern edge of its range in Michigan and has always been fairly sparsely distributed in the SLP; its occupied townships decreased from 15% to 9%. Other southern species which have not been documented as confirmed breeders in Michigan for at least 50 years include Bewick's Wren and Lark Sparrow. Perhaps Yellow-breasted Chat will soon follow, although some climate change analyses predict it will expand northward (Price 2000).

Township details for all species can be found in Appendix 3 and block details in Appendix 4, provided in the CD media attached to this publication.

Abundance and Population Trends

During MBBA II, an attempt was made to evaluate abundance as well as presence of species by conducting point counts in at least 25% of all priority blocks statewide. The coverage goal was 25 points per priority block: 20 on-road and five off-road where conditions permitted (KNC 2005). Statewide coverage was not achieved. Figure 6 shows the distribution of point counts conducted for MBBA II. MBBA II point count data were insufficient to provide statewide abundance indices. These data were used for mapping purposes and were useful for localized assessments.

Some thought was given to combining data from all the available breeding bird point counts for Michigan including point count data from the USGS Breeding Bird Survey (BBS) and from the US Forest Service (USFS) – also Figure 6. While combining these three data sets would have provided better statewide coverage, each used slightly different survey methodology and kept track of numbers by different time intervals. BBS counts are three minutes long while USFS counts are 10 minutes long, but during USFS counts birds usually are recorded within three count periods beginning with three minutes.

In MBBA I, abundance maps were generated by analyses of the BBS data and used to indicate changes in relative abundance at regional scales. When sufficient data were available, authors did look at regional BBS trends for MBBA II. The population estimates for regions and individual states developed by Partners In Flight (PIF 2007) are discussed by many authors within the species accounts.

Results and Highlights

Number of Breeding Pairs

The other method used to record abundance was based on reporting the highest number of breeding pairs or their equivalent for each block an observer visited. Pairs were represented by a male and female seen together, a family group, a female with young, singing males during the breeding season and all of the confirmed codes. The number of pairs reported thus represents a minimum count for each species in any block visited. This becomes problematic when tallying species with special breeding traits, species with large feeding ranges, singing males without mates, species with unequal sex ratios and species which sing less frequently in smaller population densities as but a few examples. Because many of these factors tend to be consistent across years, the method provides a simple reproducible method of looking at abundance.

Table 18 presents all species for which 10,000 or more pairs were recorded in MBBA II, the number of blocks in which they occurred, and the average number of pairs in the blocks where they were found. The data were derived by taking the highest number of pairs for each block for any year of the project and combining those totals by region and then statewide.

There are several interesting patterns which become apparent upon close examination of Table 18. Three of Michigan's colonial nesting waterbirds appear to be among the states most abundant bird species. The word "appear" is used here because a relatively complete inventory of colonial waterbirds was conducted from 2007-2009. These species tend to nest in conspicuous sites and in many cases were surveyed by airplane, suggesting that a great percentage of the entire Michigan population of Ring-billed and Herring gulls as well as Double-crested Cormorants were counted. In contrast, the actual estimates of the statewide populations of European Starling and Red-winged Blackbird are 3.4 million and 3.5 million respectively (Partner's In Flight 2007). These values suggest that MBBA II observers were recording slightly less than 2% of the populations of these two species and these are fairly conspicuous species.

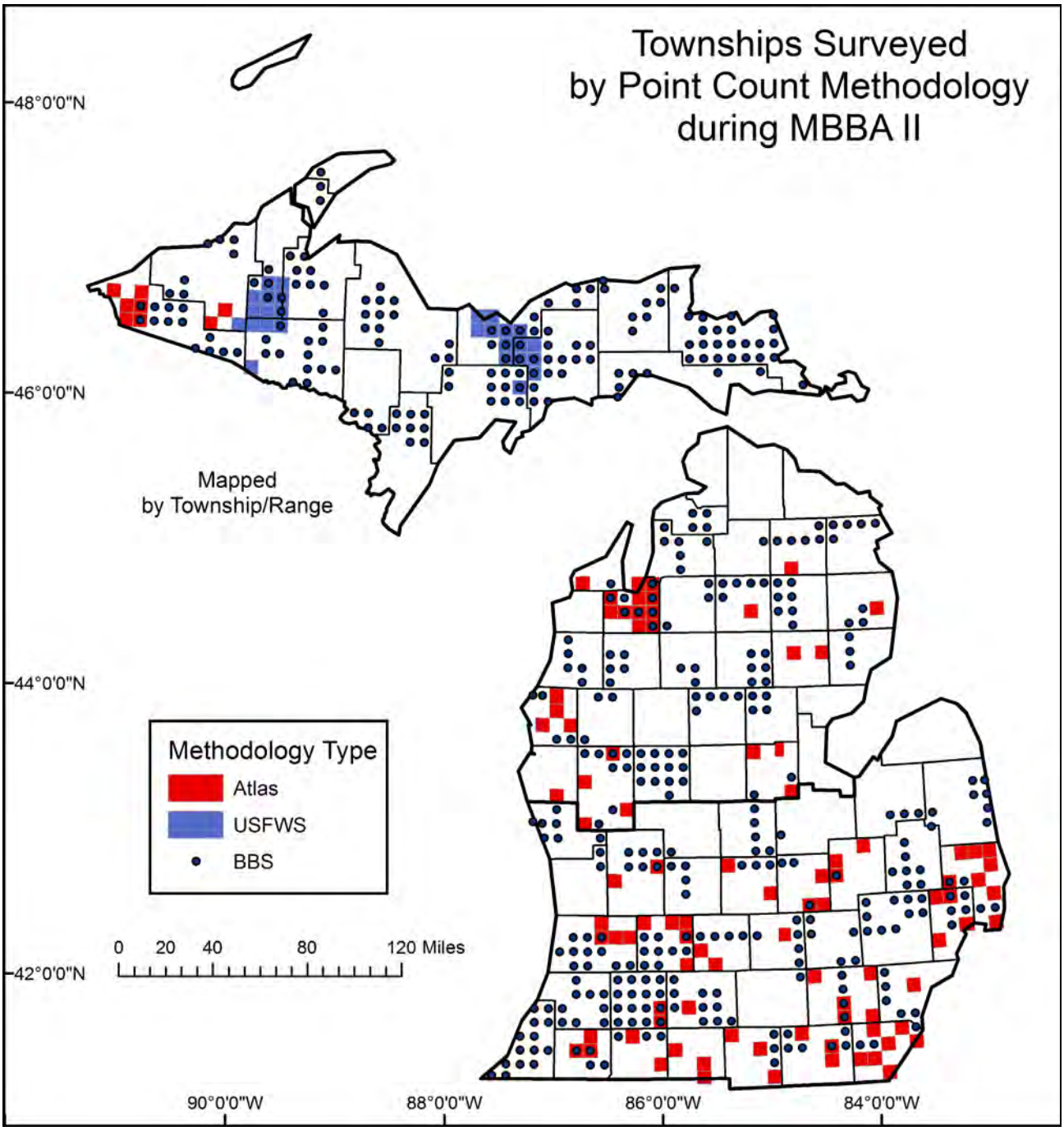


Figure 6: Distribution of point counts incorporated into MBBA II

Another interesting result in Table 18

Table 18is the placement of House Sparrow (6th). This introduced species is uniformly distributed around human habitation and easily seen, yet it is well down the lists of greatest number of townships in Michigan. To many, a surprising species on the list is Indigo Bunting. During the Atlas, it was common for citizens to inquire about what Atlas observers were watching. On the many occasions the bird happened to be an Indigo Bunting, the typical remark was "I haven't seen one of those in years." Indigo Bunting is one of the few Michigan birds associated with corn fields during the breeding season and is far more widespread than most are aware.

The vast majority of species in Table 18 are also in the tables of species found in the most townships. It is encouraging to note that despite the major declines in swallow distribution, Bank, Barn and Tree swallows are represented on the list of most abundant breeding species. In

contrast, forest birds seem to be under represented in the table given the extent of Michigan's forest.

Table 18: Most abundant breeding species and pairs per block for MBBAII

Species	# of pairs	# of Blocks	# of pairs/block
Ring-billed Gull	99,912	262	381.3
European Starling	66,673	3,011	22.1
Red-winged Blackbird	65,509	3,622	18.1
American Robin	53,047	4,285	12.4
Song Sparrow	35,320	4,078	8.7
House Sparrow	33,468	2,410	13.9
Mourning Dove	32,346	3,739	8.7
Common Grackle	32,311	3,348	9.7
American Goldfinch	29,505	3,936	7.5
Double-crested Cormorant	28,444	154	184.7
Chipping Sparrow	27,639	3,962	7.0
Red-eyed Vireo	26,824	3,855	7.0
Barn Swallow	22,597	2,800	8.1
American Crow	20,746	3,804	5.5
Canada Goose	20,130	2,039	9.9
Common Yellowthroat	19,739	3,663	5.4
Herring Gull	19,649	258	76.2
Ovenbird	18,790	2,785	6.7
Black-capped Chickadee	18,585	3,860	4.8
Cedar Waxwing	18,332	3,631	5.0
Indigo Bunting	18,269	3,610	5.1
Blue Jay	17,385	3,930	4.4
Northern Cardinal	16,220	2,685	6.0
Tree Swallow	15,590	2,779	5.6
Mallard	14,462	2,123	6.8
Brown-headed Cowbird	13,695	2,958	4.6
Yellow Warbler	13,406	2,759	4.9
Gray Catbird	13,246	2,869	4.6
Savannah Sparrow	12,499	2,229	5.6
House Wren	12,708	2,686	4.7
Bank Swallow	11,568	970	11.9
Eastern Wood-Pewee	10,839	3,222	3.4
Rose-breasted Grosbeak	10,693	3,205	3.3
Killdeer	10,258	2,601	3.9
American Redstart	10,097	2,489	4.1

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Michigan Geography

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Introduction

This section on Michigan geography gives an over-view of some aspects of the region that are relevant to avian populations. The geography of Michigan was addressed in depth in MBBA I and this information is largely unchanged. We present information here which we feel will be useful in relation to species ranges, and contains aspects of Michigan geography likely to be addressed in accounts. Maps relating to each theme follow the text relating to their theme in the same order.

Ecoregions

While some species, such as the American Robin, are widespread and occur in nearly all available natural areas, others are highly specialized and occur only within a very narrow range of conditions. These conditions may be difficult to define and depend on the many factors, including: climate variables, geology, landforms, and soils which together form a unique ecosystem. The unique ecosystems of Michigan, Minnesota, and Wisconsin have been described by Dennis Albert (1995) at the request of the Upper Great Lakes Biodiversity Committee. This classification follows the same hierarchical levels recognized by the USDA Forest Service and set forth in the *National Hierarchical Framework of Ecological Units* (ECOMAP 1993), and provides a management tool at a relevant ecological scale. This type of classification scheme can be helpful in explaining why a particular species is found in some areas and not in others. These classifications are utilized by Michigan Natural Features Inventory (MNFI) to describe the ecosystems of Michigan.

Michigan is divided into four sections (Map 1), designated by color on the map. Sections are ideal for strategic state-wide planning, but also further divided into smaller sub-sections. The various sub-sections, shown in pale gray outline denote more localized and unique features which are not shared with the section as a whole. The four sections roughly correspond with the regions designated by the Atlas as SLP, NLP, and UP. The extra category comes from a division of the UP into the eastern continental climates and the western climates, which are heavily influenced by the Great Lakes. The divisions used throughout the MBBA project are not only convenient political divisions, but correspond to ecological differences as well.

Habitat specialists are species which depend on plants, insects, or other components of a particular ecosystem and are unable to sustain themselves apart from these components. This places them at particular risk when development encroaches on their territory because they are often unable to simply move to the next adjacent natural area to find what they need. There are many types of habitat specialists, grassland specialists are of particular concern at this time. Natural grassland habitat has declined due to its ability to be readily converted to agriculture.

Kirtland's Warbler is an example of a habitat specialist with a range corresponding to a specific sub-section. Its breeding range is centered on VII.2.2, in the Northern Lacustrine Influenced Upper Michigan, known as the Grayling Outwash Plain. Jack pine in this area today is highly managed to create suitable habitat for the species; however, jack pine and northern pin oak forests are also historically a natural feature of this region. Breeding observations have increased outside of this sub-section as the population increases, yet this area remains the most critical to supporting the population.

Ecoregion information is worth consulting when a species appears limited to a small area and the reason is unclear. The categories for Michigan are listed below, with further information available in Albert (1995).

VI. Southern Lower Michigan

VI.1. Washtenaw
- VI.1.1. Maumee Lake Plain
- VI.1.2. Ann Arbor Moraines
- VI.1.3. Jackson Interlobate

VI.2. Kalamazoo Interlobate
- VI.2.1. Battle Creek Outwash Plain
- VI.2.2. Cassopolis Ice-Contact Ridges

VI.3. Allegan
- VI.3.1. Berrien Springs
- VI.3.2. Southern Lake Michigan Lake Plain
- VI.3.3. Jamestown

VI.4. Ionia
- VI.4.1. Lansing
- VI.4.2. Greenville

VI.5. Huron
- VI.5.1. Sandusky Lake Plain
- VI.5.2. Lum Interlobate

VI.6. Saginaw Bay Lake Plain

VII. Northern Lacustrine-Influenced Lower Michigan

VII.1. Arenac
- VII.1.1. Standish
- VII.1.2. Wiggins Lake

VII.2. Highplains
- VII.2.1. Cadillac
- VII.2.2. Grayling Outwash Plain
- VII.2.3. Vanderbilt Moraines

VII.3. Newaygo Outwash Plain

VII.4. Manistee

VII.5. Leelanau and Grand Traverse Peninsula
- VII.5.1. Williamsburg
- VII.5.2. Traverse City

VII.6. Presque Isle
- VII.6.1. Onaway
- VII.6.2. Stutsmanville
- VII.6.3. Cheboygan

VIII. Northern Lacustrine-Influenced Upper Michigan and Wisconsin

VIII.1. Niagaran Escarpment and Lake Plain
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Soils

Soils (Map 2) are an influencing factor on ecoregion delineations designated by Albert (1995). Soils also correspond somewhat to the regions utilized in MBBA summaries, SLP, NLP, and UP, though not precisely. The USDA Natural Resources Conservation Service (NRCS) describe soil properties in a hierarchical way, with each level viewed appropriately at different spatial scales. Soil pedon data shows the most detail, progressing to soil series, detailed soil maps, general soil maps, land resource unit (LRU), major land resource area (MLRA), to the most generalized of all, land resource region (LRR). Here we describe and show the MLRA data, the most appropriate to view at the scale shown here (USDA-NRCS 2006).

Soil characteristics are influenced by their parent material, hydrology, and by the input of humus which comes from the ecological community which is present. While soil characteristics influence the type of ecological community which can thrive in an area, the ecological community influences the soil characteristics as well. One characteristic is pH, or soil acidity, which is heavily influenced by parent rock materials. Soluble calcareous deposits can make soils either alkaline or acidic. Nutrients in the soil are influenced by the hydrology, which can leach minerals from the soil. Organic content changes the nature of soil and this comes directly from the ecological community in the form of decaying materials of all types.

Each ecoregion contains diverse soils, but each is dominated by one specific type. The Southern Michigan and Northern Indiana Drift Plain dominates the SLP with approximately 15,500 square miles (40,200 square meters) of this area. The geology determines the parent material from which the soil is derived, and this area is characterized by glacial drift deposits, mostly till, 100-500 feet thick in most areas. The dominant soil orders found in this area are Alfisols, Histosols, and Mollisols; these are reflective of the historic vegetation patterns which were present. Alfisols are related to deciduous forest. Histosols are related to saturated areas, and have a high input of organic material. Mollisols are related to the presence of grasslands. Deciduous forest continues to be supported, and much of the native grassland has been converted to agricultural uses, with cropland accounting for 47% of the land use in this MLRA.

The NLP is primarily Northern Michigan and Wisconsin Sandy Drift. This area is approximately 70 percent forested, reflecting a major concern in the region, soil conservation. Erosion is a major concern for these sandy soils, and maintaining forest cover is the best soil stabilizer. Dominant soil types are Spodosols, Entisols, Alfisols, and Histosols. Among other forest types present, this region contains a unique forest type, the Pine Barren.

As with ecoregions, soils in the UP are quite different in the eastern and western parts. The eastern part is primarily “Superior Stony and Rocky Loamy Plains and Hills”. Soils are Histosols and Spodosols with a frigid soil temperature.

Forests are mixed deciduous hardwoods and pine. Groundwater in some areas contains high levels of iron, as is evidenced from the name of a county in the MLRA, Iron County. The western UP consists mostly of the "Michigan Eastern Upper Peninsula Sandy Drift". Major soil types are the same as in the NLP, although clay is a larger component. Wetlands are a dominant feature of this region. While this region also experiences a frigid soil temperature regime, the climate is somewhat moderated by the Great Lakes.

Forest Change 1978-2001

Forest comparisons were made using 1978 MIRIS data and 2001 IFMAP/GAP data (Map 3). These represent two thorough and comprehensive datasets, each roughly corresponding to the beginning of an atlas period. The county data was summarized by county through an export of the attribute table. A pivot table was used to sum the area of each cover type, and generate a sum area for the county, which was then translated to percentages. The 2001 Percentage – 1978 Percentage was used to determine change in proportion of area of forest in that county

Problems with this method of comparing two data sets include different classes of cover, different classification rules, different data collection and file types, unclassified pixels, and discrepancies in area. While the class categories are not identical, the 2001 class categories were designed to be similar to the existing MIRIS classifications. Although the results for any given county cannot be deemed of high precision, they do give a good approximation of the change trends within the state. The 1978 dataset is in vector format, while the 2001 data is a raster dataset at 30m resolution, which leads to what geographers call the modifiable area unit problem (MUAP) because they are aggregated at different spatial units. The 2001 dataset extends beyond the shoreline and was cut to the 1978 area to eliminate excess water pixels from the Great Lakes being attributed to county area. Even so, some problems exist for coastal counties when the 1978 data included polygons for small islands or rock outcroppings that are present as unclassified pixels in the 2001 dataset. These were eliminated from the sum of pixels per county, so a slightly different area may be represented in some counties, such as Alpena, where Sugar, Thunder Bay, Gull, and Sulphur islands are all omitted or unclassified background pixels of the raster. This area discrepancy is small when compared to the overall area of the county, only 500 acres of the original 1978 area of 380,520 acres, or only about 0.1%, and therefore should cause no detrimental discrepancies in identifying trends within the state at large.

Forest was determined by a combination of categories in both the 1978 and 2001 datasets. In the 1978 data all of the main category "Forest" plus the "Wetland" sub-category of Forested, Wooded Wetland (the equivalent of lowland forest in 2001 data) was combined to reach the total forest area. In 2001, the main categories of Upland Forest and Lowland Forest were combined to determine the total forested area.

Most counties of Michigan experienced less than 5% change in forested area. Exceptions are regionalized. Areas of greatest loss are the western UP, and extending south into the northern most parts of the NLP. These areas are important to the forestry industry, and promotion of sustainable forestry practices can be of significant help in ensuring that this resource is not depleted.

The area of greatest gain in forested area centers on Oakland County. This area is predominantly low density residential; trees on large lots have matured enough to provide a significant percentage of forest cover which is detected by remote sensing technology. This apparent gain in forest cover perhaps reflects a difference in classification systems. While urban forest habitat may be quite different from large tracts of undisturbed native forest, they still provide habitat for many species which are not averse to their human neighbors. Addressing the problems of invasive species on private property and encouraging planting of native species which provide resources for avian wildlife can go a long way toward increasing the value of these areas for both residential and migrant avian species.

Forest 2001

From the early 20th century, ecologists subscribed to the idea that disturbed areas followed a path which led to a stable community. The term, "climax forest" comes from this idea, which saw the stable forest community as an ideal conservation goal. The suppression of disturbance to the climax community, by fire, native insects, and competing native vegetation types was a guiding principle of conservation for most of the century. Today we see the value of many communities at various stages, and the disturbances which affect the mature forest as processes which are essential for a functioning ecosystem.

Map 4 depicts forest cover in Michigan just prior to the start of MBBA II. While grasslands, wetlands, and young forest also provide important habitats, forest communities support a large number of avian species. Often areas with larger percentages of forest coincide with other natural communities and areas of lower population density. In Michigan, counties with the largest percent area of forest are in the UP. Moving southward, there is a gradual decrease in forest areas as major population centers are encountered and climate becomes more conducive to agricultural pursuits.

Agriculture

While generally seen as an adversity for birds, agriculture is a necessary and important land use. Because grasslands are most easily converted to row crop type agriculture, grassland species may suffer the most as agriculture increases. In Michigan, agriculture is most concentrated in the SLP where soils and climate are the most favorable. Corn, beans, sugar beets, and soybeans are major row crops in the SLP, each concentrated to a different region. Beans are suited to the climate and soils of the thumb, sugar beets are concentrated in the Saginaw Bay watershed, and soybeans are a major crop of the south central and southeast

portions of the state. Management practices of the many types of agriculture in Michigan can vary and the effect on bird populations is not necessarily negative in all cases.

Map 5 addresses row agriculture only, because it comes into direct competition with the grasslands which are important for many species. When other types of agriculture, such as: pasture, viticulture, and orchards are added to the picture, percentages increase, although the overall distribution remains the same, with higher percentages in the SLP. Some counties have the majority of their land area dedicated to agriculture. Huron, Gratiot, Sanilac, and Lenawee all had more than 70% of their land area dedicated to some type of agriculture in 2001. There may be less physical disturbance related to non-row agriculture; however, chemical spray and other management techniques may have an adverse effect on nesting birds where they may be viewed as pests. The realization that agricultural land uses affect such a widespread area should encourage bird friendly management practices, standards and laws.

Agricultural use has remained relatively constant when 2001 and 1978 data are compared. Although differences in classification methods and tabulation methods between these two datasets require that we interpret these changes with caution, eight counties have experienced a decline in agricultural land representing greater than 7% of their total land area. These counties were: Arenac (-11.4%), Hillsdale (-10.0%), St. Clair (-10.0%), Macomb (-9.2%), Bay (-9.0%), Monroe (-8.5%), Presque Isle (-7.9%), and Midland (-7.3%). Increases in land dedicated to agricultural uses were less common and never exceeded 5% of county land.

While agricultural land may be converted to urban use, the many conservation incentives available to landowners increase the likelihood of land being converted to conservation or wildlife use.

Watersheds

Water is of great importance to birds. Rivers serve as migratory pathways, provide resources for water birds, and influence the hydrology of all surrounding areas, in turn influencing the vegetation which grows there. Often conservation efforts are organized using the watershed as the spatial unit. It is a unit which crosses political boundaries, but is a logical unit for restoration efforts. Species concentrations are often described in relation to the watershed or major river system. Watersheds are hierarchical in nature and can be aggregated into larger units, or divided into smaller ones. At the continental scale, all of Michigan falls into the St. Lawrence watershed. The area of land drained by a small creek could be considered a small watershed also, yet delineation at this scale is less common. The units shown in Map 6 are designated by the Michigan DEQ; these units are named for the rivers which provide their drainage.

Elevation

Michigan is a relatively flat state; as is expected with a history of continental glaciation, which leads to a flattened surface. As visible in Map 7, the highest elevations in the state, in the UP, do not exceed 600 m (1,968 ft). The highest peaks are near the southern shore of Lake Superior, leading to the steepest slopes in the state. Through the NLP, the highest areas rival those in the UP, but are much more broadly spaced with gentler slopes. The SLP has the least change in elevation; only two counties in this region, Hillsdale and Oakland, have considerable area that exceeds 300 m in elevation.

The topography of Michigan is not the geographic barrier for migrating birds which the Rockies or the Appalachians are. Michigan is however, adjacent to four of the Great Lakes, which are significant obstacles for migrating birds, making this region quite important for recuperating south bound birds, and north bound birds preparing to make a crossing.

Population Density

Human population density can have a great impact on bird communities, in both positive and negative ways. While communities and individuals can enhance the habitat around them to ensure that food, cover, and nesting habitat are available to resident and migrant species, often their impact is negative. Areas of high population density inevitably lead to additional buildings, roads, and lots dedicated to residential, community, and commercial uses. Important natural areas are easily lost when the pressures of a high population begin to mount. Areas with high population densities also affect the surrounding areas by creating a need for agricultural products, and these needs are often met with the conversion of grassland and other natural areas to row crops and other agriculture.

In Michigan, the highest density populations are found in the Detroit metropolitan area. Map 8, created from 2000 census data shows low population density areas within the major metro unit, these are due to commercial areas that have a very low residential population. While there are several large population centers, Michigan has a large percentage of area with low population density, particularly in the UP, where large tracts of forested land exist. Even in other areas of Michigan, a priority has been set for the conservation of bird species by Audubon's Important Bird Area (IBA) designation. The IBA designation seeks to preserve areas important for sensitive species.

Reference Map

If you are not familiar with the counties of Michigan, a reference will be handy as you examine the maps and text in the accounts of this book. You will notice atlas information throughout the book is divided amongst three regions, the Upper Penninsula (UP), Northern Lower Peninsula (NLP), and the Southern Lower Peninsula (SLP). The previous maps emphasize the relevance of these divisions based on natural phenomena, however we use delineations based on

county boundaries. There are also several place names used in this book which may be familiar to Michigan natives, but less familiar to other readers. These areas may be birding hotspots, or places where unique species occur due to unique habitat. The general location of these areas is shown.

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Great Lakes shapefile downloaded 9/9/2009 from NOAA Coastal Geospatial Data, gl_lakes_caf.shp

The following datasets were provided by the **Michigan Geographic Data Library**:

DEM used for elevation map, “michigan_dem _250k_90m.tif”

Watershed data file, “watershed_250k” published, 1998 by Michigan Department of Environmental Quality.

"Large" and "Very Large" stream reaches depicted from MI_VSECv1, published 3/20/2004 by MDNR.

Michigan Geography



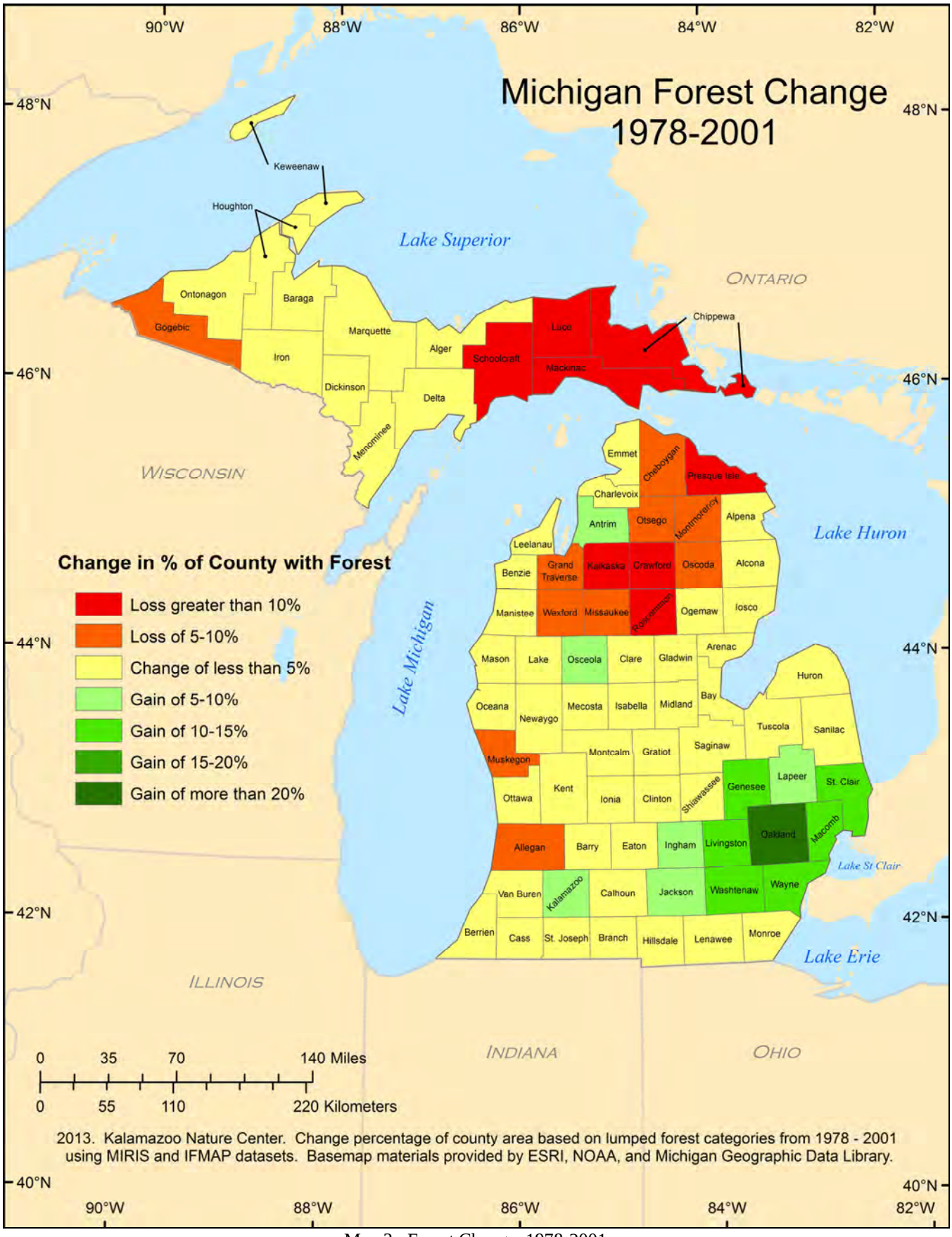
Map 1: Ecoregions

Michigan Geography



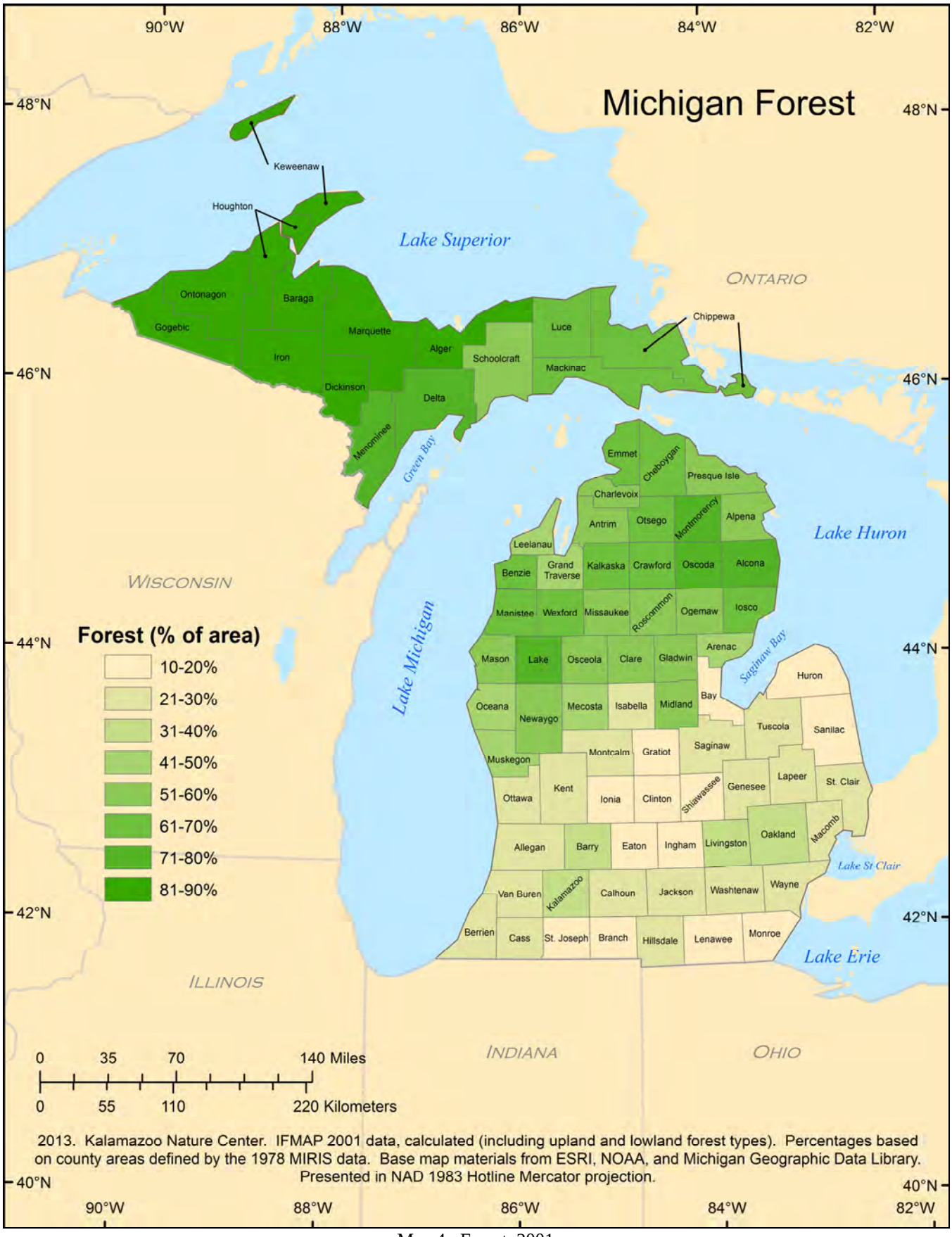
Map 2: Soils

Michigan Geography



Map 3: Forest Change, 1978-2001

Michigan Geography



Map 4: Forest, 2001

Michigan Geography



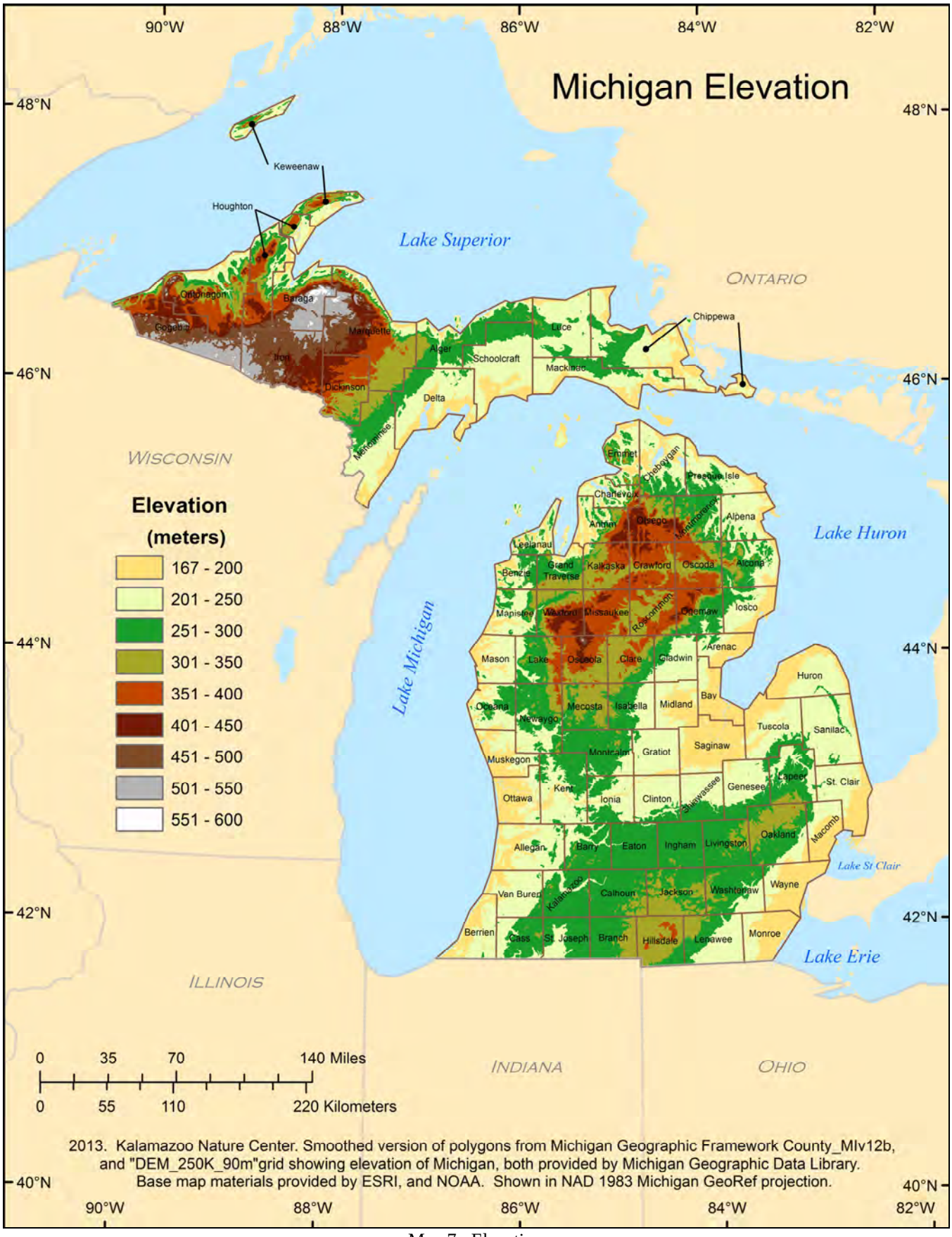
Map 5: Row Agriculture

Michigan Geography



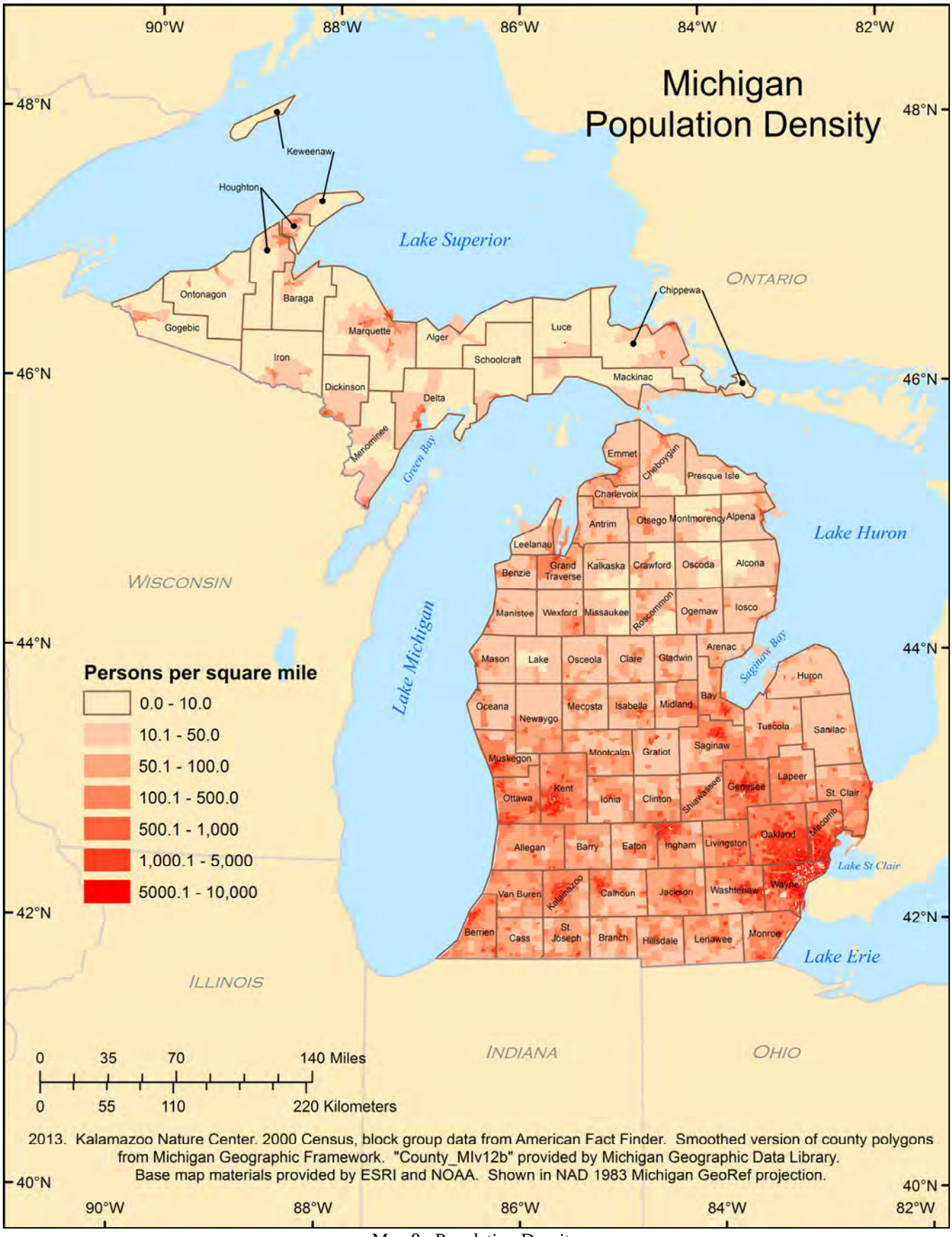
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Introduction

Relationships between wild birds and diseases vary in their ecological complexity and health consequences. Disease is broadly defined as any departure from health resulting in bodily dysfunctions from various causes, including infection, genetic defect, or environmental stress, and characterized by an identifiable group of signs or symptoms. Disease impairs wildlife by reducing the ability of individuals to reproduce or survive (Friend 2006). Some disease systems involve pathogens that cause morbidity or mortality in specific bird species, whereas other disease systems rely on multiple species of apparently healthy birds to spread pathogens. Additionally, birds may play a significant role in the emergence of diseases of human health significance – the spread of highly pathogenic avian influenza of the subtype H5N1 over the past five years across Asia, Russia, the Middle East, Europe, and Africa and the accompanying potential threat of pandemic influenza in humans has highlighted this role.

Disease emergence involving wild birds is invariably the result of a complex network of changes – often human-driven – in the ecology of the bird and/or the pathogen. For example, *Mycoplasma gallisepticum*, historically a poultry pathogen, has caused outbreaks of conjunctivitis (inflammation of the membrane around the eyes) in House Finch across the eastern United States over the past decade. The main mechanism of spread of *M. gallisepticum* involves backyard birdfeeders – particularly tube style feeders in which birds must insert their heads to obtain seed. Infected birds contaminate feeders, which then serve as the source of infection to healthy birds. Thus, supplemental feeding of birds by humans perpetuates the spread of this disease.

While the impact of disease may be significant, only recently have diseases been demonstrated at a theoretical level to have population-level impacts on host species (Anderson and May 1991). In nature, an example of a disease system in which the host is regulated by a pathogen involves a nematode parasite that is responsible for regular population cycles in the British subspecies of Willow Ptarmigan, known as Red Grouse, in Britain (Hudson et al. 1998). When grouse populations harbor heavy worm burdens, negative consequences occur, including reduced breeding success and higher winter mortality, which drive the population cycles. This example also highlights the point that clinical disease – that which is observable based on outward signs of illness – may sometimes result only after the body is challenged with multiple infections,

parasites, or stressors, any one of which alone may not cause clinical disease.

Disease is often one among many factors that leads to a species becoming threatened, endangered, or extinct. For example, many species of native Hawaiian birds became extinct during the 20th century due in part to the introduction of the protozoan parasite that causes avian malaria and the mosquito vector that transmits the pathogen to birds (van Riper et al. 1986). Additional threats to these birds include habitat destruction, introduced predators, and other diseases such as avian pox. Presently, the remaining native species on the islands occur predominantly in the high altitude areas that are above the elevational limits of mosquitoes.

Disease Ecology

Disease ecology is the discipline that studies the interactions among hosts, pathogens, and the environment as they relate to the impact of diseases on populations. This population-level approach to understanding disease emergence differs from traditional medical schemes, which aim to treat individual patients. Disease rarely results from isolated interactions, and instead emerges in complex host-pathogen ecological communities, with most diseases involving more than one host species (Collinge and Ray 2006). Changes to the structure of an ecological community may 'tip the balance', allowing enzootic disease systems to become epizootics, or allowing new diseases to emerge through the invasion of an exotic pathogen or evolution of a novel pathogen. To comprehend the disease overviews presented below, a brief glossary of disease ecology terms is provided (Table 1).

Table 1: Glossary of key terms used in disease ecology

Arbovirus	An arthropod-borne virus. Arthropods are invertebrate members of the Phylum Arthropoda, which includes insects, arachnids, and crustaceans.
Enzootic	An infectious disease that is present at a low incidence in a host population at all times
Epizootic	An infectious disease outbreak that results in a large number of diseased animals; the animal equivalent of an epidemic. Epizootics do not persist within a population
Exotic pathogen	A pathogen that is not native to a given area. Exotic pathogens, such as West Nile virus, encounter naïve wildlife hosts when they invade new areas. Naïve hosts often suffer morbidity and mortality because they have not evolved with the pathogen and have no immunity.
Pathogen	A disease-causing microorganism. Pathogens include bacteria, viruses, fungi, and protozoan parasites
Parasite	An organism that lives in or on a host. Pathogens are a type of parasite.
Reservoir host	An animal that becomes infected with a pathogen, maintains the pathogen within its tissues or blood, and serves as a source of infection to other animals. Some hosts may become clinically diseased upon infection with observable signs, whereas others remain clinically normal yet may harbor and shed pathogens.
Serotype	A sub-species level epidemiologic classification of a group of pathogens classified together based on their common surface antigens that induce a characteristic immune response in a host.
Vector	An organism that transmits pathogens from one host to another. Examples of vectors include ticks, mosquitoes, fleas, midges, and kissing bugs.
Zoonoses	Infections or diseases transmissible between animals and humans. Due to the growing human population, which results in wildlife and people sharing more space, zoonoses are increasingly important. Nearly three-quarters of emerging human pathogens are zoonotic (Woolhouse and Gowtage-Sequeria 2005).

Avian Disease

Disease Surveillance and Research

Despite the importance of disease, large gaps remain in our ability to detect the emergence of disease, quantify the prevalence of disease, and determine the impact of disease on wild bird populations. Because a sick bird that exhibits outward signs of weakness may be viewed as easy prey to a predator, birds have evolved to generally hide signs of disease – this is known as the 'sick bird syndrome', and it presents problems for individual-based medicine and treatment (Tizard 2008). By definition, disease surveillance is the ongoing, systematic, and continuous collection of health-related data for the analysis, interpretation and action to improve health within populations (Stallknecht 2007). The methods of data collection can be categorized as either passive or active.

Passive Surveillance

The primary technique for the collection of wild bird health-related data includes the detection of sick or dead birds in the wild and submission to a diagnostic facility. Some potential problems with this opportunistic strategy include *i*) the bird must persist long enough in the environment for someone to detect it, *ii*) the bird must be collected and delivered in a timely manner, and *iii*) the diagnostic facility must have the technologies to detect the agent and diagnose the disease. Rarely are all three factors achieved and thus many biases are inherent in passively-acquired data. For example, studies have shown that smaller species of birds have shorter persistence in the environment than larger species (Wobeser and Wobeser 1992, Ward et al. 2006), and urban areas have twice the detection rate of dead birds by people compared to rural areas (Ward et al. 2006). These factors lead to biases, which could inaccurately reflect the magnitude, spatial distribution, and species distribution of an epizootic. Furthermore, it is the general trend that when a new pathogen is introduced to a fully susceptible population, many birds die and are submitted for pathological testing. Subsequently, the number submitted for testing declines, despite the persistence of the pathogen within the population. In the case of emerging zoonoses, the media may initially publicize the epizootic, leading to vigilant humans eager to submit specimens, followed by a decrease in coverage. In Michigan this pattern has been observed when mycoplasmosis and West Nile virus emerged. This may be due to biological factors, in that the new disease reduces the population density of its host so there are fewer birds left to become diseased, or, the remaining individuals may be immune so the mortality rate decreases. Alternately, the decline in submissions may result from the public becoming accustomed to seeing cases on a regular basis and submission of new birds is no longer a priority.

In human medicine, the 'iceberg phenomenon' is used to describe the scenario whereby human patients with clinical symptoms of disease represent only a small fraction of the true extent of disease in the population (Lynch et al. 1987). This principle certainly applies to studies of wild bird disease, in which passive surveillance strategies rely on the detection of birds displaying clinical signs, but birds with subclinical levels of disease are not detected. The importance of passive surveillance, however, should not be underestimated. Collecting non-biased data on wild birds can be logistically difficult and too expensive for state and federal budgets, leaving opportunistic data collection as the best alternative. Previous opportunistic surveillance activities have been credited for the discovery of new diseases, such as *M. gallisepticum* in house finches (Ley et al. 1996) and bovine tuberculosis in white-tailed deer in Michigan (Schmitt et al. 1997).

Active Surveillance

Active surveillance is defined as investigator-driven data collection to meet specific information needs (Stallknecht 2007), which includes the screening of apparently healthy individuals for an agent or antibodies to an agent. The collections typically involve obtaining blood or tissue samples from hunter-harvested birds, birds killed on the roads, bird banding operations, or birds trapped for a specific research purpose. Although some limitations still exist with active surveillance, the strengths are that disease prevalence estimates (number positive as a proportion of the total sampled) are much improved. A recent example of an active surveillance program is the 'Interagency Strategic Plan for the Early Detection of Highly Pathogenic H5N1 Avian Influenza in Wild Migratory Birds', designed and implemented by the United States Department of Agriculture. Combined with the Canadian and Mexican efforts, this represents the largest coordinated wildlife disease surveillance program ever implemented (Deliberto et al. 2009).

Disease Research

Both field epidemiology and transmission experiments play an important role in understanding complex avian disease systems. In order to understand disease dynamics in free-ranging birds, population data – such as size, density, age structure, habitat utilization, and home ranges – are necessary to accurately measure pathogen transmission and maintenance across time and space. These intensive studies are also necessary to understand population-level effects of a disease. To complement field studies, controlled experimental studies in a laboratory or semi-field setting are important tools for researchers to study pathogenesis, host and vector competence, and other characteristics of disease. Furthermore, a majority of avian diseases are facilitated by human interactions. Accordingly, research studies that address the growing interface among human, domestic animal, and wild animal health within a shared environment will be increasingly important.

Avian Disease

Diseases of Importance to Michigan Birds

In this document, we highlight selected disease systems that impact Michigan birds, or for which Michigan birds play key ecological roles. The criteria for inclusion are diseases that: *i*) have the potential for local or regional bird population level impacts; *ii*) are significant diseases in Michigan which require birds for maintenance, or *iii*) are emerging due in part to the assistance of Michigan birds. The diseases covered here will highlight the historical and current significance of the disease to Michigan birds, and are not intended to comprehensively include all basic disease information such as history, etiology, epizootiology, clinical signs, pathogenesis, pathology, diagnosis, or management. For more information, we refer readers to online resources including the Michigan Department of Natural Resources Wildlife Disease Manual (http://www.michigan.gov/dnr/0,1607,7-153-10370_12150_12220---,00.html) and the National Wildlife Health Center website (http://www.nwhc.usgs.gov).

We cover diverse disease systems, from historic waterfowl diseases (botulism) to newly-emerged pathogens (West Nile virus). We include a disease system that does not negatively impact birds, but for which birds serve as a main mechanism of pathogen spread (Lyme disease), and also a disease not caused by a biological pathogen, but instead by ingestion of lead contamination in the environment. While we do not specifically address nutrition, stress, or co-infection with other pathogens as disease factors in and among themselves, it is likely that their effect on immune function allows or exacerbates other diseases. When available, specific notes on the occurrence of specific diseases within Michigan birds as detected through passive surveillance necropsy records of the Michigan Department of Natural Resources and Environment (MDNR) Wildlife Disease Laboratory over the past two decades are included (Figure 1).

Parasitic Diseases

Trematode: Verminous hemorrhagic ulcerative enteritis

Trematodes (flukes) are parasites with a complex life cycle involving two intermediate hosts (usually snails) and a definitive host (such as birds) where reproduction occurs (Huffman 2008). A wide range of birds are exposed to trematodes but most do not cause disease. One pathogenic species, *Sphaeridiotrema globulus*, is responsible for large-scale bird epizootics, including frequent occurrence in Michigan. The disease caused by *S. globulus* is called Verminous Hemorrhagic Ulcerative Enteritis (VHUE) and primarily occurs in waterfowl (Figure 2). Recurrent epizootics have occurred in the Mississippi River (Herrmann and Sorensen 2009) and the St. Lawrence River (Huffman 2008). Birds that are most susceptible to this disease, resulting in severe blood loss and anemia, are those that consume *S. globulus*-infected snails. In Michigan, the disease is primarily found in swans, with 106 Mute Swans, 2 Trumpeter Swans, and 27 Tundra Swans diagnosed by the state diagnostic lab between 1988 and 2009. The impact of *S. globulus* on wild bird populations is difficult to determine. The exotic species of snail, *Bithynia tentaculata*, is widespread throughout the Great Lakes region and is implicated as the intermediate host responsible for the establishment and maintenance of *S. globulus* in the upper Mississippi River (Herrmann and Sorensen 2009). Although no definitive answers are available, swan VHUE epizootics in Michigan might be limiting Mute Swan populations, and this disease must be considered in the restoration efforts of Trumpeter Swan in Michigan.



Figure 1: Tom Cooley, wildlife biologist with the Michigan Department of Natural Resources and Environment, begins a necropsy on a Common Loon at the Wildlife Disease Laboratory. Photo credit: MDNR Wildlife Disease Laboratory.

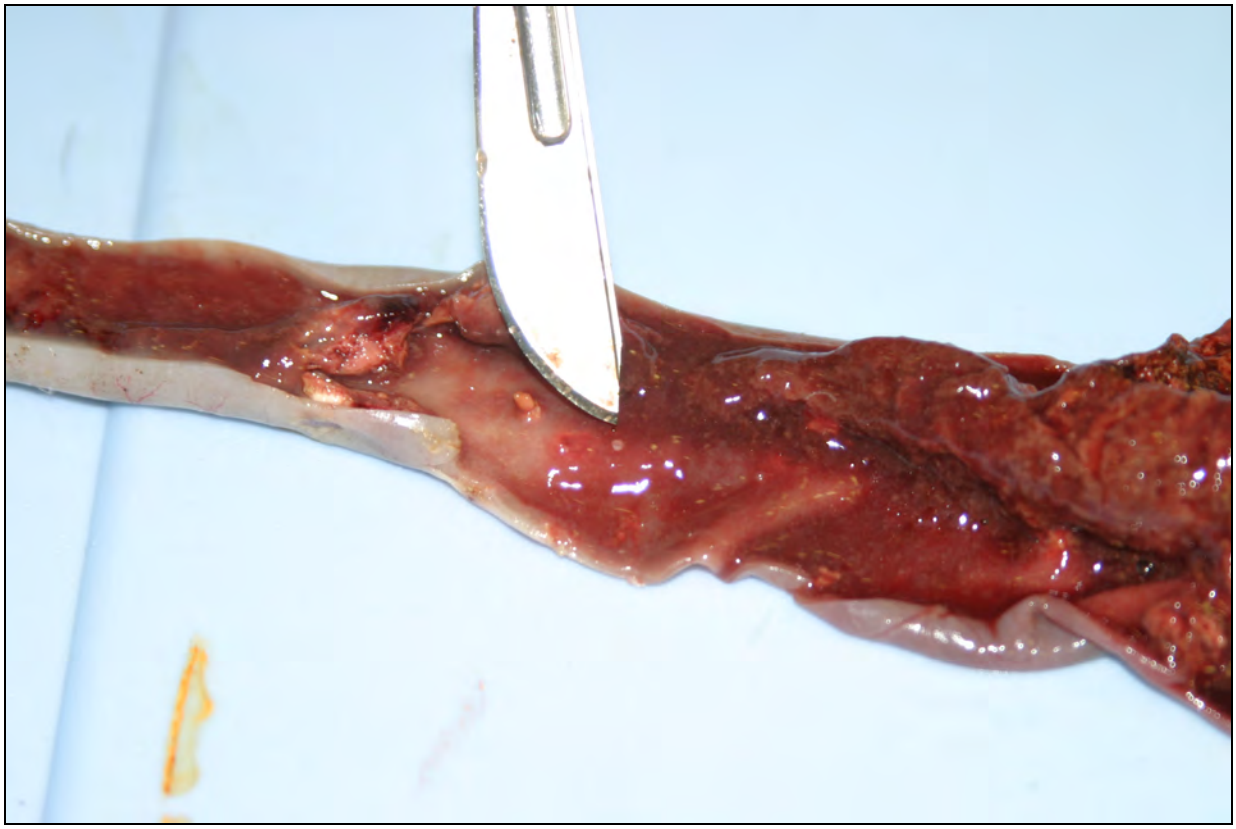


Figure 2: Tundra Swan collected from Michigan with Verminous Hemorrhagic Ulcerative Enteritis displaying clinical signs of hemorrhages in the intestinal tract. The scalpel is pointing to the adult fluke (*S. globulus*) which are small, spherical, flat, and seed-like in appearance. Photo credit: MDNR Wildlife Disease Laboratory.

Nematode: Proventricular Worm

Nematodes are an incredibly diverse group of worms with 15,000 described parasitic species. Nematodiasis, a condition of infection with nematode worms, is wide-ranging in many orders of birds occurring in Michigan, most of which are non-pathogenic and presumably have little impact on bird populations. Herein, we focus on a group of nematode parasites in the family Acuariidae. In particular, the proventricular worm (gizzard worm), *Dispharynx nasuta*, is a common parasite of birds in the Galliformes, Columbiformes, and Passeriformes. With an indirect life cycle, *D. nasuta* uses the sowbug (*Procellio scaber*) or pillbug (*Armadillidium vulgare*) as intermediate hosts (Peterson 2004). *D. nasuta* is considered pathogenic to Ruffed Grouse and has been considered the leading cause of 'grouse disease' in the northeastern U.S. (Ruff and Norton 1997). Ruffed Grouse populations throughout their range are known to experience population cycles (Williams et al. 2004, Zimmerman et al. 2008) and a recent study determined that predation was not contributing to these cycles, but other factors including parasites are likely regulating Ruffed Grouse populations (Zimmerman et al. 2008).

A closely related parasite, *Trichostrongylus tenius*, is a parasite of Red Grouse in northern England and has been implicated with regulating population cycles. The parasitic nematodes impact Red Grouse by reducing survival of adults and fecundity of females and have been implicated in contributing to Red Grouse population cycles (Hudson et al. 1998, Redpath et al. 2006, New et al. 2009). Regulation in this context implies that the parasite reduces the host population when it is above a certain threshold, and allows the population to increase under other conditions (Peterson 2004). Although these parasites do not jeopardize host population extinction, other abiotic conditions could further lead to population declines.

Although only one Ruffed Grouse has been diagnosed with Proventricular Nematodiasis caused by *D. nasuta* over the past two decades in Michigan (this case occurred in Oscoda County), we do not have a good estimate of the prevalence of these parasites in the state and their contribution to Michigan grouse population cycles. A passive surveillance program would not likely detect this disease given that these parasites do not usually cause direct mortality. Furthermore, even if a grouse dies in northern Michigan, the chances of it being recovered are slim. In the late 1970's and early 1980's, an active surveillance program that utilized hunter-harvested birds was implemented in Michigan, and reimplementation of such a program would provide a better measure of prevalence and the potential for population regulation.

Protozoa: Trichomoniasis

Avian trichomoniasis is caused by *Trichomonas gallinae*, a protozoan parasite that has a cosmopolitan distribution and primarily infects pigeons, doves, and raptors. The primary host is the Rock Pigeon and transmission among doves and pigeons occurs through feeding of young and eating contaminated food and water. Raptors are exposed by consuming infected doves or pigeons. Small outbreaks of this disease are common, and periodic large scale epizootics have occurred in Mourning Doves – the largest on record being in Alabama during 1950-1951 when 50,000-100,000 doves died. In Michigan, 71 doves have been diagnosed with trichomoniasis between 1988 and 2009, most of which were individuals collected between July and October. The impact of trichomoniasis on Michigan bird populations is unknown.

Trichomoniasis has a long history and is possibly the oldest known wildlife disease recorded (Forrester and Foster 2008). Recently, Wolff et al. (2009) discovered fossilized dinosaurs (*Tyrannosaurus rex*) with evidence of trichomoniasis-type infections, similar to the *T. gallinae* in modern birds. Other authors consider trichomoniasis as a possible contributing factor to the extinction of the Passenger Pigeon, although there is little to support this hypothesis (Forrester and Foster 2008).

Infectious Diseases

Bacterial

Salmonellosis

Salmonellosis results from infection with bacteria of the genus *Salmonella*, which includes approximately 2,500 serotypes that have been recovered from birds, mammals, and reptiles. Salmonellae are intestinal pathogens with a fecal-oral transmission route, and cross-species transmission is common. While Salmonellae are one of the main causes of human food-borne illness throughout the world, wild birds are rarely linked as the source of infection to humans; rather, wild bird infection usually reflects contamination of the environment by humans or livestock (Cizek et al. 1994). Nonetheless, salmonellosis is a significant public health and veterinary concern, as all members of this genus are potentially pathogenic to humans and animals. Salmonellae have been devastating to the poultry industry, especially before the implementation of pathogen control measures, as it has caused fatal septicemia in domestic flocks referred to as 'fowl typhoid' or 'pullorum disease'. Furthermore, poultry-associated Salmonellae pose a significant zoonotic threat to humans (Antunes et al. 2003). Host adaptation occurs with *Salmonella* pathogens, in which certain bacterial strains are evolved to exist in a long-term carrier state in specific hosts, and will occasionally emerge to cause disease within that host upon circumstances favorable to the pathogen, including periods of compromised immune function in a host (Kingsley and Bäumler 2000). The virulence of such host-adapted strains to non-target hosts is reduced.

Salmonellae can persist in the environment outside of a host's body – in water, soil, feed, litter, manure, plastics, or other materials – and wild birds most commonly acquire infections from the environment. Among wild birds, the strain most commonly isolated is a serotype of *S. enterica* called typhimurium, which has not historically been considered as host-adapted, but some types appear to be adapting to songbird species that frequent bird feeders (Daoust and Prescott 2007). While most bird infections are sub-clinical, salmonellosis is a cause of sporadic mortality particularly among young birds in large breeding colonies and songbirds around feeders in winters. As is the case for a majority of intestinal pathogens, the duration and concentration of fecal shedding of the organism is influenced by the dose of exposure, host-adaptation of the strain, the composition of the normal microflora of the intestine, and immune function of the host.

In Michigan, salmonellosis has been confirmed in 572 birds over the past two decades, comprised of 20 species across 59 counties. The most commonly infected species include the Common Redpoll and the Pine Siskin, which together account for 65% of documented cases, and House Sparrows and American Goldfinch, which together account for an additional 21% of cases. Infections have been most common in winter at bird feeders, when bird densities are high. Over 92% of the Michigan cases occurred between the months of November and April. Supplemental feeding promotes disease emergence by creating high densities of birds, high concentration of feces, and stress due to social interactions (Daoust and Prescott 2007). The spatial and temporal pattern of disease emergence in Michigan reflects the irruptive movement patterns of the most impacted species. Such irruptions are unpredictable, sudden winter movements of flocks of birds to areas outside their normal range, often driven by a lack of food on the normal wintering grounds. The winter of 1997-1998, for example, was a period of irruptive migration of Common Redpoll, when dense flocks migrated simultaneously into their wintering grounds from their Canadian breeding grounds, leading to high densities of stressed birds at feeders in Michigan which resulted in 138 documented cases of salmonellosis in this species. Similarly, the winter of 2008-2009 was a period of irruptive migration of Pine Siskin, and 29 cases were confirmed in this species over that time period. Those feeding birds can help to reduce transmission through weekly disinfection of feeders using a 10% bleach solution, altering the location of feeders to disperse contamination of the ground, and sweeping away the partially-eaten feed and feces. If diseased birds are noted, feeders should be removed to disperse birds, and all feeding within the neighborhood of diseased birds should cease for at least two weeks or until sick birds are no longer observed.

Lyme disease

Lyme disease is a tick-borne bacterial disease of humans and dogs caused by infection with *Borrelia burgdorferi*. The blacklegged tick is the most important vector in the

eastern United States. While the endemic foci for Lyme disease in the United States has historically been circumscribed to the northeast and upper Midwest, risk is increasing in new geographic areas as the tick and bacterium are expanding in range (Bacon et al. 2007). Because ticks do not move great distances on their own, significant range expansion of the tick is due to movement of the host upon which the tick is blood-feeding within a 3-7 day time period. Ticks become infected when feeding on an infected mammal or bird, and then may subsequently transmit the pathogen to a new host during the next blood meal.

Compared to the other diseases highlighted in this chapter, birds are not known to become sick when infected with the Lyme disease pathogen. Birds are, however, important in the ecology of Lyme disease for two reasons. First, migratory birds travel great distances during short time periods, and this movement may allow for infested birds to transport blacklegged ticks over large areas, expanding the distribution of the tick and correspondent Lyme disease risk (Reed et al. 2003, Ogden et al. 2008, Brinkerhoff et al. 2009); Figure 3). In areas of Lyme disease endemicity, the species of birds that are most heavily parasitized by blacklegged ticks are ground-dwelling birds, including thrushes (Turdidae), brown thrashers (Mimidae), wrens (Troglodytidae), sparrows (Emberizidae) and several species of wood warblers (Parulidae) (Brinkerhoff et al. 2009), as they are more likely to encounter and become infested by ticks. Second, many species of bird are competent reservoir hosts for *B. burgdorferi* as they can maintain this pathogen within their tissues and blood to serve as a source of infection to ticks that feed upon them. Thus, movement of infected birds may represent a mechanism of pathogen introduction to new areas. In Lyme disease-endemic areas, over 70 passerine species and one species of woodpecker have been found to be parasitized by blacklegged ticks with an overall infestation prevalence of 14%.

In Michigan, Lyme disease has historically occurred only in a focal area of the southern Upper Peninsula, as this was the extent of the distribution of the blacklegged tick in the state (Walker et al. 1999). Over the past decade, however, the blacklegged tick has been invading new areas throughout the southern and western Lower Peninsula (Foster 2004, Hamer et al. 2007). Because blacklegged ticks do not currently occupy all suitable habitats in Michigan, it is predicted that this vector will continue to expand in range, and research is underway to elucidate the role of birds in the expansion of Lyme disease risk (Hamer et al. 2010).



Figure 3: Larval ticks in the ear of a White-throated Sparrow captured at Rose Lake State Wildlife Area, East Lansing, MI. Photo credit: Gabriel Hamer, 2007.

Mycoplasmosis

Conjunctivitis – swelling or infection of the membrane of the eyelids – was first reported in wild House Finches in New York in 1994, when birds with crusty eyelids and impaired vision were observed (Ley et al. 1996, Fischer et al. 1997). The pathogen infecting the birds was identified as *Mycoplasma gallisepticum*, and this represented the first time that this pathogen (commonly a cause of respiratory disease in poultry) was isolated from passerines. Within three years, the pathogen spread across the entire eastern range of the House Finch, causing a decline of eastern populations (Hochachka and Dhondt 2000), and the disease remains enzootic today. More recently in 2002, the disease was first observed among the native western House Finch population (Duckworth et al. 2003), and has been confirmed in five additional avian species: American Goldfinch, Purple Finch, Tufted Titmouse, Pine Grosbeak, and Evening Grosbeak (Fischer et al. 1997, Hartup et al. 2000, Luttrell et al. 2001, Mikaelian et al. 2001). House Finch native to the western United States were captured and sold in pet shops in the eastern states in the mid-1900s, and released into the wild shortly thereafter. The eastern House Finch population expanded dramatically from the original small number of released birds, and currently ranges across the entire eastern and Midwestern states and southern Canada.

While there are biological reasons that likely contributed to the rapid spread of this disease in eastern House Finch populations, including reduced genetic diversity from a population bottleneck and increased population density in comparison to the western populations, the spread of this disease is enhanced through the use of bird feeders. Supplemental bird feeding provides opportunities for increased contact between infected and susceptible birds with the feeder serving as a reservoir of infection. Additionally, supplemental feeding may prolong the life of diseased birds that otherwise would not have found food, allowing them to be infectious for a longer period of time. Since its emergence, mycoplasmosis has been tracked mainly through volunteer-based passive surveillance (a form of 'citizen science') in which citizens who regularly feed birds were able to report sightings of both healthy and sick birds at their feeders to the Cornell Laboratory of Ornithology.

In Michigan, mycoplasmosis was first diagnosed in House Finches in 1995, with numerous reports in the first few years, and sporadic reports thereafter (Figure 4). That confirmed cases are not as numerous in recent years is likely an artifact of the public becoming accustomed to observing diseased finches as well as increasing immunity within the population. In addition to House Finch, a Downy Woodpecker in the state was confirmed to be infected with *M. gallisepticum*. As with prevention of Salmonellosis, transmission of mycoplasmosis can be reduced through weekly disinfection of feeders using a 10% bleach solution.



Figure 4: House Finch captured in Lansing, MI, with conjunctivitis. Photo credit: Sarah Hamer, 2006

Viral *Duck plague*

Avian Disease

Duck plague (i.e. duck virus enteritis) is a highly contagious disease of waterfowl caused by a herpesvirus (Friend 1999b). The virus is distributed globally with irregular epizootics occurring in North America since the late-1960s. The virus has been documented in a wide range of waterfowl species, but the most susceptible species include Blue-winged Teal, Redhead, Wood Duck, and Gadwall (Hansen and Gough 2007). Transmission is horizontal with host-to-host contact due to virus shedding and contamination of the environment. The largest epizootic in the United States occurred in 1973 at Lake Andes National Wildlife Refuge in South Dakota when 40,000 Mallards died. This outbreak lead to the realization that wildlife disease could actually cause population-level impacts, providing the motivation for the establishment of the United States Geological Survey's National Wildlife Health Center in 1975. The last known cases of duck plague in Michigan occurred in Muscovy and Mallard ducks in 1979.

West Nile virus

West Nile virus (WNV) first arrived in North America in 1999 and rapidly spread from New York City to much of North and South America in one decade, and has become one of the most widely distributed arboviruses in the world (Weaver and Reisen 2009). The viral agent is maintained by a mosquito-bird cycle, primarily involving *Culex* spp. mosquitoes which transmit WNV to a variety of avian hosts, and occasionally humans, horses, or other mammals which serve as incidental hosts (Kilpatrick et al. 2007); (Figure 5). By a process known as amplification, this mosquito-bird cycle typically increases the virus to peak levels in late summer (Hamer et al. 2008). In the last decade, approximately one million people in the United States are estimated to have been exposed to WNV, resulting in nearly 30,000 human clinical cases, and just over 1,000 fatalities (Gyure 2009).

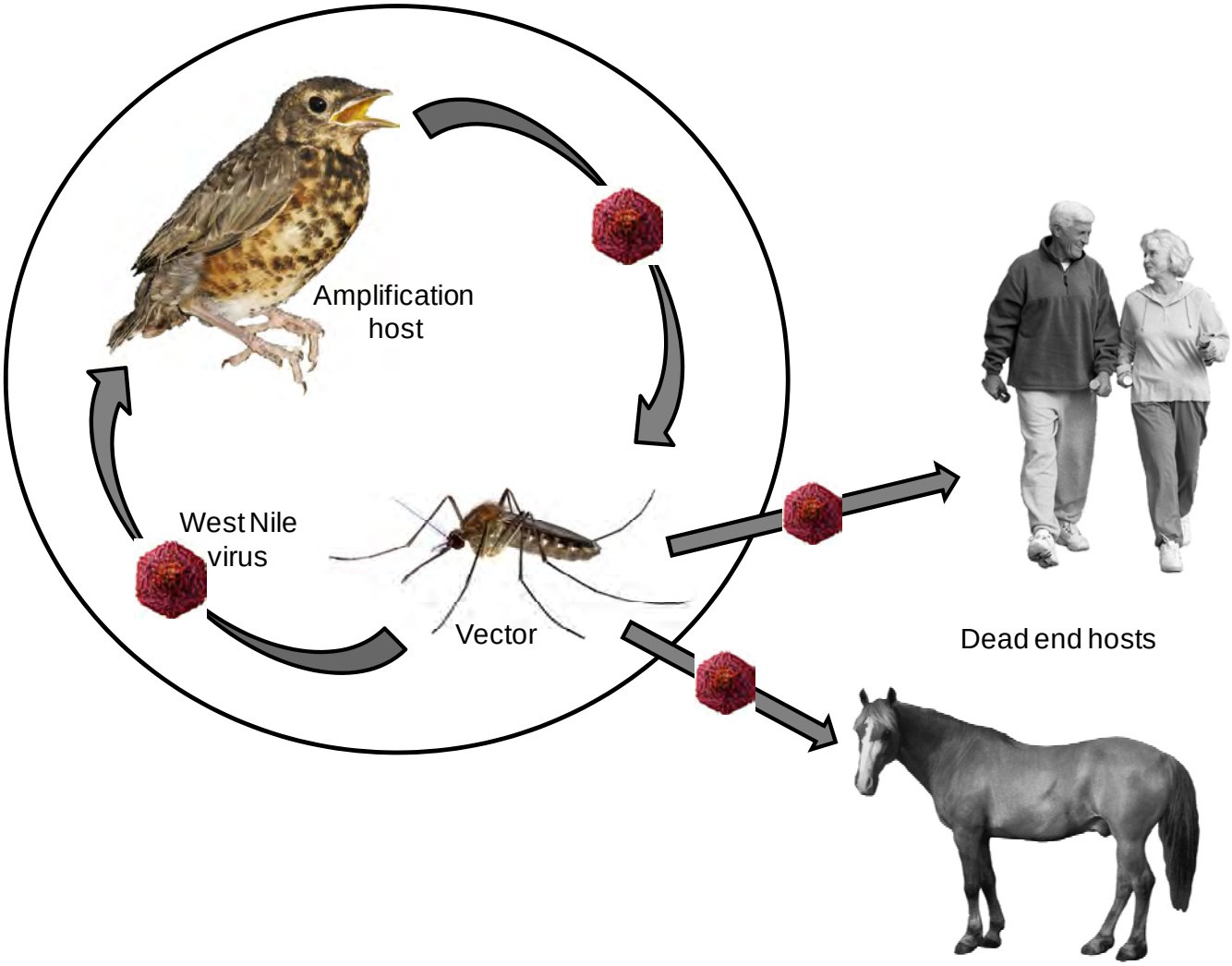


Figure 5: West Nile virus transmission cycle. Figure credit: Gabriel Hamer.

Experimental studies have demonstrated that birds vary in their competence as a host, which is measured by susceptibility to the virus, the amount of virus growth in the bird, and the duration that the bird is considered infectious to other mosquitoes (Kilpatrick et al. 2007). Several studies have used different approaches to determine the impact of WNV on wild bird populations. Yaremych et al. (2004) used a radio-telemetry study to discover 68% mortality of American Crows in 2002 in Central Illinois, when WNV first arrived in the Midwest. Several studies have utilized the U.S. Geological Survey's North American Breeding Bird Survey (BBS) to detect declining trends in bird populations due to WNV (LaDeau et al. 2007, Wheeler et al. 2009). Consistently, birds in the Corvidae family (crows and jays) are highly susceptible to WNV and have significant declines in bird populations, presumably due to WNV. For example, the Yellow-billed Magpie, endemic to California, has declined in abundance since the virus was first detected in the state in 2005, and population-level declines are evident in local surveillance (Smallwood and Nakamoto 2009), Christmas Bird Counts, and BBS data (Crosbie et al. 2008). Due to their high death rates and relative absence in urban environments, American Crows are not the most important species responsible for amplification and maintenance of WNV. Scientific evidence suggests that the American Robin is the most important host for WNV in the eastern half of the United States (Hamer et al. 2009). The risk of WNV to bird populations varies spatially, but the species with apparent population-level declines in some parts of the United States include American Crow, Blue Jay, American Robin, Eastern Bluebird, House Wren, Tufted Titmouse, House Finch, and Chickadee species (LaDeau et al. 2007, Wheeler et al. 2009). Like many species, raptors in general exhibit both susceptibility and tolerance/resistance to the virus, and any local population-level impacts that may have occurred have not manifested in Breeding Bird Survey data. Local-scale surveys of the American Kestrel, for example, show both reduced abundance in nest boxes and high levels of antibodies in surviving birds after the virus passed through (Medica et al. 2007). Due to the patchy distribution of affected birds, standardized bird counts in the non-breeding season, such as the Christmas Bird Count, are not often sensitive enough to detect impacts of the virus on subpopulations because the counts are of accumulations of birds that arrived from many different breeding areas in which only a subset may have experienced WNV transmission.

The first WNV-positive bird in Michigan was discovered in 2002, and since then 151 birds have tested positive for WNV at the MDNR Wildlife Disease Laboratory. Although most of these birds have been Corvids and raptors, this passive surveillance data is difficult to use for assessment of population-level effects, especially since national and state budgets have reduced the funding to test all dead birds arriving in diagnostic labs. Based on BBS trends in the state of Michigan, a few populations of birds appeared to have some level of decline since WNV arrived in 2002, such as American Crows, Blue Jays, and Tufted Titmouse, although it is difficult to determine cause and effect. The most apparent population decline after 2002 occurs in American Crows, but this decline has been followed by a recent increase in 2009, which may suggest a rebounding population. Recent studies have identified increasing antibody prevalence in American Crow populations (Wilcox et al. 2007, Reed et al. 2009), supporting the hypothesis that acquired immunity among some populations will decrease the mortality rate due to WNV. Now that WNV is established in the state, we expect continued transmission from year to year with variable levels of intensity, but bird populations in the state do not appear to be in jeopardy.

Avian Pox

Avian pox is caused by a viral pathogen in the poxvirus group and infects a wide range of bird species worldwide (Hansen 1999). Birds may be exposed to the pathogen horizontally, including direct contact with other infected birds or indirectly after contact with an infected surface such as a bird feeder. Additionally, mosquitoes and other vectors can mechanically transmit the virus from host to host. Once infected, birds develop lesions on the skin of toes, legs, heads, or mouth, which sometimes lead to death.

The majority of wild bird avian pox infections are mild and self-limiting (van Riper and Forrester 2007). Some epizootics have resulted in extremely high mortality rates, especially on islands with naive bird populations, such as Hawaii. In Michigan, 79 birds, over half of which were Wild Turkey, have been diagnosed with avian pox over the past two decades. Bird banders in Michigan commonly detect birds with lesions consistent with pox virus (Figure 6).

Avian influenza

Avian influenza viruses (AIVs) encompass a diverse group of RNA viruses of the family Orthomyxoviridae. AIVs infect domestic poultry and wild aquatic birds, and are typically of low pathogenicity (LP). LPAIVs are transmitted naturally among waterfowl, gulls, and shorebirds and no disease results as these birds are the natural reservoirs of LPAIV worldwide (Stallknecht et al. 2007). These strains may cause respiratory disease or reductions in egg production in domestic poultry. AIVs are transmitted among wild birds through a fecal-oral route when cloacal shedding of the virus occurs, as well as through exposure to contaminated water. High pathogenicity (HP) forms of the virus are named for their ability to cause disease in domestic chickens, and have historically caused epizootics referred to as ‘fowl plague’ with severe systemic infections and high mortality rates. Prior to 2002, the scientific consensus was that while HPAIVs posed significant risks to poultry, there was little or no risk to wild bird populations (Stallknecht et al. 2007). Beginning in 2002 in Asia however, wild and captive exotic birds began displaying signs of morbidity and mortality from infection with HPAIV of the H5N1 lineage (named for



(A)



(B)

Figure 6: A) Wild Turkey with characteristic wart-like avian pox growths on unfeathered portion of skin. B) Brown Thrasher with lesions consistent with pox virus on the bill.
Photo credits: MDNR Wildlife Disease Laboratory and Allen Chartier.

the types of hemagglutinin and neuraminidase proteins on the surface of the virus). This HPAI H5N1 virus was responsible for epizootics in both poultry and wild birds as it spread throughout Asia in the subsequent years, and reached central Europe and Africa by mid-2006 (Stallknecht et al. 2007). Globally, H5N1 virus has been reported in 104 species of wild and domestic birds, with significant mortality loss reported for some species (USGS 2006). Mallard, Northern Pintail, Blue-winged Teal, Redhead, Eurasian Wigeon, and Gadwall appear to be able to become infected with and shed HPAIV without becoming diseased (Munster et al. 2005; Keawcharoen et al. 2008; Brown et al. 2006). While the mechanism of global spread of this virus is unknown, it is likely that both infected migratory birds as well as trade of infected poultry have contributed (Stallknecht et al. 2007).

In general, AIVs are non-infectious to humans due to species barriers to transmission that relate to virus-receptor specificity (Kuiken et al. 2006). There is however, a potential for viral reassortment and mutation that would facilitate human infection and therefore risk of a pandemic (Peiris et al. 2007). Although rare considering the number of infected birds, bird-to-human transmission of the Asian HPAI H5N1 virus has been demonstrated among poultry workers in Southeast Asia. Furthermore, limited, direct human-to-human transmission from poultry workers to their immediate family members has also been documented, although the infrequency with which this has occurred and the inability to rule out common exposure to a contaminated environment do not suggest that the virus has gained the ability to be transmitted in the absence of the avian reservoir (Ungchusak et al. 2005).

In 2006, the US Interagency Early Detection System for Highly Pathogenic H5N1 Avian Influenza in Wild Migratory Birds was implemented by USDA Wildlife Services in response to the spread of HPAIV H5N1 in Europe and Asia (Deliberto et al. 2009, Pedersen et al. 2010). This effort, in conjunction with the US Department of the Interior, all 50 state fish and wildlife agencies, several tribal wildlife agencies, as well as Canadian and Mexican collaborations, constituted the largest wildlife disease surveillance program ever implemented. The aim was not only to detect potential HPAIV in wild birds, but also to provide insight on the variable strains of LPAIV in birds. Using standardized methodology, over 261,000 wild bird samples and 101,000 fecal samples were collected in the US, using a variety of sampling strategies from April 2006 to March 2009 (Deliberto et al. 2009). A majority of the samples were collected from hunter-harvested birds; also sampled were live, apparently healthy birds, sentinel birds (caged birds strategically placed in areas and repeatedly sampled to detect infection), sick or dead birds involved in morbidity or mortality events, and spent fecal samples from the ground. Over 86% of samples were collected from dabbling ducks, geese, swans, and shorebirds due to their importance as reservoir hosts for the virus (Deliberto et al. 2009). In this effort, Michigan was classified as a 'Level One' state, in which the highest level of sampling was conducted based on known distribution of AIVs, species-specific migratory pathways, geographic size and location, wetland habitat, juxtaposition with shorelines, band recovery data, and input from waterfowl biologists. Results provided evidence, with 99.9% confidence, that the US population of wild birds was free of HPAIV given the expected minimum prevalence of 0.001% (Deliberto et al. 2009). Across all states, the apparent prevalence of LPAIV in birds ranged from 9.7-11%, with a majority of virus subtypes detected in ducks. The most common subtype isolated was H5N2 and this type was most commonly associated with Mallards which accounted for the largest percentage of sampled birds, as well as the largest proportion of total virus detections (Pedersen et al. 2010).

While this viral strain is not currently highly pathogenic in poultry, mutations of the LP virus into a HP virus are possible (Fouchier et al. 2007). In Michigan, at least five unique LPAIVs have been detected through this effort (Pedersen et al. 2010). The regular contact and interaction between poultry, wild birds, and humans underscores the importance of understanding diseases that may emerge at this interface and the continued need for well-coordinated and standardized surveillance.

Mycotic

Aspergillosis

Aspergillosis is a respiratory disease of birds and mammals, including humans, caused by infection by a fungus of the genus *Aspergillus*. *Aspergillus* species have a near worldwide distribution, where they are saprophytic – that is, they live upon dead or dying organic matter – and they thrive in warm and moist conditions which favor spore formation, including crop litter in cut fields, grass along rivers, moist grain, hay, or silage, damp straw or rotting plant or animal materials (Friend 1999a). Thus, birds that are most at risk for becoming infected include species exposed to these environmental risk factors, such as wild aquatic and scavenger species, and birds that feed in agricultural fields, as well as domestic birds that are fed tainted feed. Wild birds that are transported or held in captivity have also developed disease (Converse 2007). The most commonly documented species causing disease in wild birds is *A. fumigatus*. Birds become infected upon inhalation of fungal spores in the air near a contaminated environmental source; the fungus is not transmissible directly from bird-to-bird or from bird-to-mammal (Merton 1964). The inhaled spores then lodge within the lungs and the vegetative form of the fungus (the mycelium) produces branching hyphae that infiltrate the lungs and other tissues, resulting in pneumonia and other disease manifestations. Some mycelia produce mycotoxins which can further damage blood cells, the neurological system, or other organs (Moss 2002). Aspergillosis may manifest acutely or chronically. In the acute form, birds otherwise in good body condition die rapidly after pneumonia develops, and epizootics may result when a large number of birds are exposed to a common contaminated environmental source. Conversely, in the chronic form, some birds that are exposed to the fungus may live with the infection for a long period of time before other concurrent disease, poor nutrition, or other forms of stress compromise immune function, allowing the fungus to flourish.

Over the past two decades in Michigan, aspergillosis has been identified as the cause of death in over 200 birds, with the Common Loon, Canada Goose, Mallard, Red-tailed Hawk, and Ring-billed Gull responsible for 55% of passive surveillance cases. While the ubiquitous distribution of pathogenic *Aspergillus* species in the environment suggests that wild birds will continuously be exposed, preventative measures that can be taken to reduce the risk of wild bird infection in an agricultural setting include preventing wild bird access to spoiled animal feeds as well as plowing fields of waste grain before winter if grains have become molded from excess rain or snow, and keeping bird feeders and nest boxes free of moldy grain or damp materials (Converse 2007).

Toxins, Poisons, and Pollutants

Heavy metals: Lead poisoning

Lead toxicosis is the most commonly reported waterfowl disease caused by heavy metals and has been documented in free-ranging birds since the 1800s (Sanderson and Bellrose 1986, Friend 1999c). The major source of exposure of wild birds is through the ingestion of lead shot and lead fragments from hunting activities and other lead materials such as fishing sinkers and jig heads (Figure 7). The lead enters the gizzard and is dissolved and absorbed into body tissues, causing paralysis and eventual death. Raptors can be exposed by bioaccumulation when they consume carcasses containing lead. The magnitude of the problem was slowly realized through research in the 1970s and 1980s when an estimated 1.6 to 2.4 million waterfowl died each year from lead poisoning caused by lead shot ingestion. As a result, federal legislation banned the use of lead shot for waterfowl hunting in 1991 in the United States and 1997 in Canada (Degernes 2008). In addition, non-toxic shot is also required in some states for hunting other game birds, such as Mourning Doves. In 2007, the California state government passed the Ridley-Tree Condor Preservation Act which requires the use of lead-free bullets for big game hunting in the range of the California Condor.

Although hunters have shifted to non-toxic shot such as steel, tungsten, or bismuth when hunting waterfowl, birds are still dying of lead poisoning in Michigan and elsewhere. Over the past two decades, the MDNR Wildlife Disease Laboratory has diagnosed 249 birds with lead poisoning (mostly waterfowl, loons, and Bald Eagles), and the annual numbers have not been declining since 1991 when the ban on lead shot was implemented. One reason for this could be the long-term persistence of lead shot in wetlands, which will likely require over 25 years to dissipate (Flint and Schamber 2010). Although the reduction of the use of lead shot has shown signs of reducing lead toxicosis nationwide, in recent years, reduction in the availability in nature of other sources of lead, such as fishing sinkers, has received more attention, resulting in bans of lead fishing tackle and voluntary programs that encourage the use of non-toxic alternatives (Friend 1999c).



Figure 7: Fishing spoon and lead jig head in the ventriculus (gizzard) of a Common Loon from Michigan. Photo credit: MDNR Wildlife Disease Laboratory.

Biological toxins: Botulism (Type C and E)

Globally, botulism is an extremely important avian disease and in North America it has been responsible for over a million bird deaths in a single year (Rocke and Bollinger 2007). This disease of both animals and humans is caused by neurotoxins produced by the bacteria, *Clostridium botulinum*. There are at least seven different neurotoxins produced by different strains of *C. botulinum*, the most common being type C and type E. Both types result in birds affected with varying degrees of paralysis, hence the common name 'limberneck' for the disease.

Type C botulism has been known as an important disease in waterfowl and other wetland birds, particularly in the western US, since biologists first took note of it in the early twentieth century. The primary transmission cycle for this disease is described as a carcass-maggot cycle (Rocke and Friend 1999). Briefly, decaying organic matter in stagnant water provides the ideal anaerobic and hot environment conducive to toxin production by the growth and multiplication of *C. botulinum*. Invertebrates ingesting the carcass concentrate the toxins and are consumed by wetland birds. Once more birds start to die, they contribute to *C. botulinum* growth and perpetuate the cycle. This cycle typically occurs in late summer when the lack of rain and hot temperature creates stagnant water environments. In Michigan, these outbreaks have traditionally occurred in wetlands near the Detroit River and Saginaw Bay. Type C botulism has been implicated for its large scale population level impacts in the western US; in California in 1996, 8,500 American White Pelicans were killed, an estimated 15-20% of the western metapopulation (Rocke et al. 2005). Type C botulism outbreaks in Michigan have been less frequent, less dramatic, and have less of an impact on avian populations. However, the impact on threatened or endangered birds such as the Piping Plover and the potential for outbreaks in zoo exhibits warrants wetland management practices to reduce late-summer stagnant water conditions. These management actions are encouraged at many state and federally-owned wetlands and at wetlands outside the state where Michigan breeding birds migrate or winter.

Type E botulism occurs primarily in fish and fish-eating birds of the Great Lakes Region and has resulted in extensive epizootics occurring more frequently in recent years (Riley et al. 2008). Much less is known about the growth conditions conducive to *C. botulinum* growth and toxin production in the Great Lakes and an interdisciplinary

team of researchers are investigating the transmission ecology. One hypothesis for the mechanisms leading to epizootics involves two invasive exotic species of mussels, quagga mussel (*Dreissena bugensis*) and zebra mussel (*Dreissena polymorpha*), that filter-feed and improve water clarity allowing light to penetrate deeper into the lake. The increased light improves algal growth, creating an environment with low oxygen levels as the algae proliferates and decomposes on the lake bottom. Once the correct anoxic environment for *C. botulinum* is established, the toxins accumulate in mussels and fish, particularly the invasive round gobie (*Neogobius melanostomus*), which are then consumed by fish-eating susceptible avian species. The inconsistent epizootics of large numbers of birds washing ashore have been associated with local environmental and limnological triggers (Perez-Fuentetaja et al. 2006). Although much remains unknown about this complex disease system, much attention has been focused on it in recent years and a task force consisting of state, federal, and provincial agencies in the Great Lakes Region met in Michigan in 2008 to synthesize data and direct management strategies.

From 1999 to 2008, an estimated 70,000 avian mortalities were reported in the Great Lakes due to type E botulism, typically occurring in October and November. The majority of these birds were gulls, loons, waterfowl, and shorebirds (Figure 8). The most likely species with a population level impact due to type E botulism include: Common Loon, Herring Gull, Great Black-backed Gull, and Piping Plover. Of these, Common Loon have potentially been impacted at the population level during the fall epizootics on Lakes Michigan, Huron, and Erie. Events of loon epizootics are often followed by drops in the BBS counts the following year, suggesting population level impacts, but the populations also appear to rebound quite readily (Figure 9). The loons that are being exposed to botulism toxins (presumably through fish) are staging on the Great Lakes during migration. Of the 36 Common Loons collected in Lake Michigan, processed by the MDNR Wildlife Disease Laboratory and diagnosed with type E botulism, all but one were adult birds. This age bias toward adults was also observed from a loon epizootic in Lake Huron in 1999, where 100% of the dead birds were adults. The disproportional impact on adult birds could have a greater impact on subsequent recruitment. The recent drop in populations of loons in Michigan, Wisconsin, and Minnesota since 2007 might be related to the large type E botulism epizootics in Lake Michigan in 2006 and 2007. Fortunately, little botulism activity occurred in 2008. Many government agencies in the Great Lakes Region are carefully monitoring the population impacts of avian botulism so more knowledge should be forthcoming.



Figure 8: Dead loons, grebes, and ducks along Lake Michigan's shoreline during the 2007 epizootic of Botulism type E. Photo credit: MDNR Wildlife Disease Laboratory.

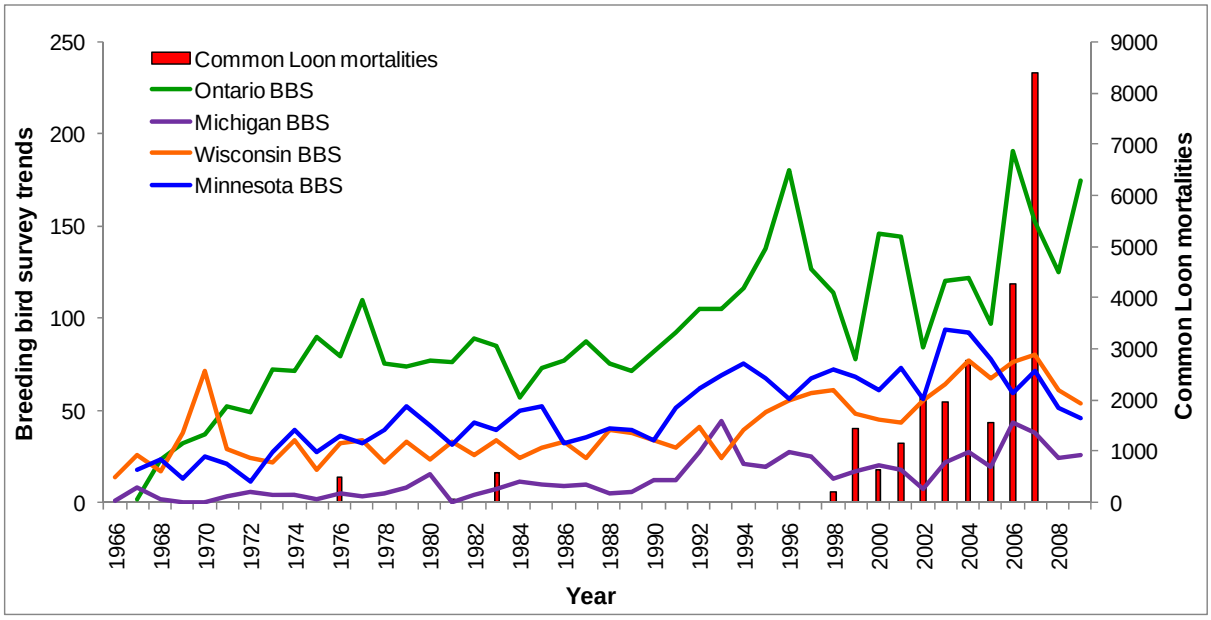


Figure 9: Common Loon Breeding Bird Survey trends and estimated mortalities in the Great Lakes. Mortality estimates were aggregated from (Fay et al. 1965, Brand et al. 1983, SeaGrant 2001, Office 2008)

Conclusion

Rates of disease emergence will continue to increase given globalization, species invasions, climate change and its influence on species distributions, habitat destruction, and other factors. A common theme preceding disease emergence is the increasing interface among humans, wild animals, and domestic animals – at this interface, pathogens are shared among species. The role of wild birds in pathogen maintenance and spread of disease has been of increasing scientific interest over the past decade given the emergence of West Nile virus and avian influenza. Elucidating the migratory patterns of wild birds will assist in understanding the spread of diseases of importance not only for wild bird health, but also for the health of domestic birds, wild mammals, livestock, pets, and humans. Despite decades of scientific research, wild bird populations are still plagued by historically important diseases, including botulism and trichomoniasis. Importantly, disease in wild birds is often the result of multiple factors with a cumulative effect of decreasing bird health, including poor nutrition, breeding, migratory, or territorial stress, and chronic, subclinical infection with pathogens. As we continue to try to protect the health of wild populations, surveillance of birds for disease presence will be of continued importance. Michigan's bird enthusiasts can play an important role by staying informed about the important wild bird diseases in our state, regularly sanitizing bird feeders, and being vigilant for the abnormal occurrence of sick or dead birds that can be reported to the Michigan Department of Natural Resources, Wildlife Disease Laboratory online (http://www.michigandnr.com/diseasedwildlifereporting/disease_obsreport.asp).

S.A. Hamer, T.M. Cooley, and G.L. Hamer

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Michigan Important Bird Areas Program

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Introduction

The Important Bird Areas Program (IBA) is a global effort to identify and conserve areas that are vital to birds and other biodiversity. The majority of birds, especially those in greatest need of protection, have specific habitat requirements, from which it follows that not all areas are equally valuable to birds. If the most valuable sites are properly conserved, bird diversity and abundance can be buffered from the effects of habitat loss, degradation and the other pervasive threats that birds and their habitats face. The Important Bird Areas Program is spearheaded and coordinated globally by BirdLife International. In the United States the Important Bird Areas Program is coordinated by the National Audubon Society. The program in Michigan began in 2006 with the hiring of a coordinator by National Audubon Society. The Michigan IBA Program, while led by an Audubon staff member, is a partnership involving Detroit Audubon, Kalamazoo Nature Center, and Michigan Audubon.

Important Bird Areas are identified at the state, continental and global level (Table 1). The identification of Important Bird Areas is conducted by state technical committees for State IBAs, and a U.S. Important Bird Areas Committee for Continental and Global IBAs. Important Bird Area criteria fall into four categories:

1) Species of conservation concern (e.g. threatened and endangered species)
2) Range-restricted species (species vulnerable because they are not widely distributed)
3) Species that are vulnerable because their populations are concentrated in an ecoregion or particular habitat
4) Species, or groups of similar species (such as waterfowl or shorebirds), that are vulnerable because they occur at high densities due to their congregatory behavior

The Michigan Important Bird Areas Technical Committee developed state level criteria most applicable to Michigan's birds. These criteria are tailored to the population levels and habitat conditions in Michigan and are defined as follows;

1) **Michigan Species of Conservation Concern (D1)** - includes species recognized by the Michigan Department of Natural Resources (MDNR) as endangered, threatened or by the Michigan Natural Features Inventory as special concern, and species on the Audubon WatchList. Specific thresholds are defined for each species (Table 2).
2) **Michigan Congregations (D4)** - sites supporting outstanding congregations (see Table 1 for details).

IBA Process

Identification and Prioritization

In Michigan, the identification of Important Bird Areas starts with the compilation, by the coordinator, of site attributes including location, bird species and numbers, criteria met, as well as ownership, habitat, land use, and conservation threats. Once data are compiled, site nominations are passed to the state IBA technical committee for approval. Sites meeting at least one threshold (an IBA "trigger") are then evaluated by the technical committee for IBA status and can subsequently be deemed a state level IBA. The state technical committee membership is outlined in Appendix 1. Members were selected to give broad geographical representation and expertise across several taxa. Most members have extensive backgrounds in conservation biology. A key goal of Audubon's engagement of this group is to provide for the technical input of each of the state's land conservation agencies into the IBA process.

Once reviewed by the state committee, identified Important Bird Areas with the potential to meet global or continental criteria are forwarded to the national IBA office and prepared for U.S. IBA Committee review. Sites are identified as either global or continental level IBAs; if data are not sufficient to support the site's significance at that level, the IBA remains a state level IBA. State level thresholds for each species of conservation concern (D1 IBA criteria) are given in Appendix 2. Risk categories (column 3 in Appendix 2) were assigned to each species in the following manner: Species were classified as "severe risk" if detected in fewer than 60 atlas blocks during Michigan Breeding Bird Atlas II (7192 total blocks), "moderate risk" if between 60 and 362 blocks, and "low risk" if greater than 362 blocks.

- **Table 1** IBA Criteria Codes and Brief Descriptions.

Criteria Level	Code	IBA Criteria Descriptions
Global	A1	A1-Global: Global Species of Conservation Concern
Global	A2	A2-Global: Assemblage of Restricted-range species
Global	A3	A3-Global: Assemblage of Biome-restricted species
Global	A4i	A4i-Global: >1% biogeographic. waterbird pop. (N.A. pop.) simultaneously; 5% over season
Global	A4ii	A4ii-Global: >1% global pop. seabirds/terrestrial sp. simultaneously; 5% over season
Global	A4iii	A4iii-Global: > 20,000 waterbirds/ >10,000 seabirds
Global	Aiv	A4iv-Global: > 5% N.A. pop. migratory waterbirds; >5% global pop. migratory seabirds/terrestrial sp. during season
Continental	B1	B1-North America: Continental Species of Conservation Concern
Continental	B3	B3-North America: Assemblage of Bird Conservation Region-restricted Species
Continental	B4i	B4i-North America: >1% flyway/subsp. waterbird pop. simultaneously; 5% over season
Continental	B4ii	B4ii-North America: > 1% N.A. pop. seabirds/terrestrial sp. simultaneously; 5% over season
Continental	B4iv	B4iv-North America: >5% flyway/subsp. pop. migratory waterbirds; >5% N.A. pop. migratory seabirds/terrestrial sp. during season
State	D1	D1-Michigan: State species of conservation concern.
State	D4i	D4i-Michigan; Top 3-5 sites or 1% of state population.
State	D4ii	D4ii-Michigan: 2,000 Waterfowl (excluding Mallard and Canada Goose)
State	D4iii	D4iii-Michigan: 100 Wading birds
State	D4iv	D4iv-Michigan: 2,500 Gulls (nesting pairs only)
State	D4iv	D4iv-Michigan: 25 Terns (nesting pairs only)
State	D4v	D4v-Michigan: 500 migratory shorebirds daily
State	D4vi	D4vi-Michigan: 1,000 migratory raptors per season
State	D4vii	D4vii-Michigan: exceptional landbird migration

Michigan Important Bird Areas Program

Site Grouping

A fundamental challenge of the IBA process was the issue of site grouping, or boundary delineation. It was often argued that the search area could be increased until enough individual territories or individuals were encompassed to meet a given threshold. Alternatively many adjacent territories that meet a threshold could be identified individually. The committee recognized this issue and identified the best course of action on a species-by-species basis. Site boundaries for IBAs were central to the process. Those triggers that were tightly clustered on the landscape (*e.g.,*. wintering waterfowl on the Detroit River, migrating raptors concentrated at Whitefish Point, Common Tern nesting colonies) were relatively straightforward in terms of how their boundary was delineated. Others were more difficult, as there was often no easily discernible clustering pattern or obvious habitat patch in which to objectively group them. For such species, Land Type Association (LTA) boundaries (Albert 1995) were used. A similar approach was used for Spruce Grouse, Sharp-tailed Grouse, Red-shouldered Hawk, Northern Goshawk, Black-backed Woodpecker, Golden-winged Warbler, Grasshopper Sparrow, and Henslow's Sparrow. In these cases, every effort was made to match IBAs with the regions supporting the state's highest densities.

Two species, the Kirtland's Warbler and the Piping Plover (Great Lakes population only), received additional consideration due to their highly specific habitat needs on breeding areas and highly threatened status. In both cases, the species relies on a patchwork of highly disjunct sites for breeding. In the case of the Piping Plover, each patch is recognized as federally-designated critical habitat by the U.S. Fish and Wildlife Service. In the case of Kirtland's Warbler, these management units are primarily in federal and state ownership. In any given year, many or most of these disjunct patches are not occupied (due to inappropriate water levels and stochastic processes for the plover and incomplete successional stage for the warbler), however over the long term each patch requires protection as it will likely provide the proper conditions for these species in time. Kirtland's Warbler constitutes the only species in Michigan for which several separate sites are grouped together to represent a single IBA, and Piping Plover represents the only species for which sites not currently occupied by the species were given IBA status (*i.e.*, separate sites were recognized, but not grouped).

IBA Boundaries

Where possible, IBA boundaries were drawn to represent ecological boundaries rather than political delineations. Examples included small patches of habitat such as patches of lowland deciduous floodplain forest supporting Cerulean Warblers (*e.g.*, Galien River/Warren Woods) and large patches (Gladwin Lake Plain, an ecoregion supporting a high density of breeding Golden-winged Warblers). However, especially in the heavily-developed southern Lower Peninsula, boundaries often had to be relegated to the largest contiguous patches of public ownership (*e.g.*, Allegan State Game Area, Pinckney/Waterloo complex).

A consequence of the different grouping regimes for IBAs was that some IBA boundaries overlapped others spatially yet were not considered the same IBA. Hawk migration corridors do not include the substrate, but rather only the air column used by the birds, so the Lake Erie Metropark Hawk Watch boundary overlaps that of the Detroit River IBA boundary. The Kirtland's Warbler Management Units IBA also overlaps several other separate IBAs, such as the Lower Au Sable River and Iosco County Northern Goshawk IBA, and the Raco Plains and Wilwin Wetland IBA. There was no other way to group these IBAs without losing the uniqueness of the Kirtland's Warbler Management Units IBA. These are the only examples in Michigan where this applies.

De-listing of IBAs

In order to retain the robustness of the IBA network, it was agreed by all technical committee members that sites no longer supporting the species for which the site was identified must be removed from the network. Audubon is attempting to set up long term monitoring of IBAs to detect such trends, and the committee remains ready to delist sites should this be merited.

The Michigan IBA Network

Through the IBA identification process, the Michigan IBA Technical Committee approved 102 IBAs in Michigan in 2009 and 2010 (Figure 1), nine of which subsequently received global significance from the U.S. IBA Technical Committee. The remaining 93 IBAs are recognized at the state level only. A complete list of these sites, as well as detailed individual site reports and other resources is available at: http://iba.audubon.org/iba/stateIndex.do?state=US-MI

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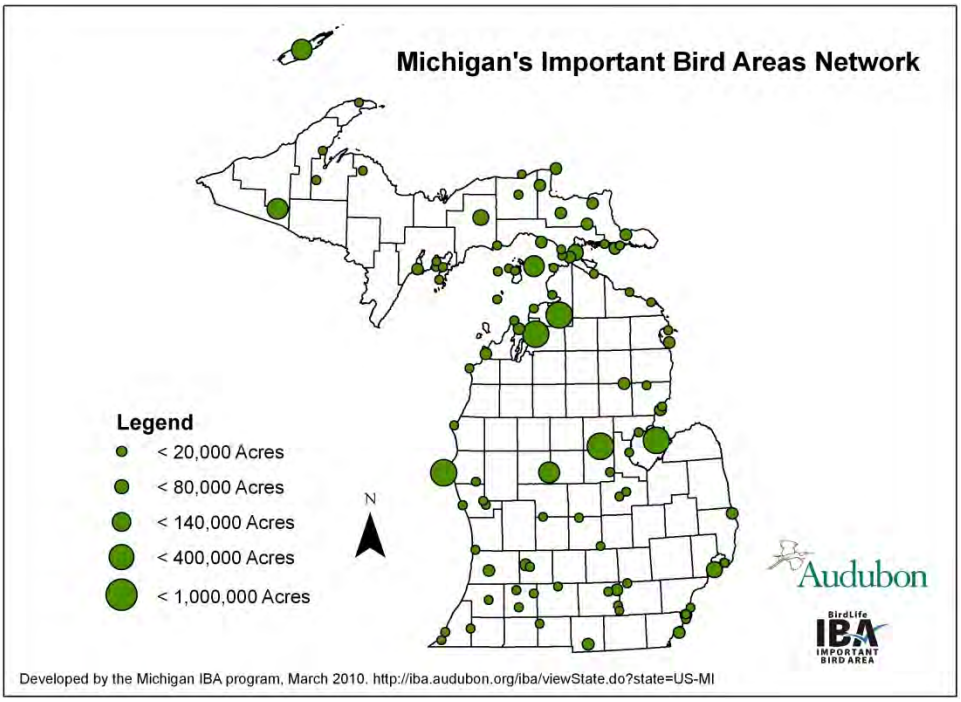


Figure 1 The Michigan Important Bird Areas network.

Conservation of IBAs in Michigan

The Important Bird Area designation does not guarantee conservation of the sites. Rather, it is used to focus limited conservation resources towards the most important sites and conservation issues, and to leverage funding for conservation action where it matters most. Audubon spearheads the formation of IBA Support Groups in order to achieve these goals. IBA Support Groups are composed of interested landowners, stakeholders, volunteers, and other citizens in order to promote and protect specific IBAs and their birds.

IBA Support Group actions are guided by the state coordinator and the Important Bird Areas Assessment process developed by Audubon's National Science Office. Audubon IBA Support Groups operate through an adaptive management process outlined by the Conservation Measures Partnership's *Open Standards for the Practice of Conservation* (Conservation Measures Partnership 2007). This process mandates the collection of and application of data on threats to each IBA, and helps participants to devise and implement successful conservation strategies to counteract these threats. It then measures the success of the group's efforts and helps the group adapt its actions as needed to correct for ineffective actions.

Michigan currently has two support groups in development. The first, spearheaded by Detroit Audubon, is focused on assessing the viability of breeding colonies of Black Terns and Forster's Terns on the St. Clair Flats and Harsen's Island IBA. This group is also working with the Detroit River International Wildlife Refuge to develop and implement a bird survey to determine the success of shoreline and wetland restoration projects at several areas within the Globally Significant Detroit River IBA. The second group is working to promote the creation of Henslow's Sparrow habitat on private lands within the Hillsdale County Henslow's Sparrow IBA, currently one of the state's top sites for this rare Michigan breeding bird. Interested individuals or organizations who would like to explore the formation of other Support Groups are encouraged to contact the Michigan IBA Program Coordinator.

Caleb G. Putnam

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Appendix 1: Michigan Important Bird Areas Technical Committee Members and Affiliations.

Ray Adams, Retired Director of Research, Kalamazoo Nature Center

John Cecil, Director, U.S. Important Bird Areas Program

Karen Cleveland, All-Bird Biologist, Michigan Department of Natural Resources

Greg Corace, Forester, Ecologist, Seney National Wildlife Refuge, U.S. Fish and Wildlife Service

Dave Ewert, Senior Conservation Scientist, The Nature Conservancy

David Flaspohler, Associate Professor, Michigan Technological University

Kimberly Hall, Great Lakes Climate Change Ecologist, Nature Conservancy

Michael Hamas, retired faculty, Central Michigan University

Bob Hess, retired biologist, Michigan Department of Natural Resources

Joe Kaplan, Director, Common Coast Research and Conservation

Mike Monfils, Conservation Scientist, Michigan Natural Features Inventory

Karl Overman, Detroit Audubon

Caleb Putnam, Michigan Important Bird Areas program coordinator, Audubon

Steve Sjogren, Wildlife Biologist, U.S. Forest Service

Richard Wolinski, Wildlife Ecologist, Michigan Department of Transportation

Appendix 2: Michigan IBA D1 thresholds.

Thresholds are given in the format: # of breeding individuals/pairs (b-i/p); # of migrant individuals (m-i); # of wintering individuals (w-i).

Species	Audubon Watchlist (NAS 2011)	MDNR/MNFI Status (MDNR 2011)	Risk Category (breeders only)	D1 Threshold
Common Loon	Yellow	T	Low	*20/40, 60, 60*
American Bittern		SC	Moderate	*5/10, 15, -*
Least Bittern		T	Moderate	*5/10, 15, -*
Black-crowned Night-Heron		SC	Severe	*5/10, 15, 15*
Trumpeter Swan	Yellow	T	Moderate	*5/10, 60, 60*
Northern Harrier		SC	Moderate	*5/10, 15, 15*
Northern Goshawk		SC	Moderate	*5/10,15, 15*
Red-shouldered Hawk		T	Low	*30/60, 90, 90*
Merlin		T	Moderate	*9/18, 27, 27*
Peregrine Falcon		E	Severe	*Criterion not used since most individuals are in urbanized areas not suitable for IBAs*
Spruce Grouse		SC	Severe	*10/20, 30, 30*
Sharp-tailed Grouse		SC	Moderate	*20/40, 60, 60*
Yellow Rail	Red	T	Severe	*5/10, 6, -*
King Rail	Yellow	E	Severe	*2/4, 6, -*
American Golden-Plover	Yellow		n/a	*-, 60, -*
Piping Plover	Red	E	Severe	*All federally-designated critical habitat*
Hudsonian Godwit	Yellow		n/a	*-, 60, -*
Marbled Godwit	Yellow		n/a	*-, 60, -*
Red Knot	Yellow		n/a	*-, 60, -*
Sanderling	Yellow		n/a	*-, 60, -*
Semipalmated Sandpiper	Yellow		n/a	*-, 60, -*
White-rumped Sandpiper	Yellow		n/a	*-, 60, -*
Stilt Sandpiper	Yellow		n/a	*-, 60, -*
Buff-breasted Sandpiper	Red		n/a	*-, 15, -*
Thayer's Gull	Yellow		n/a	*-, 60, -*
Iceland Gull	Yellow		n/a	*-, 60, -*
Wilson's Phalarope		SC	Severe	*2/4, 15, -*
Caspian Tern		T	Moderate	*20/40, 60, -*
Common Tern		T	Severe	*20/40, 60, -*

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Species	Audubon Watchlist (NAS 2011)	MDNR/MNFI Status (MDNR 2011)	Risk Category (breeders only)	D1 Threshold
Black Tern		SC	Moderate	*25/50, 75, -*
Barn Owl		E	Severe	*2/4, 6, 6*
Long-eared Owl		T	Severe	*2/4, 6, 6*
Short-eared Owl		E	Severe	*2/4, 6, 6*
Red-headed Woodpecker	Yellow		Low	*50/100, 150, 150*
Black-backed Woodpecker		SC	Severe	*10/20, 30, -*
Olive-sided Flycatcher	Yellow		Moderate	*10/20, 30, -*
Willow Flycatcher	Yellow		Low	*20/40, 60, -*
Loggerhead Shrike		E	Severe	*3/6, 9, -*
Bell's Vireo	Red		Severe	*3/6, 9, -*
Marsh Wren		SC	Moderate	*15/30, 45, -*
Wood Thrush	Yellow		Low	*50/100, 150, -*
Blue-winged Warbler	Yellow		Low	*30/60, 90, -*
Golden-winged Warbler	Red		Moderate	*30/60, 90, -*
Yellow-throated Warbler		T	Severe	*10/20, 30, -*
Kirtland's Warbler	Red	E	Moderate	*All federal and state management areas except Wetmore Outwash. Include Guide's Rest.*
Prairie Warbler	Yellow	E	Severe	*5/10, 15, -*
Bay-breasted Warbler	Yellow		Severe	*5/10, 15, -*
Cerulean Warbler	Yellow		Moderate	*5/10, 20, -*
Prothonotary Warbler	Yellow		Moderate	*15/30, 45, -*
Kentucky Warbler	Yellow		Severe	*5/10, 15, -*
Hooded Warbler		SC	Moderate	*20/40, 60, -*
Canada Warbler	Yellow		Moderate	*20/40, 30, -*
Grasshopper Sparrow		SC	Low	*30/60, 90, -*
Henslow's Sparrow	Red	E	Moderate	*5/10, 15, -*
Le Conte's Sparrow	Yellow		Severe	*30/60, 90, -*
Dickcissel		SC	Moderate	*10/20, 30, -*
Western Meadowlark		SC	Severe	*5/10, 15, -*
Yellow-headed Blackbird		SC	Severe	*10/20, 30, -*
Rusty Blackbird	Yellow		Severe	*3/6, 90, 90*

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Introduction

"Propelled by an ancient faith deep within their genes, billions of birds hurdle the globe each season…They are not residents of any single place but of the whole, and their continued survival rests almost entirely within our hands."
- Scott Weidensaul

Migratory birds are some of nature's most magnificent resources. They play a significant role in the health of the environment, economy, and culture in Michigan, across the U.S. and internationally (USFWS 2011). Birds captivate us with their spectacular migration, beautiful plumage and awe-inspiring gift of song, occasionally provide sustenance, and even serve as indicators of environmental quality and change. As such, birds have intrinsic value to people as threads in the earth's ecological tapestry (USFWS 2004).

Because migratory birds inhabit a variety of landscapes as they move across state lines and international borders, virtually all nations, organizations, and individuals can influence migratory birds and their habitats (USFWS 2004). Arguably, they also all share in the conservation estate of birds. Michigan has a rich history partnering for bird conservation through on-the-ground management and protection of important habitats and populations, providing sound science to guide decision-making, and fostering a sense of stewardship among citizens and youth.

The following sections detail prominent bird conservation partnerships that intersect or are embedded within the state of Michigan. Key to their individual success is connectivity with each other at varying levels (i.e., site, state, region, nation, flyway) to share knowledge, ensure strategic allocation of limited resources, and foster creative solutions to challenges facing bird conservationists alike.

North American Bird Conservation Initiative

Excerpted from NABCI website (undated)

Beginning in 1999, the U.S. North American Bird Conservation Initiative (NABCI) Committee has been a forum of government agencies, private organizations, and bird initiatives helping partners across the continent meet their common bird conservation objectives. The Committee is working to secure a bright future for North America's more than 1,150 species of birds, in conjunction with NABCI partners in Mexico and Canada

The Committee's strategy is to foster coordination and collaboration on key issues of concern, including bird monitoring, conservation design, private lands, international collaboration, and state and federal agency support for integrated bird conservation.

Vision: *We envision populations and habitats of North America's birds that are protected, restored, and enhanced through coordinated efforts at international, national, regional, state, and local levels, guided by sound science and effective management.*

Goal: *We aim to deliver the full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships.*

In order to achieve integrated bird conservation, NABCI focuses on the following three themes:

1) Conserving Birds Across Geopolitical Boundaries - Most birds travel great distances across our politically delineated landscapes – flying hundreds, in some cases thousands of miles during annual migrations. On-the-ground management is often linked to bird population response at the regional or continental scale. Bird conservation, therefore, requires broad geographical perspectives – perspectives that are regional, national, continental, hemispheric, and even global in scale. Coordinating and supporting conservation activities across these geopolitical boundaries will ensure that birds are protected throughout the geographic ranges of their annual life cycles.
2) Conserving Birds Across Taxonomic Groups - Birds of different taxonomic groups, such as waterfowl, raptors, shorebirds, and songbirds, often share the same habitats or use adjoining habitats within the landscape. By using a common spatial language and ecological framework to identify priority habitats and sites shared among birds of different taxonomic groups, conservation actions can be directed comprehensively to all priority birds within a landscape. Finding such 'common ground' is the key to conserving North America's precious bird diversity.

3) Conserving Birds Across Landscapes - Both humans and wildlife depend upon the bounty of the earth's natural landscapes for sustenance and survival. Sustainable landscape-level conservation thus requires that the biological needs of birds, and a host of other wildlife, be successfully incorporated into land-use policies, programs, and management practices affecting broad landscapes at regional scales. Since bird populations respond throughout their ranges to variations in landscape-level conditions, bird conservation must be delivered in the context of achieving a pre-established design of landscape sustainability.

End excerpt

NABCI also maintains the map of Bird Conservation Regions (Figure 1), ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues that are foundational to bird conservation planning and collaboration.

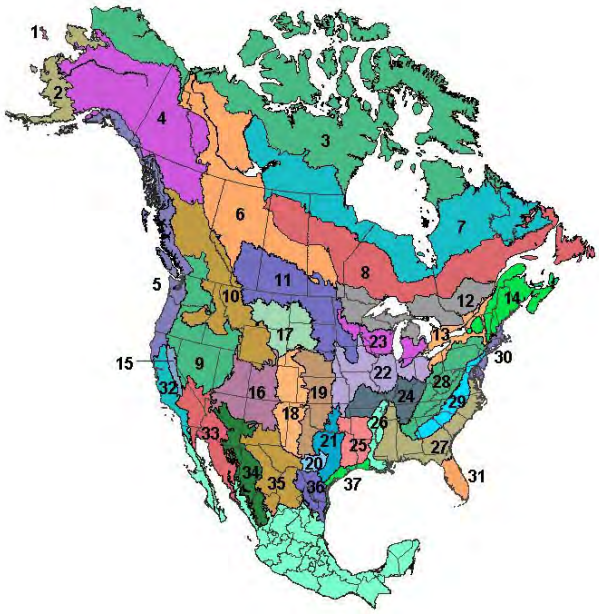


Figure 1. Map of Bird Conservation Regions (BCRs) in North America (BCR 67 (Hawaii) not shown) (NABCI 2011).

Since 2009, NABCI has also led the development and production of an annual US State of the Bird Report (http://www.stateofthebirds.org/), a collaborative effort that pulls together data from many sources to give an annual summary of the population status of U.S. birds in an easy-to-read, informative format. It serves as a measurable indicator of how well the US is doing as a steward of its environment. The first report, in 2009, focused on avian populations (NABCI 2009). The focus of these reports varies year by year, the 2010 report focused on Climate Change (NABCI 2010). In 2011, the report focused on bird distribution across public lands and will help public agencies identify which species they have the greatest conservation potential for by habitat. "Clearly, greater conservation efforts on public lands and waters are needed to realize the vision of a nation sustained economically and spiritually by abundant natural resources and spectacular wildlife (NABCI 2011)."

Partners in Flight

Excerpted Partners in Flight website (Ruth 2006)

Partners in Flight (PIF) is a cooperative effort involving partnerships among organizations, federal and state agencies, universities, industry, conservation groups, and individuals working together to conserve birds in the Western Hemisphere. The underlying premise of PIF has been that the resources of public and private organizations in North and South America must be combined, coordinated, and increased in order to achieve successful bird conservation throughout the hemisphere.

The Partners in Flight mission focuses on three concepts, which are administered by dedicated committees and volunteer groups:

1) Helping Species at Risk – Species must be conserved before they become imperiled. Allowing species to become threatened or endangered results in long-term and costly recovery efforts whose success is far from guaranteed. Endangered species must not only be protected from extinction but must be recovered to once again play their roles in ensuring the future of healthy ecosystems.

2) Keeping Common Birds Common – Common native birds, both resident and migratory, must remain common throughout their natural ranges. These species comprise the core of our avian diversity and are integral to their respective ecosystems.

3) Voluntary Partnership for Birds, Habitats and People – Conservation of landbirds and their habitats is not a task that can be undertaken alone. Partnerships must be formed with others who are working for conservation on the same landscapes as well as those who depend on those landscapes for their economic and social well-being. The conservation of natural systems is a fundamental necessity for life on earth, including that of humans.

Excerpted from Rocky Mountain Bird Observatory (2005)

In 1991, PIF began developing a formal species assessment process that could provide consistent, scientific evaluations of conservation status across all bird species in North America and could also identify areas most important to the conservation of each species. The information used and generated by this process is housed in the PIF species assessment database which is maintained by the Rocky Mountain Bird Observatory and is made available to the public through their website: http://www.rmbo.org/pif/pifdb.html. The species assessment scores and other

assessment data can be viewed online to quickly and easily examine and compare the conservation status of individual bird species, either globally or within a particular geographic area. Scores and other information from the database can also be downloaded and used in any number of ways to examine various aspects of the biology and conservation of North American birds.

Excerpts from Rocky Mountain Bird Observatory (2007)

PIF also maintains a database of landbird population estimates in cooperation with Rocky Mountain Bird Observatory (http://rmbo.org/pif_db/laped/). These estimates were derived from Breeding Bird Survey data from the 1990s and thus reflect average population sizes during that decade. These estimates may serve as the first step in setting quantitative conservation objectives within states or Bird Conservation Regions, an important component of Conservation Design.

Excerpted from Berlanga et al. (2010)

In celebrating its 20th Anniversary, PIF produced a ground-breaking document, *Saving Our Shared Birds* (http://www.savingoursharedbirds.org/) – a tri-national vision for landbird conservation. *Saving Our Shared Birds* presents a comprehensive conservation assessment of landbirds in Canada, Mexico, and the continental United States. This new tri-national vision encompasses the complete range of many migratory species and highlights the vital links among migrants and highly threatened resident species in Mexico. It points to a set of continent-scale actions necessary to maintain the landbird diversity and abundance that are our shared responsibility. Today more than ever, it is urgent for the people of Canada, Mexico, and the United States to work together to keep common birds common, prevent extinction of our bird species at greatest risk, and ensure the diversity and abundance of birdlife across North America and throughout the hemisphere, far into the future.

PIF Bird Conservation Plan for the Boreal Hardwood Transition (BCR 12 – U.S. Portion)

Note: Recent PIF conservation plans are based on regions first designated by NABCI in 1999. These regions are very similar to the preceding PIF physiographic regions, with fluid boundaries designed to be adjusted every three years based on current research. "Boreal Hardwood Transition" was designated as Physiographic Area 20 by PIF, and is called BCR 12 by NABCI.

Excerpted from Matteson et al. (2009)

The U.S. portion of Bird Conservation Region (BCR) 12, the Boreal Hardwood Transition, extends across portions of northern Minnesota, Wisconsin, and Michigan, including the Upper Peninsula. Extensive deciduous, coniferous, and mixed forests cover the planning unit, comprising more than half its land cover. Grassland and wetland habitats also are well represented, with grassland and agricultural lands especially concentrated in the Lake Superior coastal plain and southern and western fringes of the planning unit. BCR 12 has experienced less urbanization than other regions, but several metropolitan areas do exist within its boundaries, including Duluth (MN) and Saginaw (MI). In addition, recent years have seen a significant increase in rural and recreational home building in some counties. Despite low human population, the landscape has been influenced by the exploitation of timber and other natural resources since European settlement. These anthropogenic disturbances have resulted in conversion to farmland, loss of wetlands, forest simplification and an increased dominance of fewer tree species.

Major conservation issues and opportunities for the planning unit center on how to best manage northern forests. The primary challenge is how to maintain healthy, viable populations of native birds and other organisms while accommodating the growing demands placed on forest resources. Factors limiting bird populations in the Boreal Hardwood Transition involve landscape-level changes due to logging, housing development, and road building combined with the effects of natural disturbances such as forest fire and white-tailed deer herbivory. Other issues include the threats to migratory stopover habitats and the growing concern of climate change. Related to all of these issues is the state of conservation planning in the region and the limitations that may become apparent due to a lack of ecological information and the coordination necessary to achieve meaningful bird conservation.

Specific conservation recommendations for BCR 12 include:

- Identify causal factors and develop strategies to reverse population declines of Belted Kingfisher, Olive-sided Flycatcher, Brown Thrasher, Northern Rough-winged Swallow, Bank Swallow, and Field Sparrow.
- Identify areas appropriate for grassland-shrub management that will not conflict with other grassland priorities. Build public-private partnerships to conserve and restore grassland-shrub habitats in designated areas.
- Determine range of suitable habitats and identify present breeding sites for Golden-winged Warbler; verify and refine predictive habitat models for this species.
- Promote structural diversity at the landscape scale, including patches of early-, mid-, and late-successional forest in a range of patch sizes.
- Where possible, maximize the amount of forest interior (and minimize disturbance within it) to benefit area-sensitive and forest-interior species.
- Remove unneeded dams, dikes, or levees to reestablish hydrological connections between riparian and floodplain habitats and provide a greater variety of successional habitats.

- Work with local zoning boards to guide housing densities and the legal setback of buildings from shorelines.
- Advise homeowners to limit the use of pesticides and other harmful chemicals in important nesting and foraging areas.

For more information, access the plan in its entirety at http://www.partnersinflight.org/bcps/pl_20sum.htm.

PIF Bird Conservation Plan for the Upper Great Lakes Plain (Physiographic Area 16)

Excerpted from Knutson et al. (2001)

The Upper Great Lakes Plain covers the southern half of Michigan, northwest Ohio, northern Indiana, northern Illinois, southern Wisconsin, and small portions of southwest Minnesota and northwest Iowa. Glacial moraines and dissected plateaus are characteristic of the topography. Broadleaf forests, oak savannahs, and a variety of prairie communities are the natural vegetation types. A "Driftless Area" was not glaciated during the late Pleistocene and emerged as a unique area of great biological diversity.

There are many large urban centers in this area whose growth and sprawl will continue to consume land. The vast majority of the presettlement forest and oak savannah grasslands already have been converted to agriculture. The conversion to cropland may have benefitted some grassland birds, and forest birds still persist. Rates of cowbird parasitism and nest predation in this heavily fragmented region, however, are extremely high, and it is possible that only those bird communities in the few remaining expanses of contiguous habitat are self-sustaining. Forest habitat needs to be retained or restored so that a significant number of patches of sufficient size and quality each support a healthy population of Cerulean Warblers. It is assumed that each of these patches will then support the full range of forest birds. The total area of savannah habitat also should be increased, although the need for large blocks is not as apparent. Those few areas of grassland that still exist should be retained.

For more information, access the plan in its entirety at: http://www.partnersinflight.org/bcps/pl_16sum.htm.

US Shorebird Conservation Plan

Excerpted from US Shorebird Conservation Plan (2013)

Partners from state and federal agencies and non-governmental organizations from across the country pooled their resources and expertise to develop a conservation strategy for migratory shorebirds and the habitats upon which they depend. The US Shorebird Conservation Plan (2000) provides a scientific framework to determine species, sites, and habitats that most urgently need conservation action. Main goals of the plan are to ensure that adequate quantity and quality of shorebird habitat is maintained at the local level and to maintain or restore shorebird populations at the continental and hemispheric levels. Although some outreach, education, research, monitoring, and habitat conservation programs are being implemented, accomplishment of conservation objectives for all shorebird species will require a coordinated effort among traditional and new partners.

Excerpted from Conserving Shorebirds Across the Americas (2009)

Shorebirds are among nature's most ambitious, long-distance migrants, but their numbers are dropping quickly, with some species projected to go extinct within our lifetime. Protecting these birds is an important international conservation priority that requires proactive and coordinated efforts within each of the countries these birds fly through during their vast, pole to pole migrations. Paramount to successful shorebird conservation is the Western Hemispheric Shorebird Reserve Network. WHSRN's mission is to conserve shorebirds and their habitats through a network of key sites across the Americas.

Excerpted from Manomet Center for Conservation Sciences (2010)

In order to understand whether our conservation actions are working or to prioritize new protective measures, we need sound monitoring strategies administered by a coordinated network. In 1974, the Manomet Center for Conservation Sciences organized the International Shorebird Surveys (ISS) to gather information on shorebirds and the wetlands they use. ISS data are used principally for conservation and management initiatives. The data have long shown that several shorebird species were declining rapidly, but until recently the design of the ISS did not allow for a sensitive statistical analysis. The Program for Regional and International Shorebird Monitoring (PRISM; http://www.fws.gov/shorebirdplan/Prism.htm) was designed to coordinate and expand on existing shorebird survey efforts, including the ISS, the Western Shorebird Survey and the Canadian Maritimes Shorebird Survey. The closer coordination and expanded survey effort will increase the power of statistical analyses and more clearly define shorebird conservation issues on a continental scale. In December 2009, the PRISM Steering Committee published the document, **"**Guidance for Developing and Implementing Effective Shorebird Surveys**,"** to give general guidance on conducting shorebird monitoring, with a primary focus on counts of individuals or flocks. This informative 15-page guide builds on a variety of past publications about shorebird monitoring as well as incorporates the ideas and work carried out by committee members. The document addresses three categories of monitoring: casual data contribution, protocol-based programs, and designed surveys.

Waterbird Conservation for the Americas

Excerpted from Waterbird Conservation for the Americas (2007)

Conservation requires a broad range of activities over a huge geographical area, multiple scales of planning and

implementation, and the involvement of numerous partners from government and nongovernmental organizations, from the scientific community, and from local citizenry. In 2001, The **Waterbird Conservation for the Americas** initiative was launched to facilitate and guide these activities.

The initiative advances the conservation of waterbirds through the following:

- An international, broad-based voluntary partnership dedicated to conserving waterbirds and their habitats.
- A vision that the distribution, diversity, and abundance of populations and habitats of breeding, migratory, and nonbreeding waterbirds are sustained or restored throughout the lands and waters of the Americas.
- A means of formalizing alliances to plan and implement waterbird conservation cooperatively with other bird initiatives and other national and regional strategies for species and habitat conservation.
- Planning in order to identify partners and opportunities to address long-term waterbird conservation and to provide an overarching hemispheric-scale framework and guide for conserving waterbirds.
- Involvement in broader, hemisphere-wide monitoring and conservation; provides an impetus for regional conservation planning; proposes national, state, provincial and other local conservation planning and action; and gives a larger context for local habitat protection.
- Identification of priorities, thereby catalyzing and focusing resources and actions, as it is only with collective funding and effort that coordinated conservation of waterbirds can proceed

Upper Mississippi Valley/Great Lakes Region Waterbird Conservation

Excerpted from Waterbird Conservation for the Americas (2010)

The Upper Mississippi Valley/Great Lakes (UMVGL) Region (which includes Michigan) provides a wide variety of waterbird nesting, roosting and foraging habitats: marshes, ponds, creeks, streams, sloughs, lake shorelines, islands (especially in the Great Lakes), shoals, river floodplains (especially along the Mississippi, Illinois, Missouri, and Ohio Rivers), and reservoirs. A total of 46 species regularly occur during some portion of the year. The UMVGL waterbird planning region encompasses 1,879,965 square kilometers (725,854 square miles) in the north-central U.S. and south-eastern Canada.

The UMVGL Waterbird Conservation Plan (Wires et al 2010) presents a wealth of historical and current information regarding status, threats, and life history of waterbirds in the region, and it provides research, monitoring, and management recommendations, with emphasis on species commonly occurring in the UMVGL region as well as those of high conservation concern.

North American Waterfowl Management Plan

Excerpted from USFWS (2009)

In 1985, waterfowl populations had plummeted to record lows. Historical data indicated that, since the first settlers arrived, 53 percent of the original 221 million wetland acres found in the contiguous United States had been destroyed. The habitat that waterfowl depend on for survival was disappearing at a rate of 60 acres per hour. Additionally, waterfowl have been an economically important group of migratory birds throughout the North American continent. By 1985, approximately 3.2 million people were spending nearly $1 billion annually to hunt waterfowl. About 18.6 million people observed, photographed, and otherwise appreciated waterfowl and spent $2 billion for the pleasure of doing it.

Recognizing the importance of waterfowl and wetlands to North Americans and the need for international cooperation to help in the recovery of a shared resource, the U.S. and Canadian governments developed a strategy to restore waterfowl populations through habitat protection, restoration, and enhancement. The strategy was documented in the North American Waterfowl Management Plan signed in 1986 by the Canadian Minister of the Environment and the U.S. Secretary of the Interior. With its update in 1994, Mexico became a signatory to the Plan.

The 1998 update expanded the Plan's vision: partners would implement the plan guided by biologically based planning, which would then be refined through ongoing evaluation; partners would define the landscape conditions needed to sustain waterfowl and benefit other wetland-associated species; and Plan partners would collaborate with other bird initiatives and reach out to others sectors and communities to forge broader alliances.

The Plan is innovative because its perspective is international in scope, but its implementation functions at the regional level. Its success is dependent upon the strength of partnerships, called "joint ventures," involving federal, state, provincial, tribal, and local governments, businesses, conservation organizations, and individual citizens. Joint ventures develop implementation plans focusing on areas of concern identified in the Plan.

The North American Waterfowl Management Plan Committee is an international body that provides leadership and oversight for the activities undertaken in support of the North American Waterfowl Management Plan. Its purpose is to provide a forum for discussion of major, long-term international waterfowl issues and to make recommendations to directors of the three countries' national wildlife agencies.

Michigan Bird Conservation Partnerships

To date, Plan joint ventures have invested $4.5 billion to protect, restore, and/or enhance 15.7 million acres of waterfowl habitat. Their projects not only advance waterfowl conservation, but they also make substantial contributions toward the conservation of all wetland-associated species. Additionally, the Plan joint venture concept has been upheld as the model by conservationists endeavoring to address many other resource issues (i.e., Landscape Conservation Cooperatives).

Upper Mississippi River and Great Lakes Region Joint Venture

Excerpted from Upper Mississippi River and Great Lakes Region Website (Undated)

The U.S. Fish and Wildlife Service definition for a joint venture is "a self-directed partnership of agencies, organizations, corporations, tribes, or individuals that has formally accepted the responsibility of implementing national or international bird conservation plans within a specific geographic area or for a specific taxonomic group, and has received general acceptance in the bird conservation community for such responsibility." Working both collectively and independently, JV partners conduct activities in support of bird conservation goals cooperatively developed by the partnership. There are 18 habitat JVs in the nation today, and JVs are recognized as the standard for effective, science-based delivery of bird conservation through partnerships.

The mission of the Upper Mississippi River and Great Lakes Region Joint Venture (UMGLR JV) is to deliver the full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships. The geographic boundary of the UMGLR JV includes all of Indiana, Michigan, and Wisconsin, plus portions of Iowa, Illinois, Kansas, Missouri, Minnesota, Nebraska and Ohio.

The JV strives for **sustainable populations of all birds** through regionally coordinated conservation actions based on the best (or state-of-the-art) scientific information and techniques available. Explicit bird population goals, decision tools, and an implementation plan are used to guide resources for efficient conservation delivery, research, and evaluation.

Since the completion of the 2007 Implementation Plan, partners within the UMGLR JV have protected, restored, and enhanced more than 263,000 acres of habitat. Moreover, scientific endeavors required to answer plan assumptions have been pursued and will feed into future planning documents and tools.

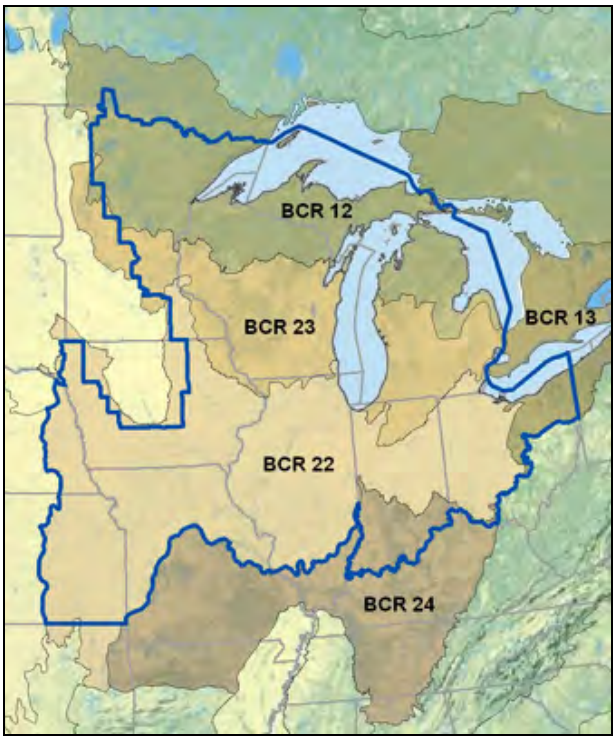


Figure 2. Boundary for the Upper Mississippi River and Great Lakes Region Joint Venture (USFWS).

At over 240 million acres (97 million ha), the UMRGLR JV is one of the largest and most diverse JV regions in the U. S (Figure 2). The majority of the UMRGLR JV is contained within three Bird Conservation Regions (BCRs): BCR 12 – the "Boreal Hardwood Transition", BCR 23 – the "Prairie Hardwood Transition", and BCR 22 – the "Eastern Tallgrass Prairie". Collectively, these three BCRs make up more than 93% of the JV region. Small portions of BCR 24 - the "Central Hardwoods" and BCR 13- the "Lower Great Lakes/St. Lawrence Plain" also occur on the southern and eastern periphery of the JV.

As the name suggests, the UMRGLR JV contains all or part of four of the Great Lakes. Most of the land within the UMRGLR JV is currently utilized for crop production (39% of JV). "Forest" communities, which include deciduous and evergreen forests, woodlands, savannas, and shrublands make up 26% of the JV land area, followed by grasslands/pastures (18%), inland water and wetlands (10%) and developed land (9%). The bird species that occur in the UMRGLRJV are as diverse as the natural communities contained within it: Colonial waterbirds breed along the shores of the Great Lakes, and breeding warblers spend their summers in the boreal forests of the northern portion of BCR 12. Waterfowl nest in the many scattered, small wetlands throughout BCRs 12 and 23, in numbers sometimes second only to the "duck factory" of the Prairie Pothole region to the west. Grassland birds still persist in the increasingly small and scattered prairie remnants throughout BCR 22, and the JV contains one of the last strongholds of tallgrass prairie on the continent in the Flint Hills of Kansas and Nebraska. Southern bird species

become locally common in forest fragments in BCR 24. Huge numbers of migrating waterfowl and shorebirds also pass through the JV each spring and fall, especially along the wetlands associated with the Mississippi River.

In the spirit of cooperation and partnership, the UMRGLR JV Management Board pledged in a 2001 Resolution to conduct all-bird conservation, accommodating other bird groups while implementing the North American Waterfowl Management Plan. The UMRGLR JV Landbird (Potter et al. 2007a), Shorebird (Potter et al. 2007b), Waterfowl (Soulliere et al. 2007a), and Waterbird Habitat Conservation Strategies (Soulliere et al. 2007b), completed in 2007, outline shared goals and commitment to all-bird habitat conservation.

Midwest Coordinated Bird Monitoring Partnership

(Excerpted from Koch et al. 2010)

Monitoring can and should play an essential role in bird conservation planning, guiding design of on-the-ground activities and evaluation of implementation practices to inform adaptive management. In the recent past, bird monitoring programs have proliferated under the direction of government agencies, universities, and non-governmental organizations. Until the development of the Midwest Coordinated Bird Monitoring (CBM) Partnership, however, lack of coordination needed to integrate monitoring into decision making at multiple scales has limited the Midwest's ability to leverage this hefty investment to advance efficient, effective, and strategic bird conservation.

The Midwest CBM Partnership is aligned to help biologists, biometricians, data managers, wildlife administrators, and citizen scientists achieve five overarching goals:

- Integration of monitoring into bird management and conservation;
- Broadening the scope of monitoring for species most at risk and for which we lack adequate information to make effective decisions;
- Coordination of programs among organizations and across spatial scales;
- Improvement of survey design, field methods, and data analysis; and
- Deployment of modern data management strategies.

A coordinated approach also increases our collective ability to detect spatial patterns and temporal trends while placing local results in a regional context. Additionally, gains in efficiency will reduce costs of monitoring and can enable greater attention to traditionally under-surveyed species. CBM working groups are attempting to retain the value of previously established programs while incorporating recommendations where past monitoring has not met information needs.

At the five workshops held in 2009 and 2010 and through discussions on the website (http://midwestbirdmonitoring.ning.com/), Midwest partners have articulated a list of the Midwest's highest CBM priorities, 2009-2012. These priorities are ordered below according to progress made thus far; they are subject to review and revision on a three-year basis. Collectively, Midwest CBM partners would like to:

1. Develop a website promoting collaboration throughout the Midwest region (Figure 3).
2. Create a comprehensive Registry of Midwest Bird Monitoring Programs.
3. Implement the National Secretive Marshbird Monitoring Program in every Midwestern state (including gathering information for conservation modeling and evaluation).
4. Expand the Midwest Nocturnal Bird Monitoring Program throughout the region to gather scalable baseline information, further our understanding of habitat requirements and availability, and identify opportunities for conservation or restoration.
5. Establish a Midwest Grassland Bird Working Group to evaluate our conservation efforts to date, forge a strategic plan for implementing source grassland bird landscapes, and coordinate evaluation of the success of our collective conservation delivery efforts.
6. Develop a centralized data repository to increase access to and use of bird monitoring datasets for regional conservation planning, area landscape design, and bird habitat delivery evaluation.
7. Further our understanding of the ecology of migrating birds in order to guide conservation, management, and energy development decisions. Specifically, inform wind energy development plans by organizing existing monitoring datasets and coordinating efforts designed to fill information gaps and document bird movements.
8. Develop a system of demographic monitoring for focal[1] species in the Midwest to identify source populations and better evaluate our conservation effectiveness in terms of meeting bird life history needs.
9. Develop a coordinated approach to evaluating collective management activities along successional gradients as they relate to sustaining source forest bird populations.
10. Integrate with and inform climate change assessment activities throughout the region as they relate to birds and wildlife habitat.

[1] In this instance, “focal species” refer to species that have been selected because they are easy to monitor, respond rapidly to management activities, are indicators of overall ecosystem function, or are strongly tied to specific ecosystem conditions.

The recently launched the Midwest Avian Data Center (Figure 3) can be accessed online at http://data .prbo.org/partners/mwadc. It is a cutting edge data management and decision support system that was developed through a partnership between the Midwest CBM Partnership and PRBO Conservation Science and made possible by the Cornell Lab of Ornithology's Avian Knowledge Network (AKN). The Midwest Avian Data Center allows Midwest bird conservation partners to compare bird population trends from several large datasets at multiple scales (e.g., Landscape Conservation Cooperative, Joint Venture, Bird Conservation Region, State, National Wildlife Refuge, County, and between months/years). It will also provide access to recommended, standardized monitoring protocols, downloadable field data entry forms, customized data entry pages, online training resources, and other important considerations for a successful monitoring program. The data center also directs users to relevant conservation planning documents (i.e., Bird Habitat Joint Venture Plans) and best management practices. Citizen scientists can learn about new ways to get involved in bird conservation and monitoring from their own backyards or in a nearby wildlife area in the region.

Providing immediate access to real-time datasets from multiple sources will allow individual land managers to understand local bird population trends and assist with management decisions in relation to Birds of Conservation Concern and impacts of climate change. The Midwest Avian Data Center can also be used to facilitate wildlife-friendly wind power development planning, analyze changes in phenology of bird migration and nesting, and project impacts of climate change on bird species' distributions.

Upper Great Lakes Young Forest Iniative

Excerpted from Wildlife Management Institute (2011)

American Woodcock (Figure 4) populations have been declining at an alarming rate over the past 40 years (Cooper et al. 2008). The loss of young forest and shrubland habitats is thought to be the primary cause of the decline. In response to the decline, an American Woodcock Conservation Plan (the Plan) was developed by a broad partnership of federal, state, and private partners under the leadership of the Association of Fish and Wildlife Agencies (Kelley et at. 2008). A copy of the Plan is available at www.timberdoodle.org. The objectives of the plan are to first, stabilize current populations, and subsequently, increase populations to densities that occurred in the early-1970s. Population objectives were tied to this time frame because it was during the early-1970's that consistent population data, via the American Woodcock Singing Ground Survey (SGS), began to be gathered, and the Plan's authors felt that the habitat objectives produced by using this period as a benchmark would be aggressive but attainable. To stabilize populations, the current acreage of early successional forest habitat (ESH) needs to be maintained throughout the species breeding range. Further, new ESH needs to be created in order to reach the population goal of the plan.

To date, three regional initiatives, under the direction of the Wildlife Management Institute (WMI), have been formed in the United States to begin implementing the habitat goals of the Plan. They are the Appalachian Woodcock Initiative (BCR 28), the Northern Forest Woodcock Initiative (BCR 14), and the Upper Great Lakes Woodcock and Young Forest Initiative (BCR 12 and 23). Biologists and conservationists created the Upper Great Lakes Young Forest Initiative in 2007 to promote the stewardship of early successional habitats (young forest and shrublands) in Michigan, Wisconsin, and Minnesota within Bird Conservation Regions 12 (Boreal Hardwood Transition) and 23 (Prairie Hardwood Transition). A step-down of the Woodcock Conservation Plan for the Upper Great Lakes region (Cooper 2008) outlines habitat goals.



Figure 3. Homepage for the Midwest Avian Data Center.



Figure 4. American Woodcock on a nest in the Upper Peninsula of Michigan (credit: Jeff Koch).

Michigan Bird Conservation Partnerships

The objective of this step-down plan is to develop explicit county-scale habitat goals for counties located in the BCR 12 (Boreal Hardwood Transition) and BCR 23 (Prairie Harwood Transition) portions of Michigan, Minnesota, and Wisconsin. Acreage goals to maintain the current population and to increase populations to 1970's densities are presented. The Ontario and Quebec portions of BCR 12, as well as, the Illinois, Indiana, and Iowa portions of BCR 23 were not included, but future work can focus on setting goals for these locations. Partners have since set up Demonstration Areas, including many on a landscape scale, to showcase habitat management techniques that help woodcock and other young-forest wildlife.

An important partner is the Golden-Winged Warbler Working Group. The population of golden-winged warblers is also falling in the region, likely due at least in part to habitat loss. Other partners include the U.S. Fish and Wildlife Service, the U.S. Forest Service, Wisconsin Department of Natural Resources, Minnesota Department of Natural Resources, Michigan Department of Natural Resources, the Ruffed Grouse Society, Woodcock Minnesota, the National Fish and Wildlife Foundation, and the Wildlife Management Institute.

Conservationists and scientists have identified high-priority management zones in the three-state region, based on predicted woodcock abundance, potential habitat, proportion of landscape in aspen, and land-ownership patterns. Wildlife biologists have also developed a set of Best Management Practices presenting optimum methods of creating young-forest habitat on the landscape.

Upper Midwest and Great Lakes Landscape Conservation Cooperative

Excerpted from Upper Midwest and Great Lakes Landscape Conservation Cooperative (2011)

The U.S. Fish & Wildlife Service (USFWS) believes that success in conserving our nation's natural resources depends on the ability of private, state and federal agencies to collaboratively develop and implement a common vision of landscape sustainability. This means, in part, working together to develop regional and continental strategies to design and target site-scale efforts for fish, wildlife, and plant species. To help achieve this vision, the USFWS is working with partners to establish a national network of Landscape Conservation Cooperatives (LCCs) that will provide the principal scientific and technical support at "landscape" scales to identify biological outcomes for the purpose of efficient conservation delivery. LCCs will also have a role in helping partners identify common goals and priorities to target the right science in the right places for efficient and effective conservation. By functioning as a network of interdependent units rather than independent entities, LCC partnerships can accomplish a conservation mission no single agency or organization can accomplish. LCCs are meant to be cooperative, partnership-oriented entities focused on developing, adapting and coordinating large-scale data and models for field-level use.

As part of this national network, the Service and partners are establishing the Upper Midwest and Great Lakes Landscape Conservation Cooperative (UMGL LCC). The geographic area includes portions of Minnesota, Iowa, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, New York and Vermont, as well as areas of Manitoba, Ontario and Quebec (Figure 5). The UMGL LCC area includes unparalleled deepwater habitats, beaches, coastal wetlands, more than 35,000 islands, major river systems, boreal forests, and prairie-hardwood transition zones. These habitats provide for extensive resident and non-resident game populations, fish and many other aquatic resources, waterfowl, colonial waterbirds, marshbirds, and neotropical migrant landbirds. Building on a long-standing conservation legacy across the Midwest, the UMGL LCC provides a venue for a community of interests to explore how and where to sustain landscapes for natural and cultural resources. In doing so, key products and services are developed for broad use.

The Upper Midwest and Great Lakes have experienced major ecological changes during the past 150 years due to many stressors. New environmental challenges continue to arise even as we address these historical damages. The impacts of climate change are already evident in warmer water, longer ice-free seasons, earlier spring runoff, changing water levels and resulting habitat alterations and impacts to water quality and ecological processes. Great Lakes management agencies continue to develop and implement innovative programs toward remediation of contaminated sites, habitat restoration, dam removal for fish passage, control of invasive species, improved fisheries management, alleviation of nonpoint source pollution, conservation of native species and communities and the many other stressors the area faces.

Michigan Bird Conservation Partnerships

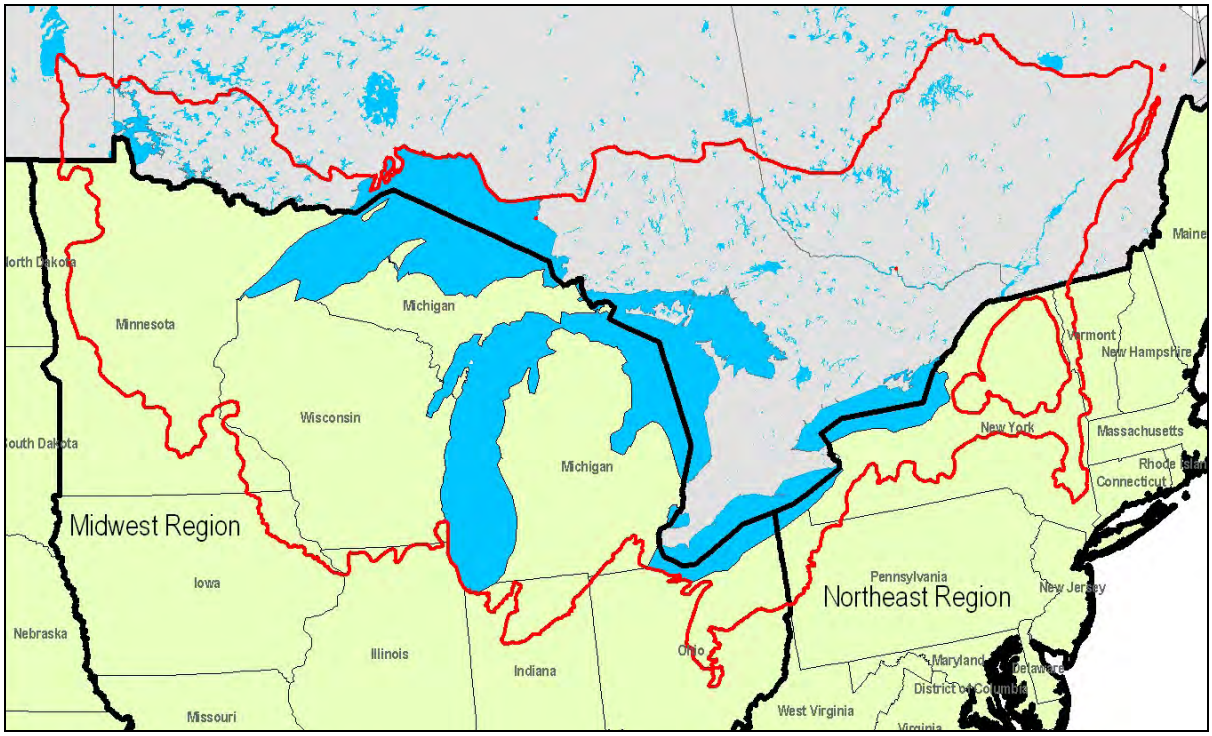


Figure 5. Upper Midwest and Great Lakes Landscape Conservation Cooperative area (outlined in red).

Michigan Bird Conservation Iniative

Excerpted from MiBCI Website (Undated)

Since 2006, the Michigan Bird Conservation Initiative (MiBCI) has united agencies, organizations, universities, and individuals to better understand and conserve Michigan's birds. More than 81 organizations and 27 individuals have signed on in support of MiBCI's vision for integrated bird conservation. MiBCI's primary purpose is to work together as a partnership to conserve, restore, and protect bird populations. While the individual missions and goals of members may be varied, all members recognize that they may be a powerful force for conservation if unified in working toward common objectives. Furthermore, open avenues of communication enable collaboration, a sense of community, and mutual respect in advancement of our shared vision.

The mission of the Michigan Bird Conservation Initiative is to identify conservation needs and promote active conservation, protection, and restoration of bird populations and their habitats in Michigan through ecologically and biologically based partnerships and actions conducted at multiple spatial scales.

MiBCI hosts an annual bird conservation workshop (http://www.mibci.org/) to share information on current research and ongoing conservation projects. MiBCI's standing subcommittees (coordination/development, research/monitoring, and education/outreach) work together year round to advance progress on projects of mutual benefit. Everyone is welcome who has an interest in conserving Michigan's birds by simply signing a Memorandum of Agreement.

More recently, MiBCI initiated a citizen-science program to survey for priority bird species in Michigan. They made marsh and nocturnal birds their top priority, because these species are not adequately monitored by the North American Breeding Bird Survey, and there is concern that some species have declined in recent decades. The goal is to collect data to track these populations over time, plan and evaluate conservation efforts, and better understand habitat requirements. They started surveys for marsh birds and nightjars in 2010 and began owl surveys in 2011. Please visit the research/monitoring page (http://www.mibci.org/) for more details about the individual surveys, protocols, and opportunities to help.

Michigan Audubon Society

Excerpted from Michigan Audubon (2009)

Formed and incorporated in 1904, Michigan Audubon is the state's oldest conservation organization. The early history of the organization was dedicated to securing protective legislation for birds at a time when the millinery industry was harming songbird populations. Through the devotion of its early conservation-minded founders, Michigan Audubon was recognized nationally for advocacy and education efforts. Today, Michigan Audubon's commitment to birds continues in the form of organized bird-related data collection by a community of "citizen scientists." Likewise, the organization educates thousands of bird watchers each

year through a series of educational programs, events, and an annual conference. Michigan Audubon's bird sanctuary network is growing and includes thousands of acres of protected bird habitat from Jackson County to the Keweenaw Peninsula.

Currently, Michigan Audubon maintains a membership of 2000 individuals and businesses, and there are 41 local chapters of Michigan Audubon active statewide. The Whitefish Point Bird Observatory is an affiliate organization under Michigan Audubon's 501(c)3 status. The organization nurtures partnerships with the National and Detroit Audubon Societies, the Kalamazoo Nature Center, the Michigan Department of Natural Resources and Environment, and the US Fish and Wildlife Service.

Michigan Audubon connects birds and people for the benefit of both through conservation, education, and research efforts in the state of Michigan.

Michigan Audubon's local chapters and affiliates sponsor a variety of state wide research, data collection projects, and citizen science programs that are used to assess the distribution and abundance of birds, including nesting occurrences, and the status of rare, threatened, endangered, and special concern bird species and habitat. Projects include the Michigan Breeding Bird Atlas, the Michigan Winter Bird Feeder Survey, the Michigan Christmas Bird Count, the North American Migration Count, and the Michigan Bird Records Committee. Results from the research projects and other natural history articles are published quarterly in ***Michigan Birds and Natural History***, a scientific journal. Members and the general public participate and provide nonscientific observation data for many of the projects mentioned above.

Michigan Audubon also protects more than 3,500 acres of important wildlife habitat in 19 sanctuaries in the upper and lower peninsulas. Three of our affiliates (Sarett Nature Center, Seven Ponds Nature Center, and Whitefish Point Bird Observatory) maintain another 1,116 acres. Rivers, lakes, marshes, bogs, fens, grasslands, hardwoods, and northern conifer communities are found in these protected areas. These lands not only serve as a refuge for many species of wildlife, but they also preserve a wide range of our state's valuable natural resources and are used for recreation, education, and research. Another affiliate, the Michigan Loon Preservation Association, utilizes a network of volunteers (Loon Rangers) across the state in monitoring and conservation activities dedicated to protecting Common Loons. Michigan Audubon is also a partner in the **Important Bird Areas** program (see related chapter), which identifies significant tracts of bird habitat which may need protection for the sustainability of threatened and endangered bird populations.

Michigan Audubon believes early encounters with nature inspire children to become responsible consumers and future conservation leaders. Working with local chapters, Michigan Audubon provides helpful tools for teachers to offer programs and field learning opportunities throughout the year. Michigan Audubon and its chapters offer a wide range of speakers, workshops, and tours for birders and nature enthusiasts at all levels. In addition, their annual conference presents nationally known experts on a variety of topics of environmental importance. To encourage families to take an active part in passing on a tradition of environmental awareness, Michigan Audubon sponsors events and activities geared toward whole family involvement such as campouts, workshops, and festivals. From answering birding questions to recommending speakers and books, Michigan Audubon's staff and board provide members and the public with birding information on a daily basis. The society also publishes a bi-monthly member newsletter, ***The Jack Pine Warbler***.

Conclusion

Although the challenges to successful bird conservation are great and increasing, the synergy from dedicated individuals forging sound partnerships gives us hope. By linking our individual efforts and engaging Michigan (and US) citizens in bird conservation activities (both at home and abroad), we strive to ensure that common birds remain common, species most at risk can one day thrive, and people recognize and value their inherent connection with birds. Concerted conservation efforts can make a positive difference in restoring habitats and reversing population declines (NABCI 2010).

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Conservation on Private Lands

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Introduction

There are more than 8,000,000 acres of state and federally held public land, accounting for 22% of Michigan's total area. While this is lower than the national average of 35%, it still ranks 15th in the nation (NRCM 1995). So while state and federal policies have an important influence on the quality of habitat in the state, most of the state is privately owned. This makes private landholders, large and small, essential to successful conservation efforts. Presented here is an overview of some of the resources and programs available to private landholders in order to assist them in conservation efforts.

Non-profit and Species focused Groups

Habitat focused

Wild Ones (www.wildones.org)

Wild Ones is a non-profit, educational and advocacy organization active in 12 states, including Michigan. Its mission states that Wild Ones, "…promotes environmentally sound landscaping practices to preserve biodiversity through the preservation, restoration and establishment of native plant communities." (Wild Ones 2010). This organization can be a valuable resource to landowners who wish to make a positive impact on their land and provide resources for wildlife. See their website (www.wildones.org) for more information.

Residential properties, even small back-yards, can provide important habitat when landscaped with wildlife in mind. Land animals need connectivity among appropriate habitats, but residential and migratory birds do utilize small and disconnected patches. Native avian communities can show high diversity in areas of intermediate housing densities (Lepczyk et al. 2008). Raising public awareness of the importance of these lands as wildlife habitat is crucial.

Gamebird focused

Due to the popularity of hunting, there are many groups and initiatives which focus on the habitat requirements of specific game species. Those active in Michigan include Pheasants Forever, Timberdoodle.org, Ducks Unlimited, and the Ruffed Grouse Society. The habitat restoration efforts of these groups can be beneficial to all species which prefer similar habitat.

While some of these groups focus their conservation efforts on the acquisition of land, they also may work with private landowners or provide information or other materials which are helpful in the conservation of habitat related to the focus species. These groups can be of great help to landowners with similar goals.

Pheasants Forever (www.pheasantsforever.org)

This organization is geared towards increasing the population of the Ring-necked Pheasant, a game species introduced from Asia in the late 1800s. This species found the prevalence of small farms an ideal environment for expansion and quickly established populations throughout the northern tier of U.S. states. Despite the development of an initial breeding population, the species is not adapting well to the current trends of landscape change. As with many grassland species, new methods and materials associated with modern agriculture, increased habitat fragmentation, and encroaching urbanization have led to population declines.

This organization provides information on improving lands and agricultural methods to accommodate the pheasant. It also offers seed mixes ideal for the creation of habitat areas which provide the resources needed for food, nesting, cover and winter survival. Recognizing the need to create large habitat blocks, they encourage land-owners to work together to create unfragmented areas with many resources for wildlife use. The Michigan Pheasant Restoration Initiative (MDNR undated) is a partnership of this type.

Timberdoodle.org (www.timberdoodle.org)

This organization works to benefit the American Woodcock, also known affectionately as the timberdoodle. Attention and funds are focused on this species due to its status as a species of concern, as well as its value as a game bird. Conservation of the early successional habitat this species requires is also beneficial to many other species which prefer this habitat such as the Golden-winged Warbler, Ruffed Grouse, and Wild Turkey.

The restoration work of this group is divided into Bird Conservation Regions (BCRs) as designated by U.S. North American Bird Conservation Initiative (NABCI). Michigan is a part of the Upper Great Lakes region and includes both

Boreal Hardwood Transition (BCR 12), and Prairie Hardwood Transition (BCR 23). This organization has a set of best management practices tailored for this region to guide the development of quality habitat for this species.

Like Pheasants Forever, they operate at the landscape scale and include many partners to achieve their goals. Partners include many Federal and State agencies, non-governmental organizations, and species groups with similar young forest requirements, such as the Golden-winged Warbler working group.

Ducks Unlimited (www.ducks.org)

Ducks Unlimited works across North America and into Central America to preserve habitat for waterfowl. This wide scope is required due to the migratory nature of these species and dependence upon habitat across long migration routes.

Ducks Unlimited can help private landowners conserve for waterfowl in several ways. They provide information about waterfowl biology and habitat requirements, employs conservation experts, places private land under conservation easements, and helps landowners to become providers of environmental credits.

Ruffed Grouse Society (www.ruffedgrousesociety.org)

The Ruffed Grouse Society is focused on young forest habitats, making it a natural partner for Timberdoodle.org, and other efforts to conserve American Woodcock. Their website provides information about Ruffed Grouse, as well as the young forest ecosystem and the many species which depend upon this habitat type.

The Society provides a conservation plan document, with habitat management techniques for a variety of forest types, and habitat seminars posted online. The Society also works directly with landowners on projects.

USDA Programs

A number of federal programs provide resources to help land owners manage their lands through the Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture. Programs apply to various types of land (agricultural, forested, wetlands, and other areas) in order to aid management for conservation. These programs may provide the landowner with professional planning assistance, monetary support, or tax benefits. Avian populations, as well as other wildlife can benefit greatly from these programs. We introduce a few options here which have goals to benefit avian populations, though other environmentally beneficial programs exist.

Brief summaries of some of the programs available are provided, but they change over time and in association with farm legislation. For the most current information contact your local NRCS office.

Note: USDA Program information excerpted from Michigan NRCS website (2013).

Technical Assistance

NRCS has technical assistance available to every county in the United States through local NRCS offices. This network of professional conservationists is available to help landowners address environmental concerns on their lands. The Conservation Technical Assistance (CTA) and the Conservation of Private Grazing Land (CPGL) programs help to give landowners sound conservation advice. These programs do not give financial assistance, but do help landowners develop the conservation plans required for many financial assistance programs. The development of a conservation plan may also help landowners determine which of the programs for which they meet eligibility requirements best align with their goals. These programs also connect landowners with technical service providers with expertise in particular fields, such as forestry, irrigation, establishing native grasses, and many others.

Environmental Quality Incentives Program (EQIP)

The Environmental Quality Incentives Program (EQIP) is a voluntary conservation program administered by the NRCS. It supports production agriculture and environmental quality as compatible goals. Through EQIP, farmers, ranchers, private forest land owners and Federally-recognized American Indian tribes may receive financial and technical assistance to implement structural and land management conservation practices on eligible agricultural land. Eligible producers are individuals engaged in livestock, crop or forest production. Eligible land includes cropland, rangeland, pasture, and private non-industrial forestland. State priorities are developed annually from input from local workgroups based on county resource assessments and individual plans to address those local needs. A State Technical Committee comprised of representation from these local work groups, Tribal groups, commodity groups, and conservation partners advise NRCS on the implementation of EQIP. EQIP activities are carried out according to a site specific conservation plan developed in conjunction with the producer. All conservation practices are installed according to NRCS technical standards. Producers may elect to use an approved technical service provider for technical assistance. EQIP offers contracts with a minimum term of one year after the implementation of the last scheduled practice and a maximum term of ten years. Total cost share and incentive payments are limited to $300,000 per individual over a six-year period, regardless of the number of farms or contracts. Eligibility for EQIP is subject to the Adjusted Gross Income provision of the 2008 Farm Bill and highly erodible land and wetland conversion provisions.

Several initiatives exist under the EQIP program, including organic, cooperative conservation partnership (CCPI), conservation innovation (CIG), and agricultural water enhancement program (AWEP). Through the organic initiative, NRCS provides assistance to eligible producers for installation of conservation practices on organic or agricultural operations transitioning to organic production. Under CCPI, the NRCS enters into partnership agreements with eligible entities that want to enhance conservation outcomes on agricultural and nonindustrial private forest lands. The CIG program is designed to stimulate the development and adoption of innovative conservation approaches and technologies. AWEP is a voluntary conservation initiative that provides financial and

technical assistance to agricultural producers to implement agricultural water enhancement activities on agricultural land to conserve surface and ground water and improve water quality.

Conservation Stewardship Program (CSP)

CSP provides financial and technical assistance for eligible producers to conserve and enhance soil, water, air, and related natural resources on their land. Eligible lands include cropland, grassland, prairie land, improved pastureland, rangeland, non-industrial private forest lands, agricultural land under the jurisdiction of an Indian tribe, and other private agricultural land on which resource concerns related to agricultural production could be addressed. Participation in the program is voluntary. CSP encourages land stewards to improve their conservation performance by installing and adopting additional activities, and improving, maintaining, and managing existing activities on agricultural land and non-industrial private forest land. The NRCS will make CSP available nationwide on a continuous application basis. Michigan will focus program impacts on natural resources that are of specific concern for specific geographic areas within the state. Applications will be evaluated relative to other applications addressing similar priority resource concerns to facilitate a competitive ranking process among applicants within a state who face similar resource challenges. The entire agricultural operation must be enrolled and must include all agricultural land that will be under the applicant's control for the term of the proposed contract. CSP offers participants two possible types of payments:

1. Annual payment for installing and adopting additional activities, and improving, maintaining, and managing existing activities
2. Supplemental payment for adoption of resource-conserving crop rotations

Wildlife Habitat Incentives Program (WHIP)

WHIP is a voluntary program designed to provide technical and financial assistance to landowners for the establishment and improvement of fish and wildlife habitat. Ranking criteria are used to select the applicants with a conservation plan that will create, enhance or protect wildlife habitat by types of wildlife habitat. WHIP activities are carried out according to a site specific wildlife conservation plan developed in conjunction with the producer. All wildlife practices are installed according to NRCS technical standards. Producers may elect to use an approved technical service provider for technical assistance. WHIP offers contracts with a maximum term of 10 years. Program payments for individual practices will vary based on the average cost for a practice's implementation. Eligibility for WHIP is subject to the adjusted gross income provision of the 2008 Farm Bill. The information on this page lists general WHIP information including ranking criteria, and provides a pre-application tool that will assist landowners to make choices about their conservation plans.

Conservation Reserve Program (CRP)

Crop and pasture lands may be eligible to participate in the CRP, a program administered by the Farm Service Agency (FSA). The primary purpose of this voluntary program is to conserve soils and waters, by protecting them from erosion through the planting of resource conserving covers. Many avian species do benefit from these plantings. Land owners are provided with USDA payments for their participation in this program based on the agricultural production value. Participants also receive technical support from the NRCS, the Institute of Food and Agriculture, State forestry agencies, local soil and water conservation districts, and private providers.

An offshoot of the CRP program is the conservation reserve enhancement program (CREP). This land retirement program for environmentally sensitive lands is administered similarly to the CRP program. In 2000, the State of Michigan made a 20 year agreement to implement CRP plans to improve water quality of the Macatawa, River Raisin, and Saginaw Bay Watershed. In addition to improving water quality, one of the issues addressed through this program is the loss of critical habitat for threatened and endangered wildlife species. See website for more information on these programs: http://www.fsa.usda.gov/FSA.

Healthy Forests Reserve Program (HFRP)

The purpose of HFRP is to assist landowners, on a voluntary basis, in restoring, enhancing and protecting forestland resources on private lands through easements, 30-year contracts and 10-year cost-share agreements.

The objectives of HFRP are to:

1. Promote the recovery of endangered and threatened species under the Endangered Species Act (ESA)
2. Improve plant and animal biodiversity
3. Enhance carbon sequestration.

The HFRP was signed into law as part of the Healthy Forests Restoration Act of 2003. It was amended in the 2008 Farm Bill. Areas of the St. Joseph – Maumee Watershed are eligible for this program.

Wetlands Reserve Program (WRP)

The Wetlands Reserve Program (WRP) is a voluntary program that provides technical and financial assistance to private landowners and Tribes to restore, protect, and enhance wetlands in exchange for retiring eligible land from agriculture. Over 1.9 million acres are currently enrolled in WRP.

Wetlands provide habitat for fish and wildlife, including threatened and endangered species; improve water quality by filtering sediments and chemicals; reduce flooding; recharge groundwater; protect biological diversity; and provide opportunities for educational, scientific, and limited recreational activities.

Plant Materials Program

The natural resources conservation service (NRCS) operates a plant materials program. While the first two mission goals of the NRCS revolve around maintaining healthy productive soils and water resources for food security, the third mission goal is to maintain healthy plant and animal communities (USDA NRCS Plant Materials Program 2010). Information about plant materials for conservation is available on the NRCS website, and through plant materials centers.

Conservation on Private Lands

State Programs

Excerpted from Department of Natural Resources (Undated)

Qualified Forestry Property Program (QFP)

In September 2006 the General Property Tax Act (1893 PA 206, as amended) was amended to add QFP tax exemption (Public Acts 378, 379 and 380). The intent of this tax exemption is to encourage private landowners to manage their land for forestry by providing a property tax reduction as an incentive. Landowners approved for this tax exemption are exempt from some school operating taxes. Participating landowners are not required to allow public access on their land. Landowners approved for this exemption must have a minimum of 20 contiguous acres (no buildings or structures are allowed), and are limited to exempting 320 acres per taxing unit. Landowners must manage their land with a DNR-approved forest management plan or a forest management plan certified by a third-party certifying organization. Participating landowners are required to report to the Department of Natural Resources (DNR) annually the amount of timber produced on this land and whether any buildings or structures have been constructed on the land.

Forest Stewardship Program (FSP)

FSP provides financial and technical assistance to Michigan's non-industrial private forestland owners. By providing cost share funds for land management planning, sound management practices are promoted that consider elements important to forest health and vigor: soil, water, wildlife, timber, wetland and other resources and resource values. Once a stewardship management plan is prepared, the landowner may then qualify for assistance in management implementation through other assistance programs. Forest Stewardship plans help create informed landowners that become more engaged in planning and managing their forests. This greatly increases the likelihood that their forests will remain intact, productive and healthy, and that the social, economic and environmental benefits of these lands will be sustained for future generations.

The program provides landowners with the professional planning and technical assistance they need to keep their land in a productive and healthy condition. To enter the program, landowners select a private resource consultant from the list of certified stewardship plan writers maintained by the State. In partnership, the landowner and the consultant will identify the management objectives for the property. For some landowners, enhancing wildlife habitat for a particular species may be the most important objective; others may wish to manage their land for some type of recreation or for timber outputs. All are valid objectives under the Forest Stewardship Management Plan. Implementation of the plan is entirely voluntary, although most landowners indicate a desire to move forward with management implementation once a plan is created to their specific objectives.

USFWS Programs

Landowner Incentive Program (LIP)

Excerpted from USFWS Wildlife and Sport Fish Restoration Program (2013)

LIP provides federal grant funds to grant funds to the states, the District of Columbia and insular areas to protect and restore habitats on private lands, to benefit federally listed, proposed or candidate species or other species determined to be at-risk.

Grant funds must be used to establish or supplement State landowner incentive programs to benefit species identified in the State's Comprehensive Wildlife Conservation Strategy (State Wildlife Action Plan) or classified as Special Concern by the State, or federally listed, proposed, or candidate species or other species determined to be at-risk. These grant funds may also be used to provide technical and financial assistance to private landowners for habitat protection and restoration

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Canada Goose *(Branta canadensis)*

W.C. Joe Johnson



Joan Tisdale ©

Few Michiganders can remember the 25 September 1946 headlines in the *Battle Creek Enquirer* newspaper: "Hunters won't have the Canadian Goose for prey when the hunting season opens October 5." The hunting season was closed because biologists estimated that there were less than 50,000 left in the entire Mississippi Flyway. In the mid-2000s biologists estimated that there were 2.5 million in the flyway (Fronczak 2009). Conservation programs worked for the Canada Goose. They have been restored or introduced in many areas and now can be found nesting in all Canadian Provinces and all 49 continental states (Mowbray et. al. 2002).

During MBBA I, twelve subspecies of Canada Goose were recognized (Delacour 1956). But in 2004, primarily based on genetic studies, the American Ornithologists' Union split five of the small-bodied, primarily tundra-nesting subspecies (*hutchinsii*, *asiatica*, *leucopareia*, *taverneri*, *minima*) into a separate species, the Cackling Goose (Banks et al. 2004), which is fairly common in Michigan in late October, especially on waterfowl refuges in the southern part of the state. This is a very small goose, weighing about 2 kg (4 lbs.) and has a voice that has been described as a "cackle". This left seven large-bodied subspecies assigned to the Canada Goose (*canadensis*, *interior*, *maxima*, *moffiti*, *parvipes*, *fulva*, *occidentalis*), of which the "Giant" Canada Goose (*maxima*), once thought to be extinct, is the subspecies nesting in Michigan, and the subject of this account.

Distribution

During MBBA I the Canada Goose was observed in all 83 counties and confirmed nesting in 81 of them. In MBBA II, they were observed and confirmed nesting in all 83 counties. The new counties were Huron and Delta. Township observations increased significantly between the two atlases, with 774 occupied during MBBA I and 1,121 during MBBA II, an increase of about 45%. Distribution throughout the state does not seem to have changed much, with over half of the observations occurring in the SLP, a little over 25% in the NLP and about 20% in the UP. The distribution of lakes and ponds likely affect the distribution of this species. A major change in nesting habitat has occurred since the 1970s when geese were thought to need a least a two hectare (five acre) wetland (Kaminski 1975). This very adaptable species, tolerant of humans, now occupies and nests on or near very small runoff ponds associated with industrial and residential development. The high incidence of confirmed nesting in Wayne County is probably not because of major wetland restoration but the development of storm water retention ponds. Golf courses with ponds and lots of green grass attract lots of nesting geese. Many urban/suburban areas are closed to hunting and act as refuges for geese.

It was only a matter of time before Canada Geese became so common that human/goose conflicts began to rise. Beginning in 1972, the DNR began trapping and relocating conflict geese. Many thousands have been relocated throughout the state, and many thousands have been sent to Arkansas, Iowa, Kentucky, Mississippi and Oklahoma through 2008 (MDNR unpub. data).

Breeding Biology

There is no evidence that there have been any changes in nest initiation, hatch and fledging dates. This species begins nesting shortly after ice free conditions occur in late March, typically completes an average clutch of six eggs by early April which begin to hatch by early May.

Consistently since 1982, biologists have been able to capture for banding purposes, seven to ten week old goslings and their flightless parents between 10 June and 4 July every year. If ice cover loss starts to occur earlier, then the Canada Goose will likely begin to nest earlier like they do in Ohio and Indiana.

Abundance and Population Trends

A highly significant increase in the number of Canada Geese observed on Michigan BBS surveys occurred between our two atlases, calculated to be a 7% annual increase. In the 1980s, about three birds per route were observed; by the mid-2000s, the number had risen to 15 (Sauer et al. 2008). USFWS Region 3, the Great Lake States, had an annual increase of 8%, increasing from 4 geese to 25 per route. In the 1990s, major growth was also reported in atlas reports from Wisconsin (Craven 2006), Ohio (Peterjohn and Rice 1991) Indiana, (Keller and Castrale 1998) Ontario (Hughes and Abraham 2007) and New York (McGowan 2008).

Michigan spring waterfowl survey estimates, based on observations from 22 stratified aerial flight lines, indicated an average of 205,000 (range 172,000 to 246,000) Canada Geese between 2002 and 2008 (D. Luukkonen pers. comm.). It is not that there are too many geese, but there is a distribution problem when so many occur in urban and suburban settings (McNew. 2007). Hunting season structure (length and bag limits) has stabilized the Michigan population at around 200,000.

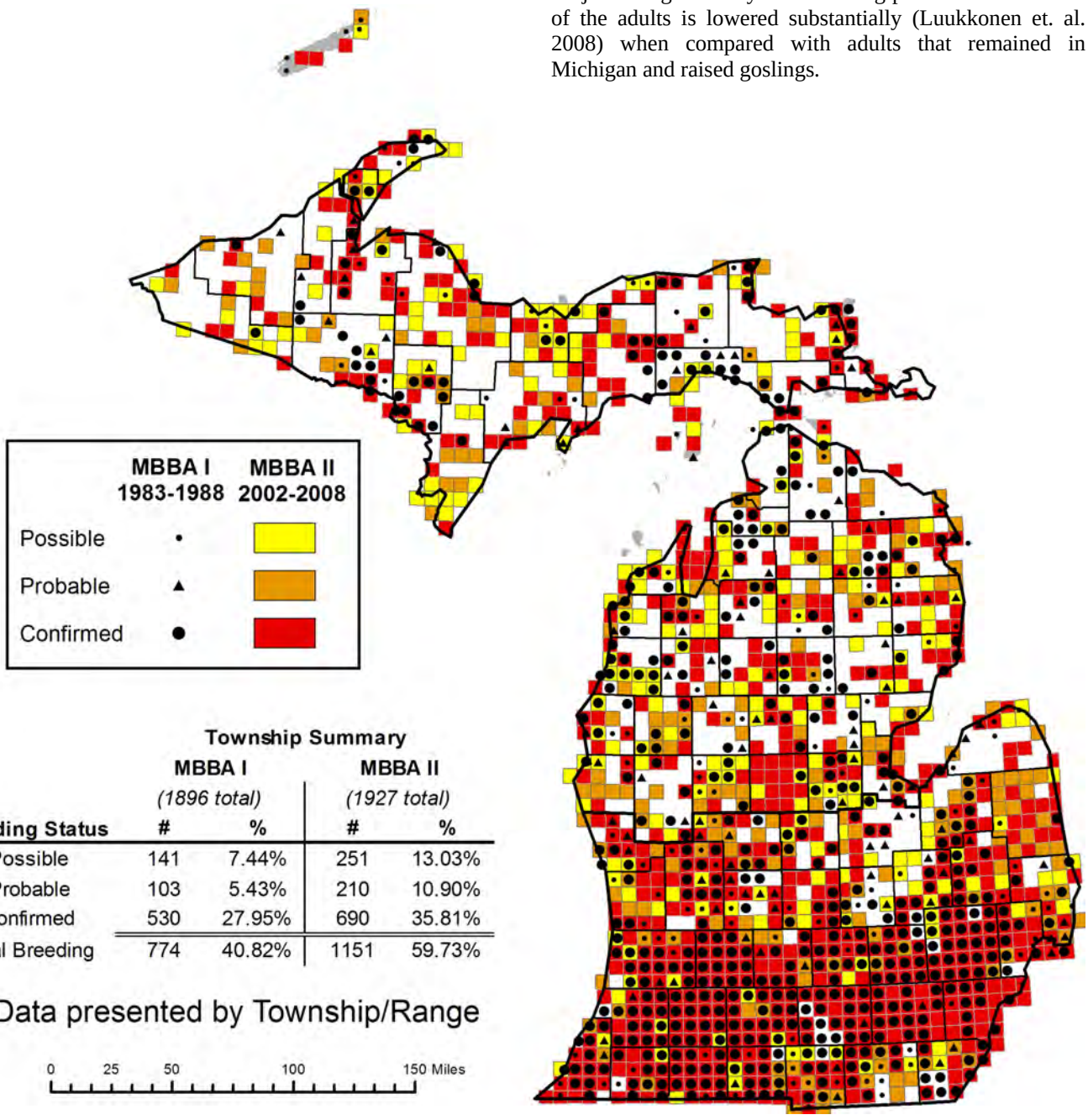
Canada Goose *(Branta canadensis)*

W.C. Joe Johnson

Conservation Needs

The current DNR goal is to ensure the welfare and sustainability of our Canada Goose resource. The DNR objective is to keep the spring population estimate between 175,000 and 225,000 Canada Geese (F. McNew pers. comm.). To help control the population size and provide recreational opportunities, liberal Canada Goose hunting seasons and bag limits have been in effect for several years. Unfortunately hunting cannot be used to control geese located in major metropolitan areas because of laws prohibiting the discharge of firearms and other public safety issues.

In metropolitan areas during MBBA II, 4,000-7,000 geese were rounded up during their flightless period in June each year for relocation to other areas in Michigan and the Midwest. This control method is very time consuming, expensive, and suitable release sites are limited, therefore it is not likely to be sustainable into the future. A second control program started in 1998 is the issuance of permits to citizens to destroy nests and eggs (Payne 2006). During MBBA II, 5,000-6,000 eggs were destroyed annually in the Metro Detroit area, Ann Arbor, Alpena, and Sault St. Marie. If the eggs are removed after the 14th day of incubation, the vast majority of the adult geese perform a molt migration into northern Canada in late May – early June. During the return flight in September, the geese are subject to significantly more hunting pressure and survival of the adults is lowered substantially (Luukkonen et. al. 2008) when compared with adults that remained in Michigan and raised goslings.



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	141	7.44%	251	13.03%
Probable	103	5.43%	210	10.90%
Confirmed	530	27.95%	690	35.81%
Total Breeding	774	40.82%	1151	59.73%

Data presented by Township/Range

Mute Swan *(Cygnus olor)*

W.C. Joe Johnson



Joan Tisdale ©

This large majestic and graceful swan is native to Europe and Asia where it has been held in captivity as a domestic species since A.D. 1186. These domestic swans were imported from Europe and released on ponds in local parks and estates in New York, Michigan, Maryland's Chesapeake Bay, and British Columbia as ornamental birds from the mid-1800s to the early 1900s. The Mute Swan is a domestic exotic species in North America, which is present in the wild as a feral bird primarily as a result of escapes from captivity

In North America they are known to nest from New Hampshire to Virginia on our east coast, through all of the Great Lakes states except Minnesota, and have become very common in Ontario. Today, Michigan has the largest population of mute swans in North America, and appears to be a source population for surrounding states and provinces. A small population nests in southern British Columbia (Ciaranca et al. 1997). Formerly afforded protection under the Migratory Bird Treaty Act, the Mute Swan was removed from this list of protected species in 2004, amid controversy primarily due similarities with a native species of swan, *C. paloregonus*, of the same sub-genus, now extinct (Trapp 2005). This decision was supported by most state agencies with Mute Swan populations, where it is considered an aquatic invasive species, present in the wild as a feral bird primarily as a result of escapes from captivity. Many state agencies feel the Mute Swan should be returned to captivity from whence it came, others believe the populations should be managed to minimize ecological damage and conflicts between humans and swans.

Distribution

During MBBA I there were 19 township observations in the UP, 97 in the NLP and 120 in the SLP. This data suggests that the Mute Swan was quite uncommon in the UP and fairly equally observed in the NLP and SLP. During MBBA II, there were only 15 township observations in the UP, 103 in the NLP and 242 in the SLP. The 22% (19 to 15 townships) decrease in observations in the UP was most obvious in Baraga and Mackinac counties. Mute Swans remain uncommon in the UP. The 6% (97 to 103 townships) increase in the NLP suggests little change; however there were notable decreases in Charlevoix and Kalkaska and notable increases in Oceana, Mecosta, Isabella and Iosco counties. The 100% (120 to 242 townships) increase in the SLP suggests a major change in the number and distribution of breeding Mute Swans there. Notable increases occurred in Muskegon, Montcalm, Ottawa, Kent, Barry, Macomb, Wayne, Washtenaw, Calhoun, Cass, St. Joseph and Branch counties. During both atlases, about 55% of the observations were confirmed; not unexpected for this very large, white, easy to identify bird.

Breeding Biology

There does not seem to be any evidence that the breeding biology of this early nesting bird has changed between atlases. Because of their domestic origin, they often nest and rear their young in close proximity to humans. Year round lakeside homes and the jet-ski are relatively new experiences for the Mute Swan. Territorial male Mute Swans can aggressively protect their nesting site and young from other wildlife and humans. The DNR Southfield Operations Service Center (unpub. data) received a complaint that a Mute Swan apparently attacked a jet-ski, knocked the rider off, and broke the rear view mirrors. This report was from Bush Lake in Oakland County on 10 August 2000, and was one of 96 citizen complaints about aggressive Mute Swans between 1981 and 2000. Complaints are kept on file at DNR Operations Service Centers. There is growing concern for public health and safety on many lakes in Michigan.

Abundance and Population Trends

The USGS BBS data indicated no change in abundance between our two atlases. An average of 4.5 Mute Swans were observed in the 1980s (MBBA I) and in the 2000s (MBBA II), on only 10 routes (Sauer et al. 2008).

Christmas Bird Counts (CBC) may provide better evidence of how the Mute Swan population has expanded and grown in the last five decades (NAS 2009). In 1960, 102 Mute Swans were observed in one CBC circle; Traverse City. By 1967 a total of 221 swans were counted in three circles: 190 in Traverse City, about 26 in Cheboygan and less than six in Alpena. In 1967 several SLP counts were active, but no Mute Swans were observed. In 1977, 14 counts reported 528 swans. Most were seen on one count in Traverse City (414; 79%). Of the other 13 counts five were in western SLP, five in eastern SLP, and three in the NLP. In 1987, 25 counts reported 805 swans, but only 121 (19%) were in Traverse City, with several hundred counted in the SLP. The current distribution pattern was set by 1997, when 36 count circles reported 1,501 swans, only 37 in Traverse City, notable numbers in central Michigan, and very common in the SLP. The Traverse City flock was artificially fed each winter; by the early 1970s, 13-20 tons of corn and large quantities of lettuce and bread were being fed to over 500 swans each year (Wood and Gelston 1972).

The DNR spring waterfowl surveys from 2002 to 2008 indicated 4,500 to 10,200 Mute Swans with an average of

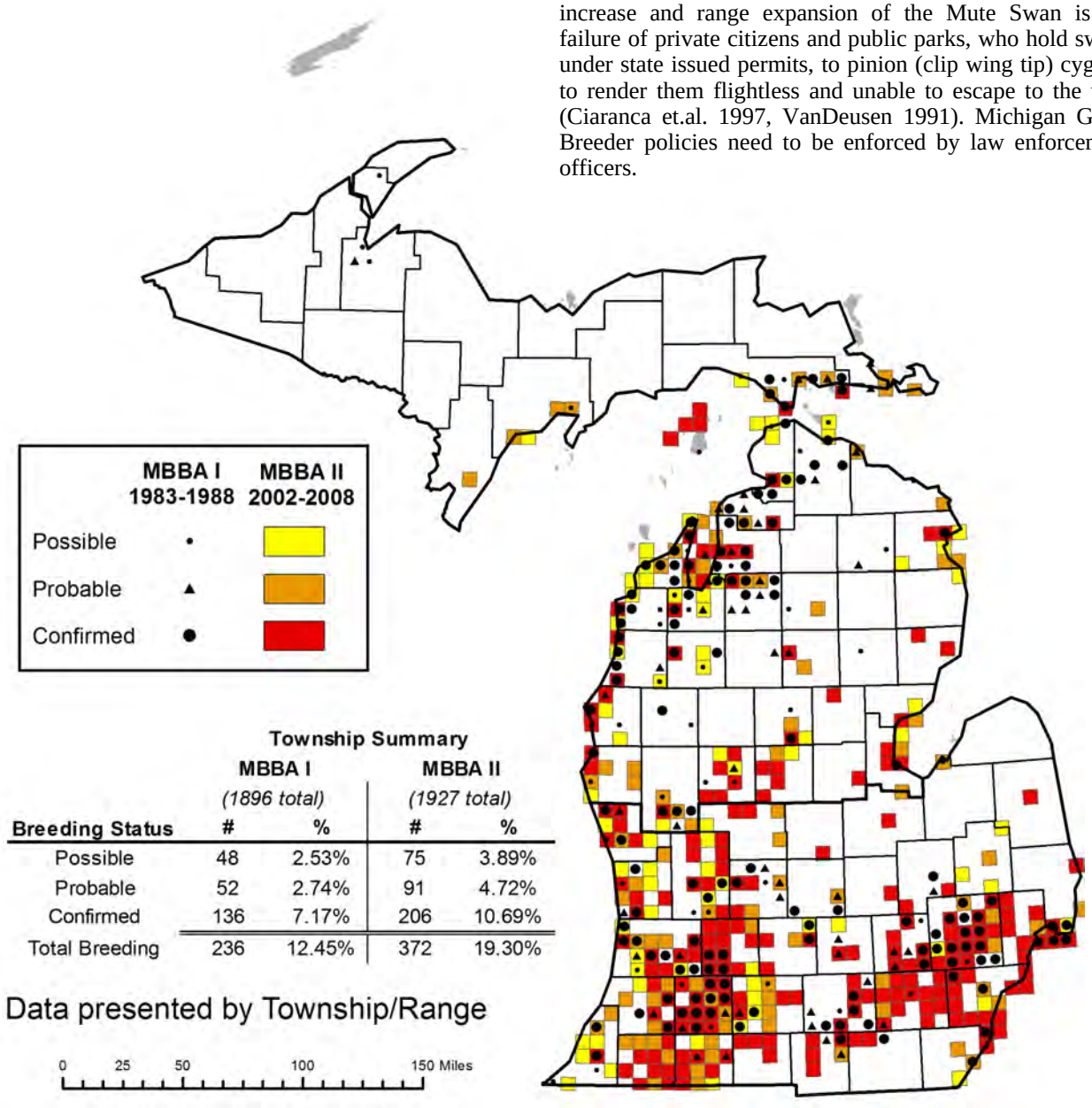
Mute Swan *(Cygnus olor)*

W.C. Joe Johnson

7,200. The vast majority of them occurred in the SLP and the numbers are increasing each year (MDNR unpub. data). This agrees with the CBC data presented above and the distribution of this species observed during MBBA II. In an Ontario study, Petrie (2003) used his most conservative estimate of population growth rate, 10% per year, and calculated that the Ontario population of 2,700 counted in 2003 could reach 30,000 by 2033.

Conservation Needs

Petrie (2003) stated that "given that the species is non-native and its ecological impact potentially could be large," he suggested that "control measures be implemented before the population grows much larger in the mid-west". Results from recent studies on the ecological impact of Mute Swans vary greatly with swan density. Flocking Mute Swans were found to have a negative effect on submerged aquatic vegetation (Tatu 2006). A study on Mute Swans in nesting pairs at lower densities by Conover and Kania, found that while there was aggression towards native species and humans, most often in the form of chasing behavior, but occasionally by biting or beating with wings. Mute Swans were not avoided in nest site selection, nesting no further from Mute Swan pairs than from randomly selected points. This low density study also found the Mute Swan presented no interference with native species nest attempts or effects on biomass (1994). Michigan has a long range management plan goal to reduce the feral population of Mute Swans to less than 2,000 by 2030. Control methods include egg and nest destruction and removal of birds on both public and private lands. Private citizens may obtain permits from the DNR to destroy eggs and remove swans that are a threat to human safety or threaten native plants or wildlife. Mute swan control efforts should be significantly increased to reduce the rapidly expanding population. One contributing factor to the increase and range expansion of the Mute Swan is the failure of private citizens and public parks, who hold swans under state issued permits, to pinion (clip wing tip) cygnets to render them flightless and unable to escape to the wild (Ciaranca et.al. 1997, VanDeusen 1991). Michigan Game Breeder policies need to be enforced by law enforcement officers.



Trumpeter Swan *(Cygnus buccinator)*

W.C. Joe Johnson

Status: *State Threatened*



Al Menk ©
Species sponsored by: Bryce & Paula Dreezen,
And also by: Joe Johnson.

Banko (1960) presents some compelling evidence that this species was once abundant and widespread on the North American Continent; from the Atlantic to the Pacific and the Arctic to the Gulf coast. The population was severely depleted by subsistence hunting and over 125 years of commercial swan skin harvest by hunters and trappers for the Hudson Bay Company. Many thousands of skins were shipped to Europe between 1772 and the late 1800s (Banko 1960). By 1933 there were thought to be only 66 Trumpeters alive in North America and thus nearly extinct (Banko 1960). Unknown and unrecorded remnant populations existed in Canada and Alaska (Mitchell 1994).

Major conservation efforts have resulted in a significant recovery of this species. There are three major populations. The Pacific Coast Population nests in Alaska and winters along the Pacific Coast as far south as Washington. The Rocky Mountain Population nests in Northern Alberta, British Columbia and the Yukon Territory. For the most part this group migrates to the tri-state region of Montana, Idaho and Wyoming for the winter, joining a small population of non-migratory Trumpeters that nest in the region. The Interior Population ranges from South Dakota and Nebraska through the Great Lakes States to Eastern Ontario and New York.

All of the swans in the Interior Population are the result of restoration projects by federal, state and provincial biologists between 1962 and 2008. Biologists began the Michigan effort in 1986 and finished releasing swans in 1993. A total of 124 Trumpeters were released as two year olds. About a third of the swans were released in the eastern UP, another third in the NLP and the remainder in the southwestern LP. Many of the swans were hatched and reared from eggs collected in Alaska; many others were donated by major zoos and private aviculturists. From 1994 to 2005, 122 more were released in the western UP, northeastern LP, northwestern LP and southeastern LP by Consumers Energy Corporation, Native American tribes, and private citizens. The restoration effort was sponsored by the DNR Nongame program and MSU's Kellogg Bird Sanctuary.

Distribution

There are numerous "New France", pre-English, records the most interesting of which was a journal entry by M. de Lamothe de Cadillac in July of 1701 about Lake St. Clair: "There are such large numbers of swans that the rushes among which are massed might be taken for (white) lilies" (Lumsden 1984). These were clearly outside the summer range of Tundra Swan and the Mute Swan did not exist in Michigan at that time. Between 1860 and 1884, several Trumpeter Swan were reported shot on Lake St. Clair, however none were confirmed (Barrows 1912). A single museum specimen (#70317) resides in the National Museum in Washington D.C. It was shot on the St. Clair Flats on November 20, 1875 (Barrows 1912). No other sightings in Michigan have been recorded (Barrows 1912, Wood 1951). The species was gone, extirpated from the entire Midwest by 1900.

Michigan's restoration effort started during MBBA I, when 44 Trumpeter swan eggs were placed under feral Mute Swans at the Allegan State Game Area (1986-1988). A total of 31 cygnets hatched during this cross-fostering experiment, but only six survived to flight stage. Had a species map been created for MBBA I, it would have had one possible observation in one township (Valley) in one County (Allegan). In contrast, atlas workers during MBBA II observed Trumpeter Swans in 147 townships in 42 counties. Nesting was confirmed in 82, probable in 45 and possible in 20 townships. It may just be a coincidence, but the distribution of townships occupied and the percentage of them occupied mirrors the proportions of swan released from 1989-1993, about a third of the population in each zone and just a bit over 7.5% of the townships occupied.

Breeding Biology

Based on a literature review of habitat needs of this species in the west, biologists in Michigan were asked to seek wetlands for potential release that were large (24ha/60 acres); had lots of emergent wetland plants to nest in; had abundant and diverse submersed aquatic plants for food; had no overhead electric wires (a major source of death); had no Mute Swans; and most importantly, had no history of waterfowl hunting because lead shot poisoning is a major killer of Trumpeter Swans in the Great Lakes region (Degernes and Redig 1990, Degernes and Frank 1991, Johnson 2000). This was not an easy task, but several federal and state refuges and Audubon Sanctuaries were selected. Trumpeter Swans do not actually need 24 ha wetlands; many are now nesting on beaver ponds as small as 1.5 ha (3 acres). They seem to select wetlands with

Trumpeter Swan *(Cygnus buccinator)* ***W.C. Joe Johnson***

Status: *State Threatened*

minimum human disturbance and rarely select lakes that are residentially developed, or that have ice-out to ice-in boating activity by humans. Upon encountering a pair of Mute Swans on a wetland, nine times out of ten a mature pair of Trumpeters will drive them from their nest and territory and occupy the wetland (Johnson 1999).

Trumpeter Swans often return to their nesting site before ice out; they often use the same nest site for several years. In southern Michigan, egg laying begins in early to mid-April with cygnets hatching in mid to late May. In the UP, they are about two weeks later.

The first successful nesting in Michigan occurred in 1992; one pair in Cass County and a second pair at the Seney National Wildlife Refuge in Schoolcraft County. Biologists at Seney have studied the nesting biology of Trumpeter Swans for more than 15 years. They estimate that the average clutch size is six; that 88% of eggs laid hatch; that 95% of the observed nests hatch one or more cygnet. Brood size ranged from one to nine. From 1992-2004, 632 cygnets hatched and 353 survived to flight stage; average cygnet survival was 56% (D. Olson, pers. comm.) Statewide, from 1992-2005 a total of 375 broods contained 1,220 cygnets for an average of 3.26 cygnets per successful pair (Johnson, 2005 unpub. survey data).

Abundance and Population Trends

Trumpeter Swans have been surveyed across North America every five years since 1975. In 2005, record high numbers were recorded: 34,803, 47% higher than 2000 (23,647). The Pacific group was 24,928; the Rocky Mountain group was 5,228 and the Interior Population, to which Michigan belongs, was 4,647 swans, an increase of 91% over the 2000 estimate of 2,430 (Moser 2006). In 2005 there were 471 Trumpeter Swans in South Dakota/Nebraska, 644 in Ontario, 2,000 in Minnesota, 431 in Wisconsin, 269 in Iowa, 91 in Ohio, 13 in New York, and 728 in Michigan which included 345 in the UP, 161 in the NLP, and 222 in the SLP (Moser 2006).

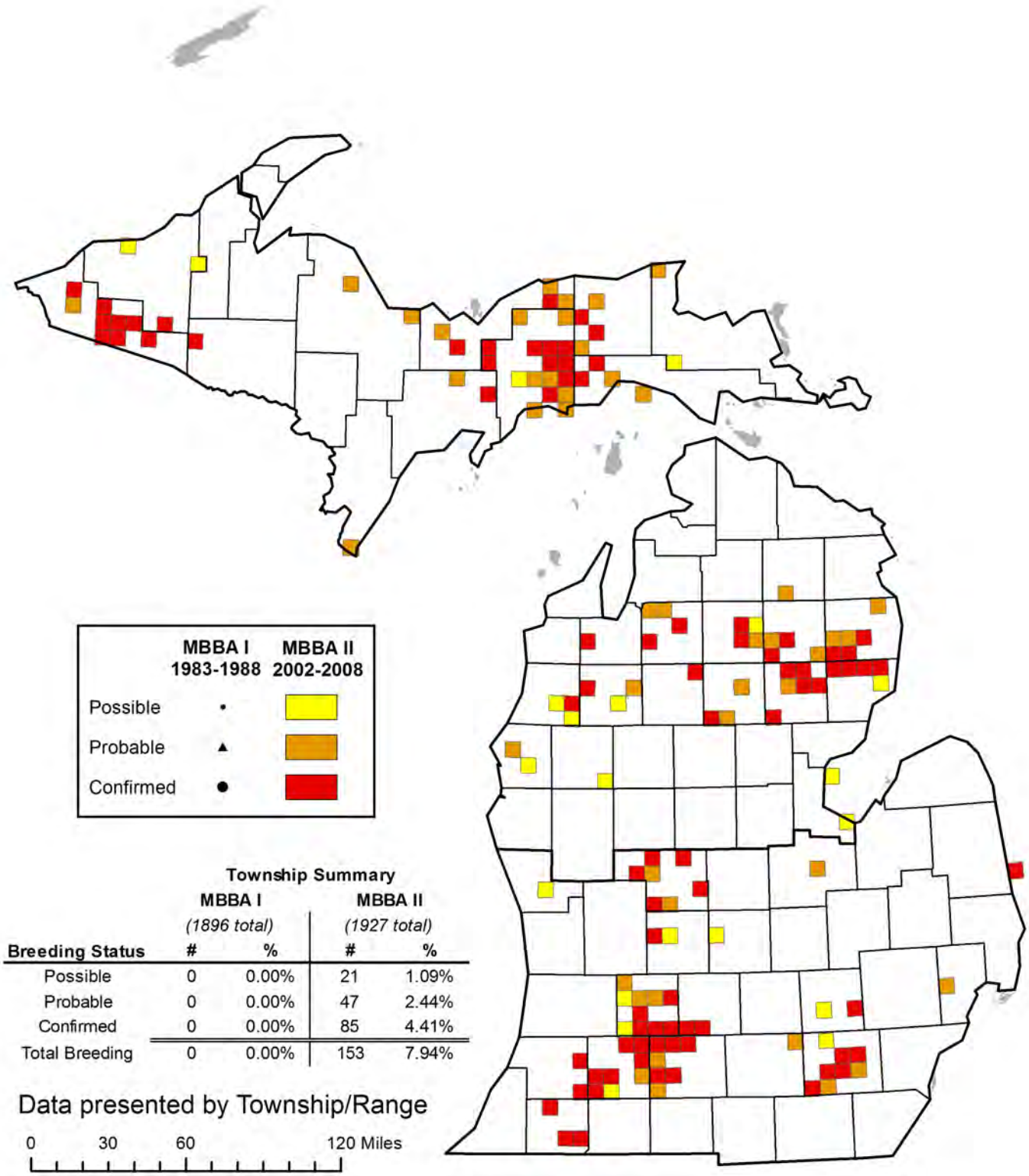
Conservation Needs

Michigan's initial effort was guided by the 1984 North American Management Plan for Trumpeter Swan (USFWS 1984) and later by the 1998 Joint Flyway Management Plan for the Interior Population of Trumpeter Swans (Ad hoc Drafting Committee for the Interior Population of Trumpeter Swans 1998). The goal of the joint plan was to "restore a self-sustaining, migratory population of Trumpeter Swan in the Central and Mississippi flyways" and the first objective was to develop a dispersed breeding population of at least 2,000 birds and 180 successful breeding pairs by the year 2001. The Interior Population objective was reached in 1999 when 2,087 swans were surveyed and the successful breeding pair objective was reached in 2000 when 202 pairs were recorded.

The Michigan restoration plan (Martz et al. 1986) had a very modest goal of two flocks of 100 birds each by the year 2000. That goal was reached in 1997 in the UP and the southwestern LP. Perhaps it is time to reconsider the original Michigan population goal and establish a new one. Many agencies – the DNR, Natural Resources Conservation Service (NRCS), USFWS, and private groups like Ducks Unlimited – are spending a great deal of money to restore Michigan wetlands. This is good news for all wetland dependent wildlife, as Michigan has lost half of its original wetlands. Since the only official inventory of Trumpeters is conducted once every five years across the continent, we must plan for the continuation of these surveys in the future.

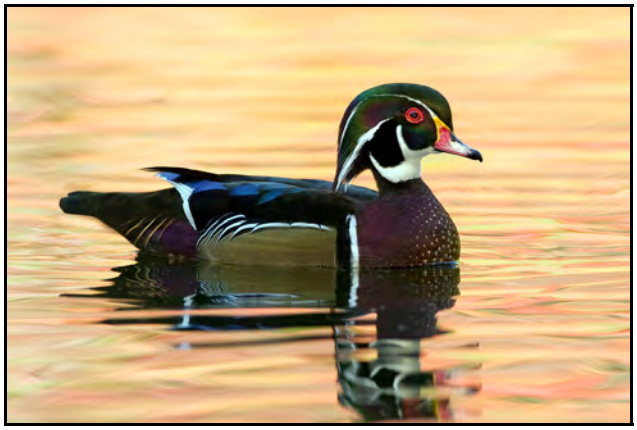
Trumpeter Swan *(Cygnus buccinator)* ***W.C. Joe Johnson***

Status: *State Threatened*



Wood Duck *(Aix sponsa)*

Ron Hoffman



Greg Schneider ©

Male Wood Ducks in breeding plumage are the most beautiful waterfowl native to North America. Their name is fitting for a duck with the unusual habits of perching and nesting in trees that is seldom found far from woodlands associated with water. The species range is primarily in the eastern half of North America extending from southern Canada to the Gulf of Mexico, and along the Pacific Coast. They are common summer residents in Michigan, arriving in the SLP in late March and usually departing by late October. They spend the winter in the southern states along with a non-migratory population found there. Both MBBA I and II confirmed nesting in every county in Michigan. Among ducks, only the Mallard is better known by the general public.

Distribution

Wood Ducks were common prior to European settlement in Michigan but they rapidly decreased in numbers during the late 1800s until they were considered a rare breeder by the turn of the 20th century (Barrows 1912). Unregulated hunting, deforestation, and loss of wetlands caused their decline (Hepp and Bellrose 1995). A slow recovery began with enactment of the Federal Migratory Bird Treaty Act of 1918 and habitat protection. Development of artificial nest boxes in the 1930s further helped Wood Ducks reoccupy their former range (Bellrose and Holm 1994).

The dependence of "woodies" on nesting cavities near water probably best defines their breeding distribution, although other factors such as breeding physiology may limit their range in northern areas where suitable habitat exists (Bellrose and Holm 1994). Both MBBA I and II found Wood Ducks more broadly distributed in the SLP than in more northern regions. Their distribution coincides with clay and loam soils being more common in SLP while farther north light sandy loams prevail in the NLP and thin, acidic soils are common in the UP (Bellrose and Holm 1994). Although much of the oak forest in the SLP has been replaced by open land (farms, rural residential), oak woodlots are still common, some of them close to water. Floodplain forests still remain along many rivers and streams in the SLP. Typical deciduous trees in these forest types, such as silver and red maple and black, red, and white oaks, provide the nest cavities favored by Wood Ducks (Bellrose and Holm 1994). The relatively low productivity of soils further north favors coniferous forests with fewer nest cavities and a smaller wetland food base.

Breeding Biology

One aspect of Wood Duck breeding biology that seems to have changed since MBBA I is the potential impact of raccoon predation on nesting success. Raccoons have been identified throughout North America as having the single greatest impact on egg success and incubating hen mortality (Bellrose and Holm 1994). MDNR furbearer harvest data indicates a trend of increasing raccoon abundance during the past 20 years (Frawley 2007). It is uncertain whether this trend has a significant impact on Wood Duck production. However, it does support the importance of equipping nest boxes with effective predator guards.

Abundance and Population Trends

Wood Ducks are one of the most difficult species of waterfowl to survey. Secretive habits combined with their use of tree-lined streams and woody swamps make them hard to detect when aerial surveys are conducted for other waterfowl, so other methods such as banding data are relied on to estimate Wood Duck abundance. Bellrose and Holm (1994) estimated the 1981-85 Michigan breeding population at 139,360. Even the BBS provides only long-range indices of the species because so few Wood Ducks are encountered along the survey routes (USFWS 2008). BBS trend analysis suggests a not statistically significant 4.6% per year increase in Michigan during 1966-2007, which declined to a 3.3% per year increase during 1980-2007. Of the surrounding states and provinces, only Ontario had a higher rate of increase. It appears that the status of the Wood Duck in Michigan is stable or slightly increasing.

Wood Ducks are more abundant in the SLP than in northern regions of the state. On the average, 3.6 ducks per block were found during MBBA II in the SLP compared to 2.1 in the NLP and 2.0 in the UP. This is considerably less than 21.5 ducks per block in the 1981-85 estimate by Bellrose and Holm (1994) for Michigan. As suggested above, north-south population density appears influenced by soil fertility. During MBBA II, the highest Wood Duck density was at Shiawassee National Wildlife Refuge (190 ducks per block) and at Pointe Mouillee State Game Area (180 ducks per block). Both of these wildlife management areas have extensive forested and emergent wetlands that provide abundant nesting cavities and brood habitat.

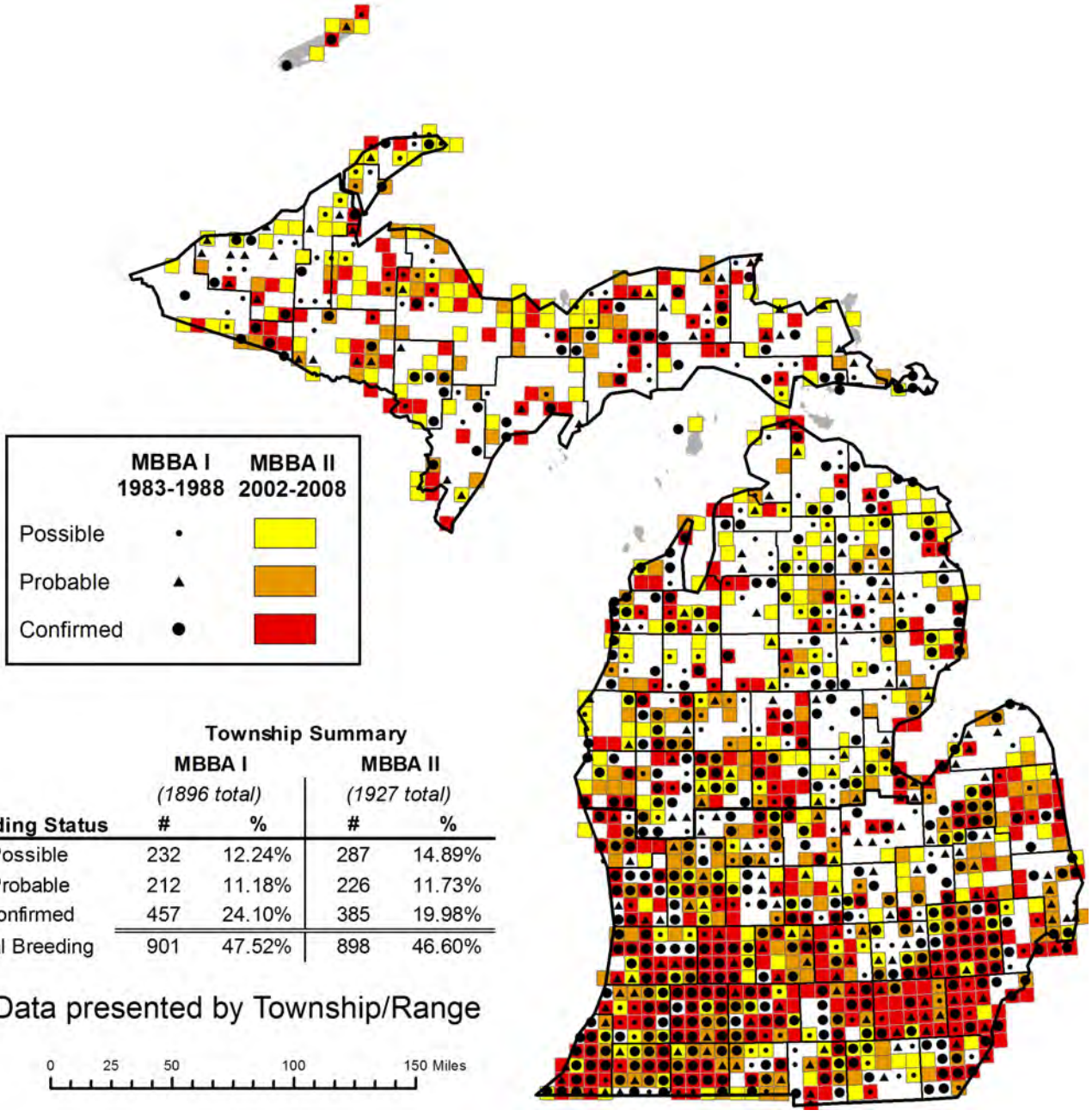
Wood Duck *(Aix sponsa)*

Ron Hoffman

Conservation Needs

Hunting has played a major role in determining population numbers of Wood Ducks (Hepp and Bellrose 1995). Wood ducks are the second most commonly harvested duck in Michigan, behind only Mallards. In 2007, hunters shot an estimated 48,200 woodies when the bag limit per day was two (Richkus et al 2008). The bag limit was increased to three per day in 2008 and 2009 when USFWS and MDNR determined the population could sustain an increased harvest.

Next to the Mallard, Wood Ducks are probably the most adaptable duck in North America (Bellrose and Holm 1994). They readily live near humans and accept nesting boxes. Properly constructed and maintained nest boxes can increase their numbers in local areas but old growth timber stands near water still produce the bulk of their population. The future of woodies appears bright as long as their wetland habitat is protected, especially adequate water for brood rearing.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	232	12.24%	287	14.89%
Probable	212	11.18%	226	11.73%
Confirmed	457	24.10%	385	19.98%
Total Breeding	901	47.52%	898	46.60%

Data presented by Township/Range

0 25 50 100 150 Miles

Gadwall *(Anas strepera)*

Mike Sefton



Greg Schneider ©

The elegantly understated Gadwall is a medium sized dabbler that lacks the bright colors of many of the *Anas* species. The male is grayish brown with a black rump and undertail coverts, a lighter colored head and neck, a white belly, a conspicuous white speculum seen when the bird is in flight and sometimes seen when the bird is on the water, and a dark bill. The female is a buffy tan with a smaller white speculum than the male, and a grayish bill with yellow-orange along the opening of the bill.

The Gadwall is widespread over much of the Northern Hemisphere. In North America, the Gadwall breeds in the Great Plains and prairies, from southern Canada to California, and to Iowa in the east. It also breeds occasionally east and south of this area, and is well-established along the Eastern Seaboard from North Carolina to Quebec. Gadwalls winter in southern North America south to Central Mexico, Jamaica, and Cuba in the New World (Madge and Burn 1988). In the Great Lakes area, Gadwall breeds regularly in parts of northwest and eastern Wisconsin, at scattered locations in Michigan, the western shore of Lake Erie in Ohio, and the eastern shore of Lake Huron and the northern shore of Lake Ontario (LeShack et al. 1997).

Distribution

Barrows (1912) described the Gadwall as one of Michigan's rarer ducks, and believed that it probably nested in the state, but had no evidence of breeding. An increase in observations in Michigan, at the same time the bird was increasing in the central U.S., resulted in Payne (1983) revising the status as a transient from uncommon to common. The Gadwall is now considered a common migrant and rare breeder.

During the MBBA I period there were seven confirmed breeding records at scattered sites around the state, mostly coastal, such as Drummond and Beaver Islands, the Muskegon Wastewater Treatment System, at Nayanquing Point State Wildlife Area and Fish Point State Wildlife Area in Saginaw Bay, and at Pte. Mouillee State Game Area. The Gadwall's status as a rare breeder in Michigan was validated in MBBA II, with only three confirmed breeding records, in Luce, Chippewa, and Saginaw Counties. MBBA I noted three townships with probable breeders, and ten with possible breeders (Eastman 1991), whereas MBBA II had eight probable and nine possible breeders.

Breeding Biology

Most Gadwalls begin to form pairs before leaving their wintering areas, and 90% are in monogamous pairs by November, four to five months before breeding takes place. Males keep watch while the female looks for a suitable location for the nest. Gadwalls prefer islands for nesting (LeSchack et al. 1997), and nests are usually located in dense brush, forbs, or tall grasses in dry areas. Nests are usually less than 150 meters from water, but may be as far as 2.4 kilometers from water. Island nests may be within a few meters of water. The nest is lined with vegetation and down from the female's breast. Gadwalls usually nest later than other *Anas* species, with the average time between spring arrival and the laying of the first egg being 28 days, though nest site availability and weather can affect the timing. The late start in nesting may explain the unusually high success rate of 68% documented elsewhere in their range (Granlund 1994). Gadwalls are single brooded, though the hen often renests if the first eggs are destroyed. Nests are sometimes parasitized by Lesser Scaup, Redheads, Ring-necked Pheasants, and other Gadwalls (LeSchack et al. 1997).

In Michigan, egg laying occurs from 30 May to 25 July, with an incubation period of 25 to 28 days. Unfledged juveniles are found from 16 June to 25 August, and fledglings from 29 June to 19 September (MDNR. 2005).

Abundance and Population Trends

Gadwall in traditional survey areas of North America are up 73% from the long term average (USFWS 2009). BBS trends for USFWS Region 3, although non-significant, suggest that the number of Gadwalls detected per route decreased from MBBA I to MBBA II (Sauer et al 2008). Trends are unavailable for Michigan, which serves only as a minor breeding area for the Gadwall (Bellrose 1980). During MBBA II, Gadwalls were observed in 34 townships, 14 more than during MBBA I. The largest area of increase was from the SLP which had 7 townships during MBBA I and 15 in MBBA II. The NLP and UP both had a small increase with three more townships each than MBBA I.

Gadwalls are more often observed in Michigan as a migrant, using the state as a minor flyway from the core breeding range to wintering grounds on the eastern coast (Bellrose 1980). They are fairly common in the SLP from March through May and September through November with a few individuals being seen through the winter season. In the NLP and UP, Gadwalls migrate through during April and May and again during September and most of October with very few, if any, lingering over the winter season (Chartier and Ziarno 2004).

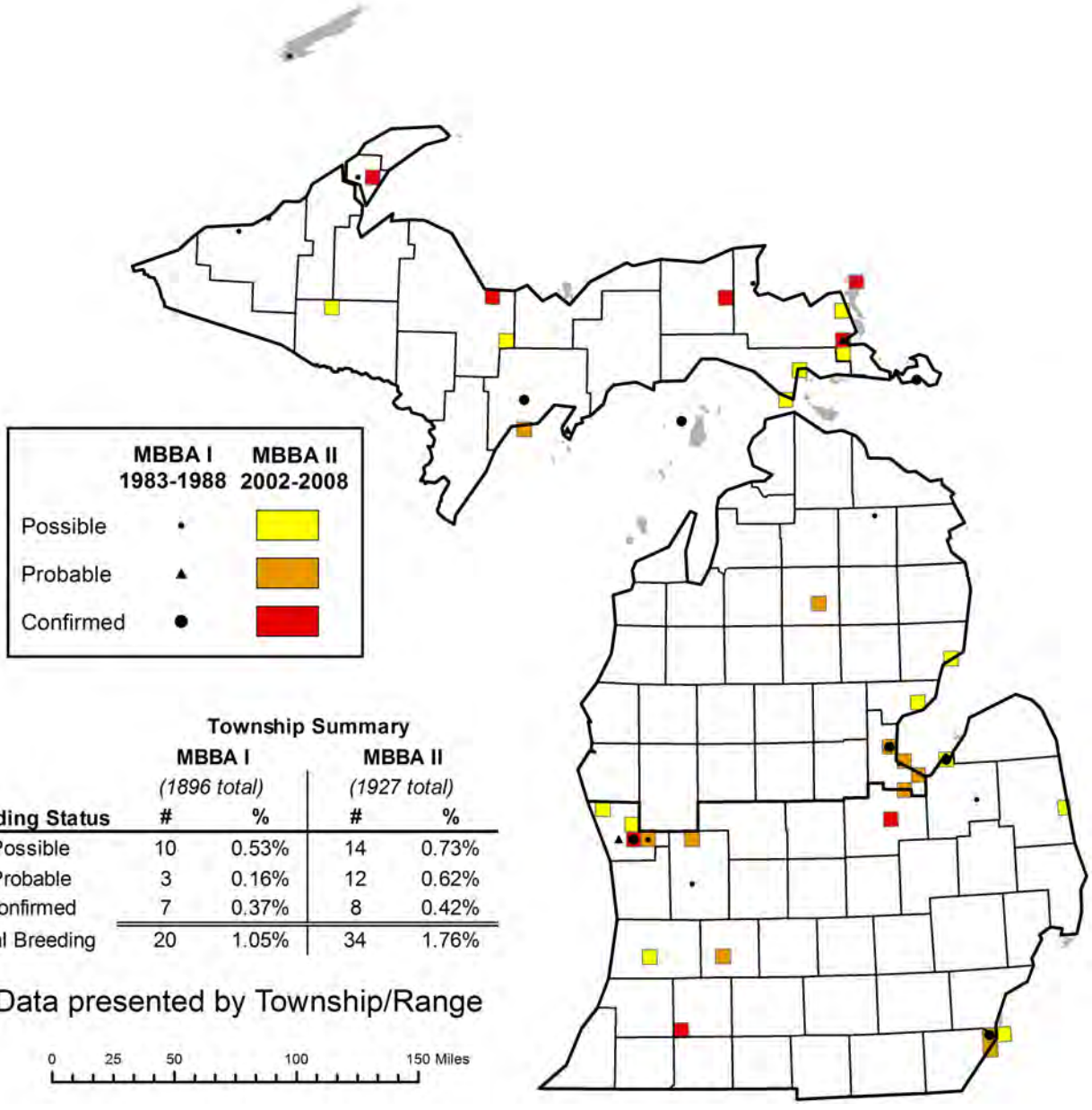
Gadwall *(Anas strepera)*

Mike Sefton

The first confirmed breeding record for Ohio was in 1979, where the Gadwall is a rare breeder with seven confirmed sites during their atlas period, primarily in the western Lake Erie marshes (Peterjohn and Rice 1991). Ontario showed a slight increase in breeding records from their first atlas (1987) to their second (2007) with the largest concentration of breeders on the northern shore of Lake Ontario and further east along the St. Lawrence River (Curry 2007). Wisconsin had confirmed nesters in 13 blocks, and another 15 blocks had probable or possible breeders (Cutright et al. 2006).

Conservation Needs

While the Gadwall is increasing overall in the United States, there are too few breeding records for Michigan to predict whether Gadwall will increase or decline in the state. It is possible that the Gadwall may increase in the state due to its general increase and range expansion in other areas of the country, and the efforts of the Michigan DNR to increase restoration, retention, and regulation of wetlands on public lands, and to encourage similar efforts by private landowners (Eagle et al. 2005).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	10	0.53%	14	0.73%
Probable	3	0.16%	12	0.62%
Confirmed	7	0.37%	8	0.42%
Total Breeding	20	1.05%	34	1.76%

Data presented by Township/Range

0 25 50 100 150 Miles

American Wigeon *(Anas americana)*

Skye Christopher G. Haas



Greg Schneider ©

With an irreverent whistle for a voice, and a face pattern that looks as if painted by a street fair artist, the American Wigeon displays an air of whimsy as it languidly shuffles about in shallow marshes or on agricultural fields. Primarily found in Michigan during migration, large numbers pass through the state in April and again in September and October. It is only found in the extreme southern reaches of the State in winter, and is one of our more uncommon nesting dabbler species. Breeding populations range from localized or casual populations through the Great Lakes eastwards into the Maritime Provinces. American Wigeon becomes more abundant in the north central U.S. and throughout much of Canada west of Ontario, as well as encompassing much of Alaska (Mowbray 1999). More terrestrial than most ducks, evolutionary modifications to the bill allow the species to graze easily on land in a manner similar to geese. When foraging in water, wigeon will often associate with Canvasbacks, scaup or American Coots, opportunistically feeding upon plant matter brought to the surface by these and other herbivorous diving waterbirds (Mowbray 1999).

Distribution

The historical status of the American Wigeon is difficult to ascertain. Barrows (1912) deemed it a rare migrant in Michigan and discounted earlier ornithological lists that included the species as a state breeder. With the benefit of an added century of observations during which the wigeon has proven to be a sporadic, low density breeder, it is possible that Barrows simply failed to discover viable evidence. More likely, however, is a scenario in which the species expanded its range into Michigan as part of a broader eastern incursion noted in the 1930s through 1950s (Peterjohn 1991, Mowbray 1999, McGowan 2008).

The first documented breeding of American Wigeon in the state came in 1938, when a nest was found in Seney National Wildlife Refuge, Schoolcraft County. Although a small local breeding population persisted there for the next decade, there have been no recent reports of breeding since the inception of MBBA I. In the 1950s through 1970s a handful of breeding confirmations came from southeastern Michigan. MBBA I documented evidence of nesting wigeons in a total of 34 townships, though only five confirmations were recorded. A handful of post-MBBA I breeding records originated from Houghton County, with nesting documented in 1989-90, 1992-93 and 1999-2000 (Binford 2006).

The American Wigeon has experienced a small decline from an already low population since -MBBA I. Binford described three localized populations within Michigan during MBBA I; one in the Keweenaw Peninsula primarily restricted to the rural sewage pond system in Houghton and Baraga Counties; eastern Chippewa County in the farm country and waterways along the St. Marys River; and in the Lower Peninsula in the extensive wetlands of Saginaw Bay and the Shiawassee Flats. However, atlas observers in MBBA II did not find birds in the Keweenaw Peninsula and confirmed nesting in only three townships, all in the UP. American Wigeon sightings in MBBA II increased slightly in the NLP, and decreased in both the UP and SLP, with its occurrence in the UP dropping from 3.44% of all townships surveyed to 2.25%. The overall number of Michigan reports by township decreased from 1.79% to 1.40%.

Breeding Biology

Nesting singly or in small, loose colonies, American Wigeons can be found with their broods in open water more frequently than other species of dabbling ducks (Mowbray 1999). A study conducted at Seney NWR showed that nesting wigeons utilized an 8.1 ha open water marsh with only a sparse fringe of emergent vegetation around the shoreline and a wide variety of loafing and sleeping sites such as exposed mudflats, semi-submerged logs and sedge tussocks (Beard 1964). The habitat selected by females for nest sites tends to be grassy uplands or hayfields, often with low shrub cover, near shallow marshes, ponds or sloughs (Mowbray 1999). In Michigan, the pastoral farmlands of eastern Chippewa County, dotted with ponds and wet areas, and the coastal marshes along the St. Marys River, appear to be suitable for wigeons, as they have remained present in this location for over 20 years. However, as with many other species of prairie pothole duck, it is rural sewage ponds that tend to constitute the preferred nesting habitat in Michigan. The former breeding populace in the Keweenaw Peninsula seemed dependent on this habitat, and most breeding confirmations in MBBA II were found at sewage ponds in farm country.

Abundance and Population Trends

Populations in North America have oscillated in recent decades, with lows coinciding with periods of drought in the Prairie Provinces. Counts and estimates made in 1997 showed the overall population to be at its highest point since 1984 (Mowbray 1999). However, numbers began to drop again in the late 1990s, and a halt to the eastward

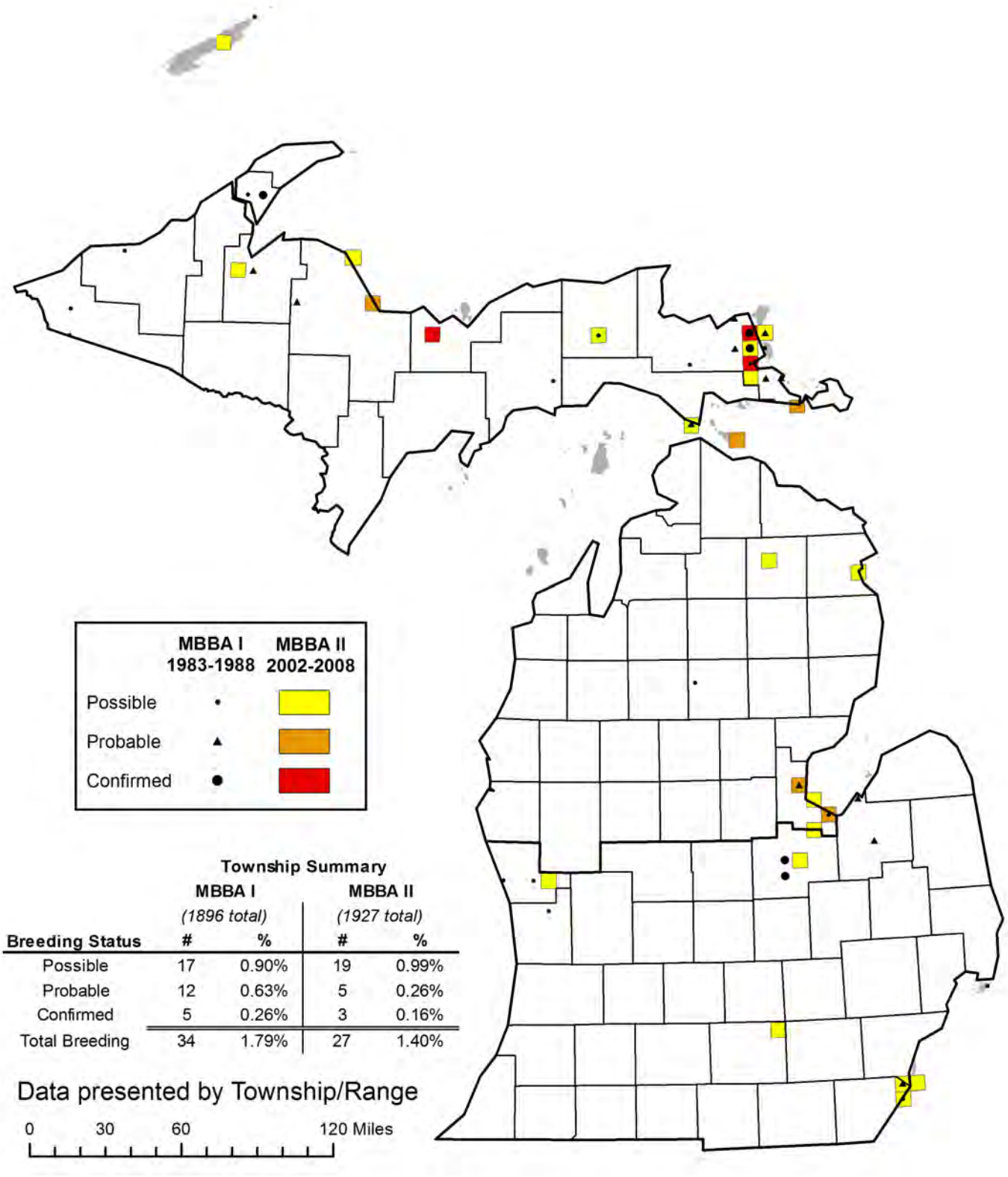
range expansion of the mid-20th Century has been noted (McGowan 2008). Recent population estimates based on surveys conducted by the USFWS found wigeon numbers to be at 2.4 million in 2010, which was similar to both the 2009 and long-term averages of 2.6 million (USFWS 2010). American Wigeons have declined in New York, occurring in half of the blocks they were found in during the state's first Breeding Bird Atlas (McGowan 2008). Ontario has also noted a slight decline in its breeding wigeon abundance, with a shift of the population center within the province to the north. One of the localized concentrations of American Wigeons in Ontario is on the Algoma side of the St. Marys River, with confirmed breeding in Sault Ste. Marie, Manitoulin Island and Sudbury (Gendron 2007); it is likely that this meta-population contributes to the longevity of the Chippewa County breeding colonies.

Breeding wigeon in Michigan seem to have temporal local populations. Local breeding populations spring up, only to disappear after a period of time. Populations in the Keweenaw Peninsula and at Seney National Wildlife Refuge have demonstrated this. The breeding confirmation at the Chatham Sewage Ponds in Alger County was of a female that nested and fledged young in both 2004 and 2005.

Conservation Needs

In Michigan, sewage ponds with grassy borders that mimic prairie pothole habitat, primarily in northern rural areas, seem to be where the nesting American Wigeons were found, adding this species to the long list of birds that benefit from this type of manmade habitat. It would certainly be advantageous for wigeons if conservation groups and state and federal wildlife agencies coordinated more closely with the local governments that operate the majority of these ponds, managing them for wildlife conservation as well as their intended purpose. Such initiatives have been undertaken in states such as Florida, Texas and Arizona, with positive results for birds and for local communities benefiting from the growth of ecotourism. Binford (2006) stated that without proper management of sewage ponds and their surrounding grasslands, wigeons would not expand or even survive within the Keweenaw Peninsula... a prophetic declaration given the species' absence in the region during MBBA II. Of additional benefit to the wigeon population in Michigan would be the adoption of low-impact, semi-industrialized farming practices in eastern Chippewa County that promote healthy grasslands near wetland habitat, as opposed to the large-scale industrial monoculture farming that occurs across much of the Midwest. Finally, protection and restoration of interior wetlands and coastal wetlands of Lake Huron and Lake Erie can only serve to help the long-term prospects of the American Wigeon within Michigan.

American Wigeon *(Anas americana)*

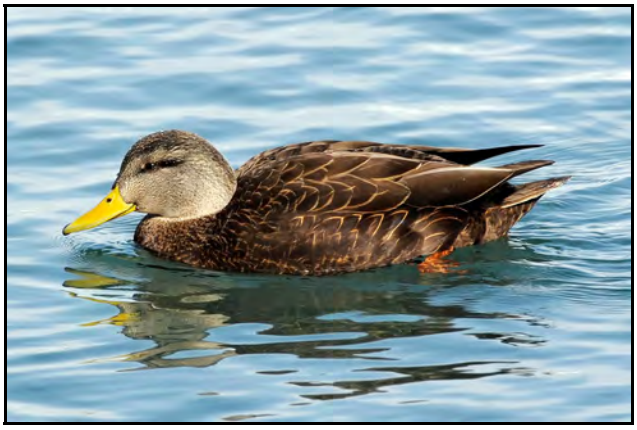


Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	17	0.90%	19	0.99%
Probable	12	0.63%	5	0.26%
Confirmed	5	0.26%	3	0.16%
Total Breeding	34	1.79%	27	1.40%

American Black Duck *(Anas rubripes)*

W.C. Joe Johnson



Jerry Jourdan ©

The American Black Duck may need more than our invested dollars to restore habitat. Once very abundant from Ontario through Quebec and the Maritimes in Canada, and from Minnesota through the entire Great Lakes states, through New York to our east coast from Maine to North Carolina, this species has declined substantially, especially in the Western portion of its historical breeding range (Longcore et al. 2000).

Distribution

In Michigan this duck remains sparsely distributed. MBBA II data suggests the population may have declined in Michigan by over 50% in the last 20 years. There seems to be evidence that the Black Duck's distribution has also changed between atlases. During MBBA I atlas workers observed this species in 285 (15%) of Michigan townships, while during MBBA II they observed this species in only 129 (6.7%) townships, a dramatic 55% decline. During MBBA I, this species was observed in 133 townships in the UP and in only 79 townships in MBBA II, a 41% decline. In the NLP, observations dropped from 66 to 29 townships, a 57% decline. In the SLP, observations dropped from 86 to 20 townships, a 77% decline. While the hours of effort between the two atlases increased by about 10% in the UP, declined by 14% in NLP and declined by about 9% in the SLP, they do not seem to be strongly related to the dramatic decreases in observations of Black Ducks.

On a broader scale, atlas workers during MBBA I were able to confirm nesting in 41 of Michigan's 83 counties, but during MBBA II they were only able to confirm nesting in 19 counties. Black Ducks seem to be in a serious decline in Michigan as well as Wisconsin, Ohio, New York, and parts of Ontario (Peterjohn and Rice 1991, Cutright et al. 2006, Ross 2007, Swift 2008).

Breeding Biology

Land use changes, including wetland drainage, degradation, deforestation, increased agricultural activity and urbanization have altered historical breeding habitats (Longcore et. al. 2000). The abundant Mallard may be responsible for displacing and hybridizing with Black Ducks (Ankney et al. 1987). Increased human disturbance may be affecting breeding Black Ducks as Longcore (2000) cited several instances of nest desertion caused by humans. We now are active on our residential lakes from ice-out to ice-in; years ago there were only cottages that were used from Memorial Day to Labor Day. Many new housing developments are centered on large wetlands and the resulting human activity and pets may discourage Black Ducks from nesting.

Abundance and Population Trends

According to Pirnie (1935) and Wood (1951), the American Black Duck was the most abundant breeding duck in Michigan during the middle of the 19th century. Black Ducks are not encountered on Michigan BBS routes, and no data is available from this monitoring program. Since 1992, the DNR has been flying 22 aerial transects annually to survey breeding waterfowl in Michigan. During MBBA II, the average number of Black Ducks surveyed was 4,000 and ranged from a low of 2,000 to a high of 9,000 (MI-DNR unpub. data). A remarkable contrast to the average of 276,000 Mallards recorded on the same transects during MBBA II. There does not seem to be a clear reason for the dramatic population declines in the Great Lakes region.

The Mid-winter waterfowl survey is another reasonable index of annual numbers of Black Ducks (Longcore et al. 2000). In the Mississippi Flyway (a group of 15 states on either side of the Mississippi River), the average number of Black Ducks counted from 1955 to 1960 was 205,000; from 1981 to 1985 the average was 74,400 and from 2001 to 2005 the average was 30,000 (Fronczak 2009). The data suggests a dramatic decline in Black Ducks in the western portion of their breeding range. In the Atlantic Flyway, which is the eastern portion of this duck's breeding range, the winter survey numbers declined until the 1980s and have now stabilized at a little over 200,000 (Swift 2008, Fronczak 2009). This index does not include many, many thousands of Black Ducks surveyed in Canada.

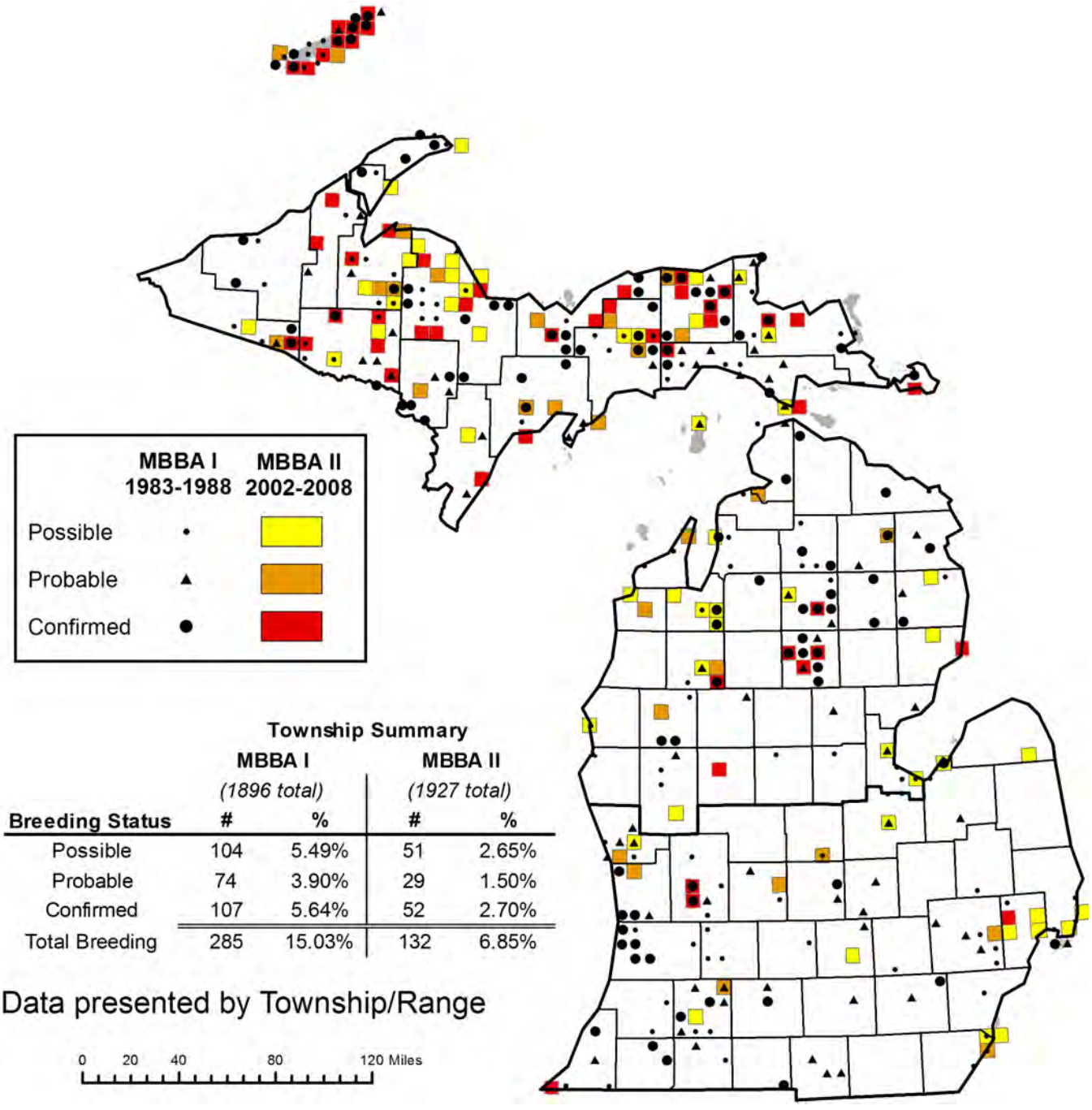
Reports from other Great Lakes breeding bird atlases are not encouraging. In Wisconsin, Black Ducks are not considered a common breeding duck and are a species of special concern found in only 6.63% of quads (Cutright et al. 2006). Black Ducks were never common in Indiana and were reported from only 1% of 647 blocks (Castrale et al. 1998). In Ohio, the Black Duck was formerly a locally common summer resident. There have been substantial declines there however, and they were only reported in 1.8% of blocks (Peterjohn and Rice 1991). In Ontario this species remains stable at about 20 pairs/l00 km square (about the size of a 36 square mile township) in northern areas (Cadman et al. 2007). However in SW Ontario there were estimated to be 11.7 pairs/100km square in 1971 and this had dropped to 6.7 pairs by 1995 (Ross 2007). In New York, this species was confirmed nesting in 21% of blocks during their first atlas (Andrle and Carroll 1988). By their

second atlas they were only confirmed in 14% of blocks, a nearly 50% decrease (Swift 2008).

Conservation Needs

Longcore et al. (2000) stated that acid rain and environmental contaminants are no longer considered a threat to Black Ducks; however habitat loss, degradation, human disturbance, and hybridization with Mallards seem to have led to dramatic declines since the 1950s. It remains unknown which factors are having the largest impact on Black Duck declines.

Restrictive harvest regulations should continue to be evaluated. Efforts for restoring wetlands and improving wetland quality, especially on the wintering grounds, are ongoing. Current research is focused on habitat quality on the wintering grounds to determine if Black Ducks are getting enough nutrition to ensure successful nesting.



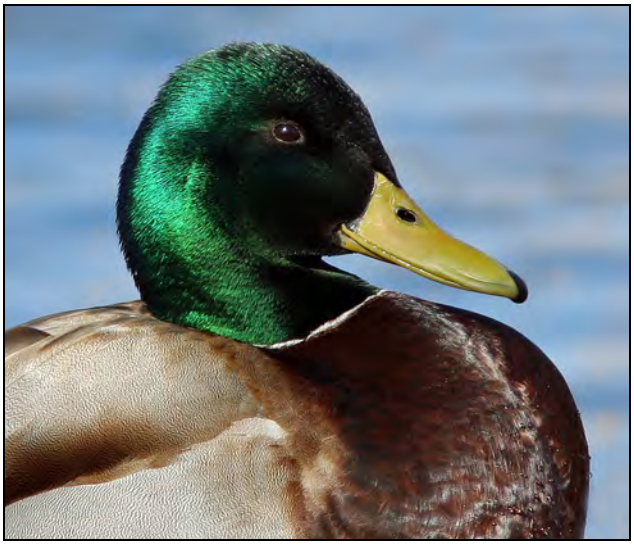
Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	104	5.49%	51	2.65%
Probable	74	3.90%	29	1.50%
Confirmed	107	5.64%	52	2.70%
Total Breeding	285	15.03%	132	6.85%

Data presented by Township/Range

Mallard *(Anas platyrhynchos)*

W.C. Joe Johnson



Darlene Friedman ©

Each year biologists fly aerial transects over much of the breeding range of Mallards in North America. The traditional survey area includes parts of Alaska, much of Canada and the North Central U.S. including Minnesota, Wisconsin and Michigan. Michigan's connection to this vast area of land is documented by leg band recoveries in the state. Mallards are the most numerous breeding duck in the Great Lakes region (Yerkes 2005).

Distribution

From a historical standpoint, the Mallard has likely nested in Michigan for many hundreds of years. By the 1950s they were considered to be very common summer residents in the southern LP, less abundant in the northern LP and UP. Both MBBA I and MBBA II suggest that the distribution of the Mallard has not changed and that they are quite common throughout Michigan. The observations of Mallards at the township level were remarkably similar: 1,251 in MBBA I and 1,184 in MBBA II. This 4% decline does not seem significant. The 10% decline in townships with observations in the NLP may be indicative of a population decline between the two atlases or it may be a reflection of decreased coverage there by atlas workers during MBBA II.

Breeding Biology

From 2001-2003, Ducks Unlimited biologists studied Great Lakes Mallard nesting biology at nine sites: three in Wisconsin, three in Michigan and three in Ohio. From mid-March to early April about 60 female Mallards were captured at each of the nine sites. Radios were implanted in their abdomens, and the biologists followed them every day throughout the breeding season (Yerkes 2005). According to Davis (2008) this was the first extensive nesting study in these Great Lakes states.

In the three states studied, most of the nests were in grassland (40%), wetlands (25%), haylands (12%) and scrublands (10%) with very few in cropland or woodlands (Davis 2008). Of the 563 nests studied, 143 hatched, 340 were destroyed by predators, 34 were abandoned, 27 were destroyed by hay cutting, eight were flooded, 10 were lost to unknown causes, and one was infertile (Davis 2008).

In the three Michigan sites studied, Gratiot County had only 11.3% nest success, Barry County had 21.7% nest success, and Mecosta County had 24.1% nest success, the highest of all nine sites studied (Davis 2008). The earliest nest was started on 30 March; the latest start was on 14 June with an average hatch date of 4 June. The earliest hatch occurred on 8 May and the latest hatch occurred on 12 July (Davis 2008). There was not much variation in nesting and hatching dates in Michigan's three counties.

Yerkes (2005) followed a total of 121 broods to determine duckling survival. Survival rates varied widely, from a low of 24% in Ohio to a high of 55% in Michigan (Simpson 2005). Survival rates in Gratiot, Barry and Mecosta counties were 44%, 55% and 36% respectively. Broods reared in wetlands with abundant emergent vegetation had a much higher survival rate (Barry County), whereas those reared in wetlands with a high proportion of forest had a poorer survival rate (Mecosta County). Simpson (2007) related these habitat components to predation, primarily by hawks and owls.

Abundance and Population Trends

During the period covered by MBBA II (2002-2008), biologists estimated a North American average of 7.6 million Mallards, ranging from a high of 8.3 million in 2007 to a low of 6.8 million in 2005 (USFWS 2008). Annual variations do occur, and they are strongly connected to the number of May wetlands. When the number of wetlands decreases during a drought, so does the number of breeding Mallards. When a wet year occurs, the number of wetlands increases, and so do breeding Mallards. The long term North American average for May ponds is 4.9 million, with a low of 2.7 million in 2002 and a high of 7.0 million in 2007 (USFWS 2008).

Michigan federal BBS trends from 1983-2008 indicate no significant change in Mallard numbers between our two atlases; there was a non-significant decrease of 1.6% between the 1980s and the mid 2000s (Sauer et al. 2008).

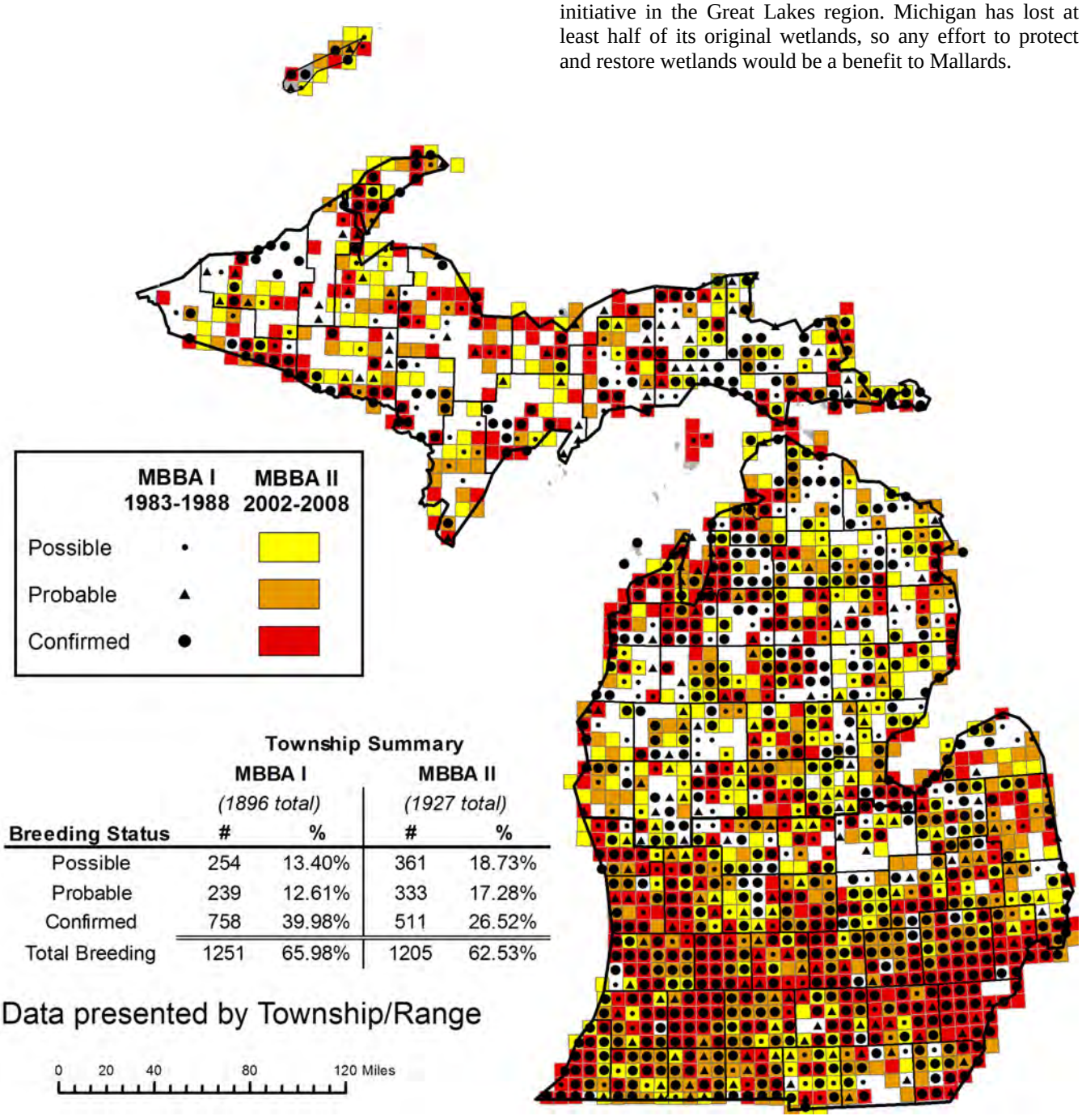
Since 1991, DNR biologists have flown the Michigan Spring Breeding Waterfowl Survey with 22 aerial transects statewide to survey waterfowl. These spring surveys are an index of numbers and not an absolute population number. During MBBA II, the index varied from a low of 189,000 (2008) to a high of 337,000 (2002), with a seven year average of 276,000 (USFWS, 2008). During the seven years prior to MBBA II (1995-200l) the index varied from a low of 358,000 (2001) to a high of 567,000 in l998. The average was 476,000. The evidence indicates that Mallard numbers have likely declined in Michigan during the last decade. Most Mallards were observed in the SLP,

consistent with atlas observations at the township level during both atlas efforts.

Conservation Needs

The population trend data seems to support published statements by Yerkes (2005) and Coluccy (2008) that Great Lakes Mallard populations increased steadily for several decades and have declined in recent years. The Great Lakes Mallard study (Yerkes 2005) was designed to determine which factors most negatively affected population growth of Mallards. Coluccy (2008) suggested that effective conservation programs should focus on improving female survival during the fall and winter, increasing duckling survival, and in some areas (e.g. Gratiot County) increasing nesting success.

It is crucial to restore habitat by enhancing and maintaining quality vegetated wetlands to improve duckling survival. In areas with an abundance of agriculture, the placement of over-water nesting structures in wetlands with emergent vegetation should dramatically increase nesting success (Drilling et al. 2002). Grasslands in close proximity to wetlands are very important to the Mallard for secure nesting habitat; therefore efforts to restore grasslands by federal, state, and private entities should be encouraged and supported. Yerkes (2005) suggested a "wetlands forever" initiative in the Great Lakes region. Michigan has lost at least half of its original wetlands, so any effort to protect and restore wetlands would be a benefit to Mallards.



Blue-winged Teal *(Anas discors)*

Mike Sefton



Jerry Jourdan ©

A long distance migrant, the elegantly understated Blue-winged Teal is a fairly common breeder in the LP of Michigan, and an uncommon breeder in the UP. It is among the last ducks to arrive on the breeding grounds in spring from its primary wintering grounds in northern South America and Central America (Prince 1991). It breeds over a large portion of North America, with the greatest concentration in the U.S. and Canadian prairie pothole region, where it is often one of the most abundant breeding ducks, second only to the ubiquitous Mallard. Lesser breeding populations range from southeastern Alaska, British Columbia east of the Coast Range, southern Yukon, southwest Northwest Territories, Alberta, Saskatchewan (except northeast), central and southern Manitoba and Ontario, southern Quebec, southern Newfoundland, and the Maritimes, except for western New Brunswick. In the U.S., breeding takes place mainly east of the Cascades from the Canadian border to northeast California, northern Nevada and Utah, southern New Mexico, the Texas Panhandle, northern Oklahoma, central Missouri and Illinois, northern Indiana, southwest and northeast Ohio, southern Pennsylvania, New York, coastal New England south to Delaware, and the northern coast of North Carolina. Blue-winged Teal is absent from much of central New England, with some breeding in West Virginia, southwest Kentucky, southeast Missouri, western Tennessee, and eastern Arkansas, and along the Rio Grande and Gulf Coast of Texas and coast of Louisiana. Smaller breeding populations exist outside of these boundaries (Rowher et al. 2002).

In breeding plumage, the attractive male sports a gray head with a vertical white crescent in front of the eye, blue upper wing patch, green speculum, buffy under parts with black spots, and a white patch behind orange legs. The female shares drab brown plumage with several other ducks, with a duller blue wing patch and drabber green speculum than the male.

Distribution

Historically, Blue-winged Teal was a common breeder in Michigan, with early nest records from the SLP and Chippewa Co. in the UP, but by the early 1900s, statewide distribution was reduced to local areas (Barrows 1912). The Blue-winged Teal with its conspicuous behavior and tendency to be found in large groups was readily hunted. (Barrows 1912). The resurgence of the Blue-winged Teal began in the late 1930s, concomitant with the initiation of national wetland conservation programs and greater regulation of waterfowl harvest. The Teal was noted in Cheyboygan Co. and the Eastern UP and once again was considered a common breeder probably summering in all counties in the state (Wood 1951).

Blue-winged Teal is described as a fairly common summer resident in the LP of Michigan, and an uncommon summer resident in the UP (Chartier and Ziarno 2004). Blue-winged Teal are locally common where there are large areas of emergent wetlands, such as state game areas and wildlife areas in the Saginaw Bay region. Data from MBBA I indicate wide breeding distribution for Blue-winged Teal in the state, with reports from numerous blocks in the east and west portions of the UP, but few in a wide central section. Data from MBBA II indicates a decrease in township totals for almost every county in Michigan, with the exceptions of Monroe County in the southeastern SLP, and Isabella County in the lower central NLP, which both had modest increases.

Breeding Biology

Breeding habitat includes bluegrass, hayfields, and sedge meadows within 100 m of water, including semi-permanent wetlands, stock ponds, and seasonal wetlands (McPeek and Adams 1994). Most pairs form during northward migration from wintering grounds as far south as northern South America, which with Central America, is the primary winter range, though some winter in the southeastern U.S. In the LP, nesting begins the last week in April, and the first broods are seen in late May, while nesting in the UP begins two to three weeks later (McPeek and Adams 1994).

Hatching success varies considerably: 60% for 223 nests in Iowa in a 1938 study versus 21% in 1956 for the same area, and 35% in Minnesota in a 1964 study of 257 nests. A summary of nine studies in 1964 reported that an estimated 49% of females produced young (Johnsgard 1975). In studies between 1938 and 1995 in Iowa, the Dakotas, Saskatchewan, and Alberta, hatching success ranged from 7% to 43% (Rowher et al. 2002).

Abundance and Population Trends

The Michigan DNR's Wildlife Action Plan of 2005 states: "BBS data indicate a decline in Michigan, probably due to a loss of wetlands, and annual statewide breeding waterfowl survey data indicate that current estimates are below the long term average." (Eagle et al. 2005).

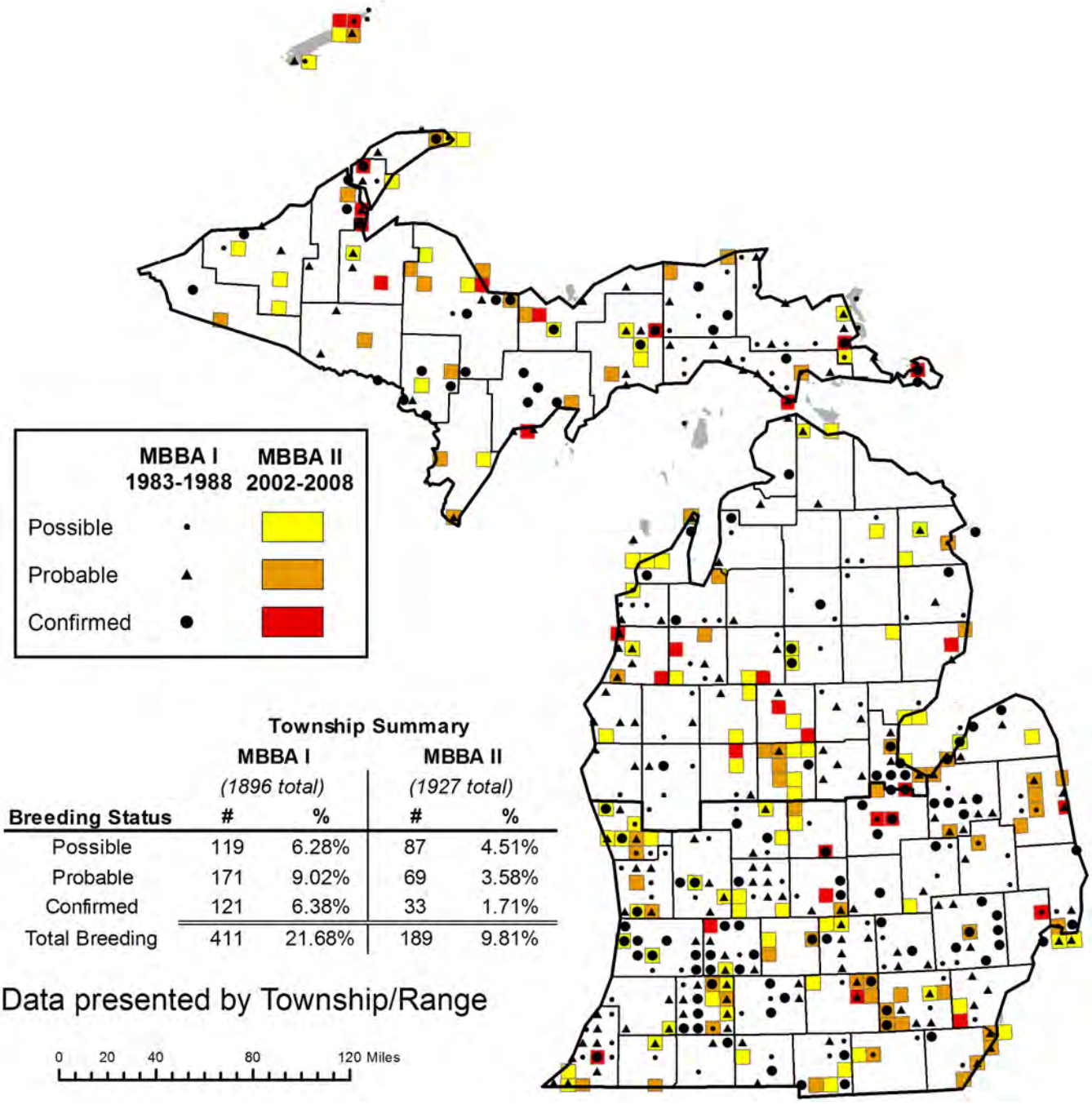
Blue-winged Teal *(Anas discors)*

Mike Sefton

Ontario has also noted an overall decrease in the probability of observation for their second atlas (2007) compared to their first atlas (1987) (Cadman et al. 2007). A similar decline was noted for New York state (McGowan and Corwin 2008). The trend estimate for Illinois is -5.9% from 1996 to 2000, while populations for the Upper Midwest are estimated to have decreased 4.0 % for the same period (Kleen et al. 2004).

Conservation Needs

The Michigan DNR classifies Blue-winged Teal as SGCN (Species of Greatest Conservation Need). As the reason for the decline in this species from the long-term average is thought to be from wetland loss, the DNR's Wildlife Action Plan calls for increasing regulatory protection for wetlands, implementing restoration of wetlands, establishing buffer zones around wetlands, and providing tax incentives for retention and development of wetlands on private property (Eagle et al. 2005). Conservation and restoration of grasslands adjacent to wetland areas is also important for nesting success, and has been accomplished in some areas through the U.S. Department of Agriculture's Conservation Reserve Program (Rowher et al. 2002).



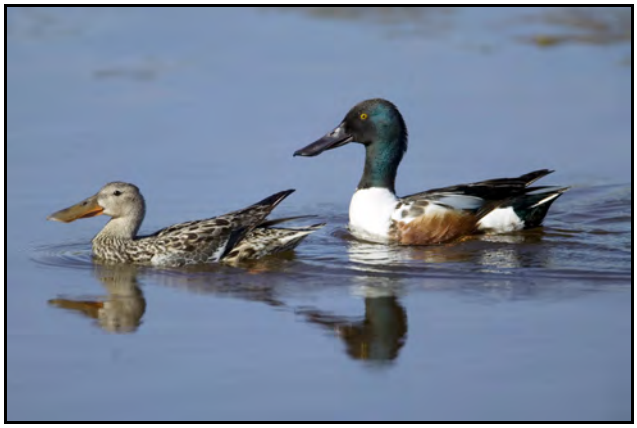
Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	119	6.28%	87	4.51%
Probable	171	9.02%	69	3.58%
Confirmed	121	6.38%	33	1.71%
Total Breeding	411	21.68%	189	9.81%

Data presented by Township/Range

Northern Shoveler *(Anas clypeata)*

Mike Sefton



John Van Orman ©

If Northern Pintail or Wood Duck are the most beautiful ducks in the U.S., then perhaps Northern Shoveler, with its shovel-like bill, could be called the oddest looking duck. Among dabbling duck species, interesting features of this bird are that the males remain paired with females longer than any other species and they are the most territorial (Austin and Miller 1995). Though the male and female have many plumage characteristics similar to the Mallard, the shoveler's distinctive spatulate bill sets it apart from other North American ducks. The male is especially beautiful, with his green head and neck, dark bill, white breast, green speculum, blue area on the interior of the forewing, and rufous flanks and belly.

The breeding range of the Northern Shoveler includes northern areas of Europe and Asia, and much of North America. Its breeding range in North America is primarily in the western U.S. and Canada, from southern Alaska, the Yukon, western Northwest Territories, British Columbia away from the coast, Alberta, Saskatchewan, and Manitoba. In the Lower 48 states, the breeding range includes eastern Washington, eastern Oregon, northeast and central California, Idaho through western Minnesota, northern Nevada, northern Utah, Wyoming, northern Colorado and Nebraska, South Dakota, and northwest Iowa. There are isolated breeding areas in the Southwest, Upper Midwest, and southeast Ontario, and adjacent to the St. Lawrence River in Ontario and Quebec (Johnsgard 1975). The winter range in the New World includes the western part of British Columbia through California, Florida, the southern coastal areas of the Carolinas, the southern portion of the southern tier of states, all of Mexico except for the Yucatan, the coastal areas of Central America, and northern Columbia (Madge and Burn 1988).

Distribution

Historically, Northern Shoveler has been a very rare breeder in Michigan. Barrows (1912) knew of no definite breeding records, Wood (1951) cited breeding records in the 1930s from Tuscola, Bay, and Schoolcraft Counties. Payne (1983) notes records from Muskegon and Delta Counties in addition to those cited by Wood, and Brewer et al. (1991) notes additional records from around Lake St. Clair and Roscommon County.

During the MBBA I period 18 townships reported breeding, with only three confirmed breeding records which were in Tuscola, Monroe, and Gogebic Counties. Probable breeding was reported for Muskegon, Saginaw, Chippewa, Houghton, and Ontonagon Counties, with possible breeding taking place in Kalamazoo, Macomb, St. Clair, and Baraga Counties. MBBA II had 33 townships detecting Northern Shoveler. Confirmed breeding was reported in ten townships in eight counties; Baraga, Houghton, Chippewa, Muskegon, Sanilac, Kent, Saginaw, and Huron. Probable breeding was reported in nine townships in four counties; Mackinac, Grand Traverse, Allegan, and Monroe. There were six townships with possible breeding in the first atlas versus 15 in the second. Many of the records for MBBA II were from sewage ponds or lagoons.

Breeding Biology

Northern Shovelers form pair bonds on the wintering grounds and begin to arrive in Michigan in late March, with most arriving in April and May. Shovelers usually raise one brood per season, though renesting will occur if the first nest is destroyed. Egg dates range from mid-May to early June, with a 21 to 26 day incubation period. The ducklings are independent at six to seven weeks, and unfledged juveniles are found from 12 June through 18 July (MDNR 2005a).

Abundance and Population Trends

In the Southern Lower Peninsula, shovelers are rare in March, uncommon in April and May, and rare in June and July. Migrants swell the numbers to uncommon for August and early September and to fairly common for late August and September. They are uncommon in natural settings in November and rare in December, January and February, but concentrations exceeding 2,000 can persist as late as early December (MDNR 2011) in isolated locations where open ponds can be found, such as waste water facilities (i.e. Muskegon County Waste Water Facility). Occurrence in the Northern Lower Peninsula is basically the same as in the Southern LP, except that shovelers are largely absent in December, January and February. In the UP, they are rare for most of April, uncommon from late April through May, casual in June and July, uncommon from late August through October, dwindling to rare from late October through mid-November, and absent until late March (Chartier and Ziarno 2004). The increase in observations of shovelers, and the increase in breeding evidence for the second atlas period in Michigan mirror the overall increase in the long term average for shovelers in the breeding population estimates by the U.S. Fish and Wildlife Service in traditional breeding areas outside of Michigan (USFWS 2009).

The Indiana breeding bird atlas had two instances of confirmed breeding (Castrale et al. 1998), Illinois had one

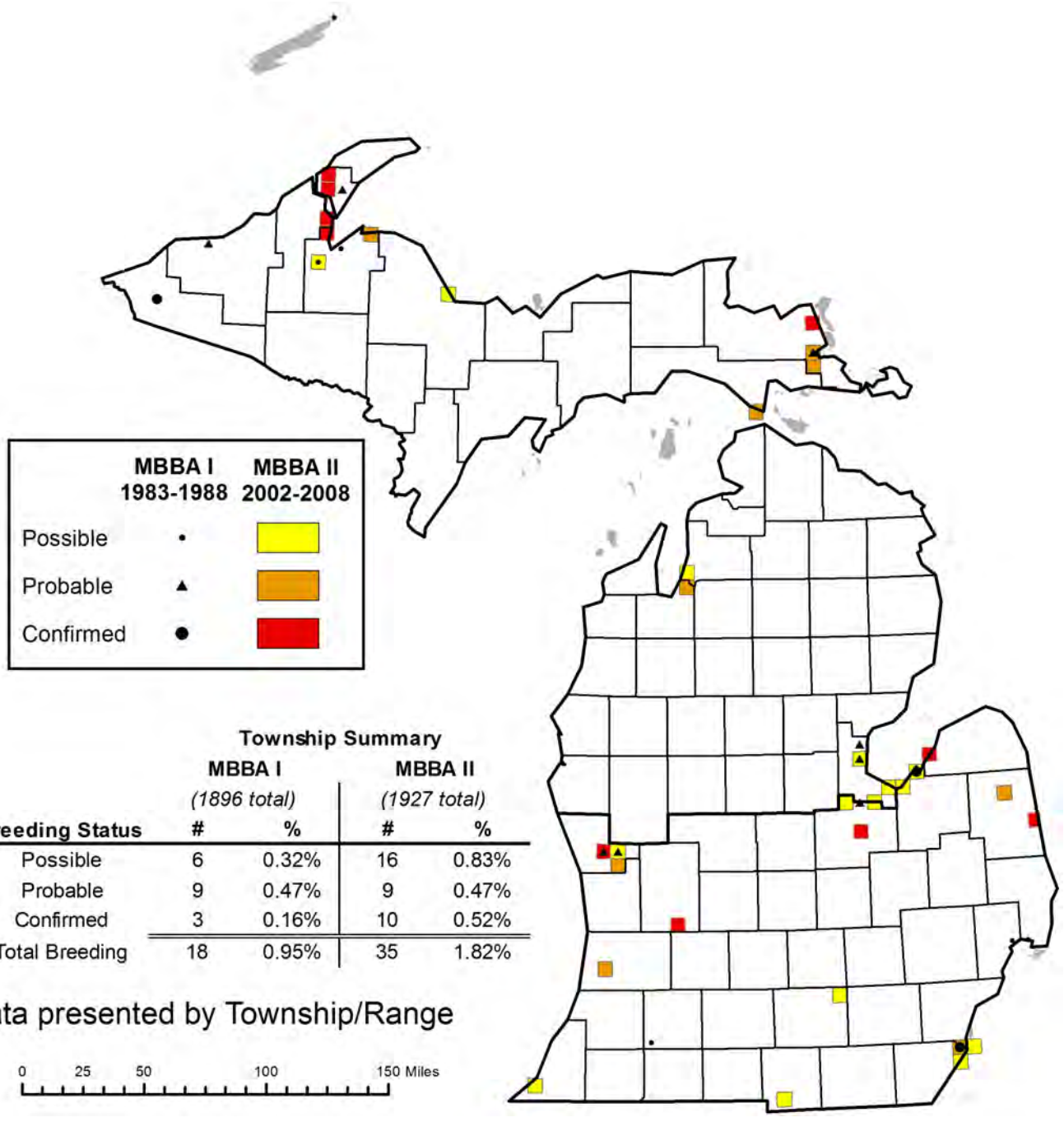
Northern Shoveler *(Anas clypeata)*

Mike Sefton

confirmed breeder (Kleen et al. 2004), the Wisconsin atlas shows confirmed breeding in 13 blocks (Cutright et al. 2006), Ohio had no confirmed breeding and only three blocks as probable (Peterjohn and Rice 1991), and Ontario had a slight increase in breeding, though it is still only locally rare to uncommon. The shoveler's primary breeding range and greatest abundance is in the prairie pothole region to the north and west of Michigan, and it is only a rare breeder in Michigan and surrounding states.

Conservation Needs

As Michigan is not in the Northern Shoveler's main breeding range, it is unlikely to have a marked increase in breeding attempts in the future. However, as is the case with many puddle ducks, the shoveler may benefit from recommendations in the Michigan DNR's Wildlife Action Plan for wetlands and encouraging retention and restoration of wetlands and grasslands on public and private lands (MDNR 2005b).



Green-winged Teal *(Anas crecca)*

Annette Doukas



John Van Orman ©

A flutter of metallic green peeks out from the sedges. The distinctive whistle and up to seven repeated quacks that gradually grow softer can be heard (Johnson 1995). The Green-winged Teal is North America's smallest dabbling duck, and one of the fastest flying (Hughes 2007). As with other dabbling ducks, the male is brightly colored and the female is clad in cryptic brown (Sibley 2000). The Green-winged Teal is a common breeding bird in forested wetlands and river deltas to the tree line from Alaska east to Newfoundland and Labrador, south to northern New England, west through the northern Great Lakes, northern Great Plains, northern Rocky Mountains and the Great Basin to the Pacific Northwest south to Oregon. It is not as numerous in the prairie potholes as in other habitats. It winters generally south of the breeding range throughout the southern U.S. to southern Mexico and the Caribbean (Johnson 1995, Sibley 2000).

Distribution

Breeding habitats include uplands (Padding 1991), mudflats, shallow marshes, flooded fields, pond or lake edges (Keller and Castrale 1998), grasslands, sedge meadows or shrubs near wetlands (Bacon 2006) and sometimes sewage lagoons (Hughes 2007).

In Ontario, the Green-winged Teal breeds essentially throughout the province, being most common in the Hudson Bay Lowlands in the north and sparsely distributed in the Carolinian zone in the south (Hughes 2007). The Wisconsin Atlas data showed breeding birds in 22 priority blocks, 79 quads (35 confirmed) and 23 counties. Wisconsin has a widely dispersed breeding population pattern (Bacon 2006). Illinois only recorded three instances of breeding Green-winged Teal during their atlas, with the highest level of evidence being in the probable category (Kleen et al. 2004). A similar distribution was found in Indiana, with only three blocks recording the species from the northwestern corner of the state with one confirmed, one probable, and one possible record (Keller and Castrale 1998). The Ohio atlas found breeding Green-winged Teal only in the northwestern corner of the state in marshes along western Lake Erie and Sandusky Bay, and single isolated records from southern Summit and western Cuyahoga Counties in northeastern Ohio (Peterjohn and Rice 1991).

Although it is fairly common in spring and fall migration, Michigan is on the periphery of the breeding range of the Green-winged Teal and north of the main wintering range (Johnson 1995, Sibley 2000, Chartier and Ziarno 2004). During MBBA I, it was found breeding sparsely throughout the state, being recorded in 96 blocks (1.36%) while in MBBA II it was found in only 58 blocks (0.81%), with declines most notable in the UP and southern LP where most reports were obtained in both atlases. Only eight blocks confirmed the species in MBBA II compared with 23 blocks confirming in MBBA I.

The Green-winged Teal was found in only 11 townships/sites in both atlases. These consistent breeding sites in both atlases include: Calumet and Chassel Sewage Ponds, Houghton County; Smith's Bend near Ewen, Ontonagon County; Seney NWR, Schoolcraft County; Houghton Lake WRA, Roscommon County; Nayanquing Point and Quanicassee State Wildlife Areas, Bay County; Fish Point State Wildlife Area, Tuscola County; Shiawassee NWR, Saginaw County; Muskegon SGA, Muskegon County; and Pte. Mouillee SGA, Monroe County. Areas where Green-winged Teal were not recorded during MBBA II included the southern UP in Menominee, Dickinson, and eastern Mackinac Counties, parts of Ottawa, Kent, Barry, Kalamazoo, and St. Joseph Counties in the southwestern LP, and Hillsdale and Lenawee Counties in the southeastern LP. Several new possible and probable breeding records from Marquette and Alger Counties were found in MBBA II. Fewer locations were recorded in MBBA II from the Keweenaw Peninsula and Muskegon County.

Breeding Biology

Green-winged Teal nest on the ground in dense vegetation 100-400 meters from the water (Padding 1991, Hughes 1987, Keller and Castrale 1998). In Michigan, nesting commences in late May to late June (Hertling 1994). Green-winged Teal feed on sedge and grass seeds, insect and insect larvae, aquatic plants, crustaceans and mollusks. They also forage in agricultural areas during winter (Johnson 1995). Green-winged Teal form monogamous pairs for a single breeding season; however paired males may attempt forced copulation with females of other pairs during the laying season. Copulation takes place on the water (Johnson 1995). The incubation period is 20-23 days and the young fly at 35 days of age (Bacon 2006). Eight to 18 eggs may compose a clutch (Barrows 1912) but 6-9 eggs per clutch are average (Johnson 1995).

Green-winged Teal *(Anas crecca)*

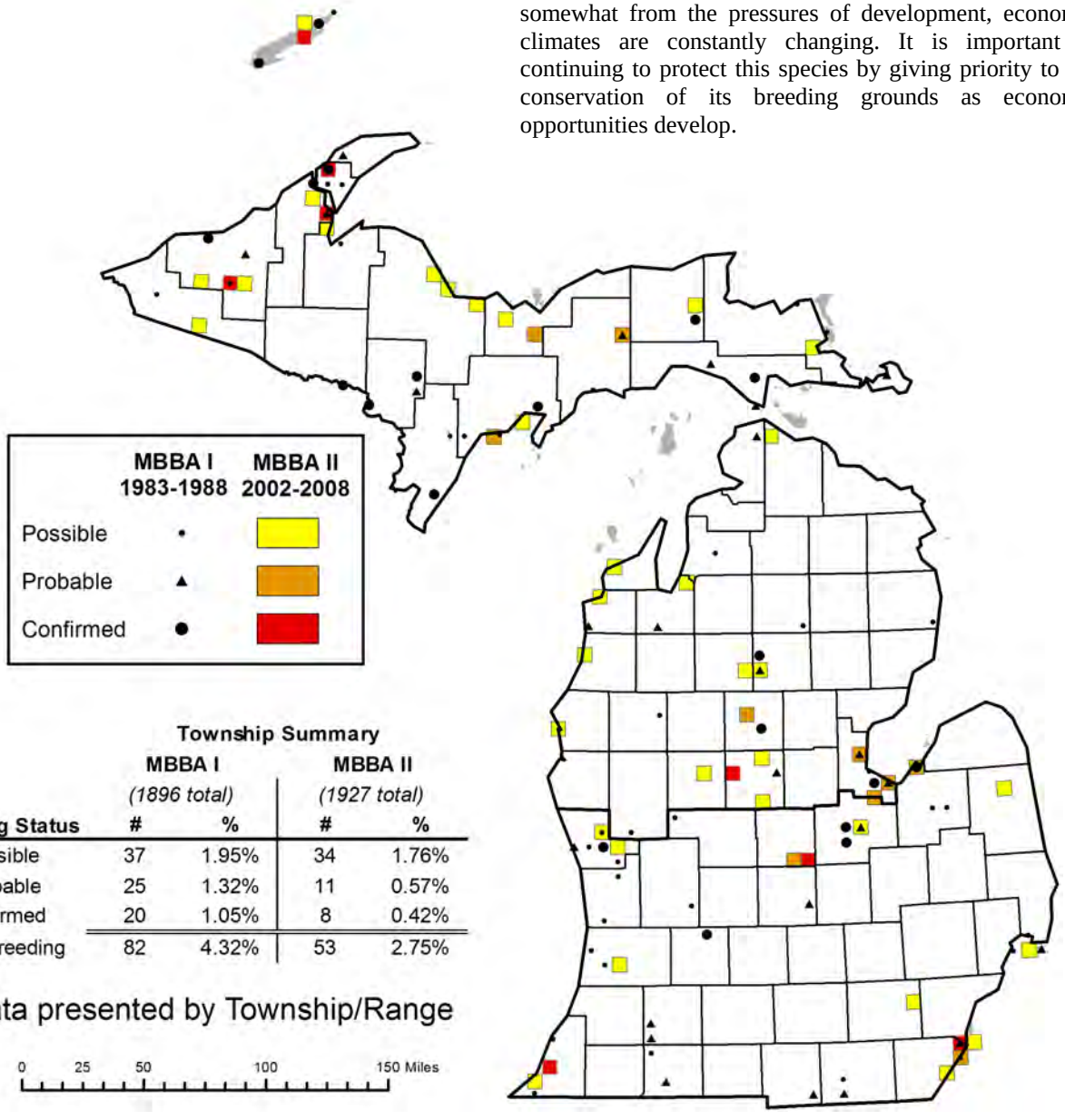
Annette Doukas

Abundance and Population Trends

Green-winged Teal is considered a widespread and plentiful species with a total North American population estimate of 3.4 million +/- 200,000 (USFWS 2009), with about 80% breeding in Canada and 20% in the U.S. (Johnson 1995). The most recent U.S. Fish and Wildlife Service survey (USFWS 2009) for the eastern survey area (parts of Ontario east to the Maritimes and New England) tallied 273,000 Green-winged Teal in 2009, a 1% increase over 2008 and a non-significant 13% increase over the 1990-2008 average of 242,000. The population estimate in the region of northern Saskatchewan, northern Manitoba, and western Ontario for 2009 was 399,000, which was an increase of 41% over 2008 ($p=0.009$) and a 96% increase over the 1955-2008 long term average of 203,000 ($p<0.001$). Using the MBBA II block count data from May and June (July reports often included many young), the minimum number of pairs breeding in the state is approximately 300 pairs.

Conservation Needs

The Green-winged Teal is typically second most commonly harvested duck in North America after the Mallard (Johnson 1995, Baldassarre and Bolen 1994). , and is not considered a species of conservation concern (Johnson 1995). In Michigan, Green-winged Teal accounted for 7.3% of the 2009-2010 hunting season duck harvest, with 22,432 taken, making it the fourth most commonly harvested statewide (Raftovich et al 2011). Hunting pressures seem not to have affected populations of Green-winged Teal, which have remained stable for many years (USFWS 2009, Johnson 1995). As this species breeds largely in the vast and remote forests of Canada, habitat destruction is not currently a significant issue as is the case with some species concentrated in the prairie pothole region, where the Green-winged Teal does not breed extensively (Johnson 1995). While the remote nature of the breeding grounds has protected the species somewhat from the pressures of development, economic climates are constantly changing. It is important to continuing to protect this species by giving priority to the conservation of its breeding grounds as economic opportunities develop.



Canvasback *(Aythya valisineria)*

Brett A. Basler



Jerry Jourdan ©

The "King of Ducks," the Canvasback is considered to be the most desirable waterfowl on which to dine. A male Canvasback is distinguished by its long sloping bill, dark burgundy head, black chest and white back. These features make it one of the most striking waterfowl. Females are similarly plumed, trading the burgundy head for one light brown or olive in color. Found only in North America, it breeds chiefly in the aspen parklands and mixed prairies of the northwest. Most breeding occurs in Alaska and the Yukon Territory as well as in southern Canada and the northern United States. Localized breeding populations occur mostly west of the Mississippi River, but scattered populations can also be found in Wisconsin, Michigan, and New York.

Distribution

This bird does not have a substantial history in Michigan. The state has historically been a stopover point for large numbers of the birds during their migration, but breeding was considered to happen only rarely if at all. These stopover points were Lake St. Clair, the Detroit River, Lake Erie, and Saginaw Bay (Reeves 1991). Bellrose (1980) mentioned the presence of these stopovers and that the birds bred on Lake St. Clair, but only in small numbers on the Ontario side. Birds were not confirmed to be nesting in Michigan until the first atlas.

In MBBA I, the Canvasback was reported as one of the rarest nesting ducks and one of the rarest nesting birds in Michigan (Reeves 1991). Only eight blocks reported any breeding activity, with two being in the UP and six in the LP. The single confirmed block occurred in the LP at the Pointe Mouillee State Game Area in Monroe County along Lake Erie. Possible occurrences might be attributed to the tendency for yearling females to stray outside traditional breeding range, when in fact yearlings are not very likely to breed.

MBBA II found there to be fewer occurrences of breeding Canvasbacks in the state than in MBBA I, with only six in total compared to the previous eight for all categories. However, MBBA II has two confirmed reports compared to the lone confirmation of MBBA I. During MBBA II, in addition to a confirmation at Pte. Mouillee as in the first atlas, a second confirmation was found in the UP in Delta County on the north end of Lake Michigan. This was the only occurrence in the UP during MBBA II compared to two in MBBA I.

Breeding Biology

Canvasbacks begin to return in March to the southern portions of the state with some birds not arriving in the UP until well into April. Pair bonds form during spring migration and early on the breeding grounds (Hohman and Rave 1990). Breeding habitat includes a variety of wetland and upland types, typically those with dense emergent vegetation. The nest, constructed solely by the female, is a platform of interwoven vegetation taken from surrounding emergent plants. It may have an overhang or cupola shielding it from above. The hen may also build one or more ramps of vegetation leading from the nest cup down to the water (Erickson 1948). Mean clutch size is eight eggs with an incubation period of 24-29 days. The ducklings usually leave the nest within 12 hours of hatching (Mowbray 2002).

Abundance and Population Trends

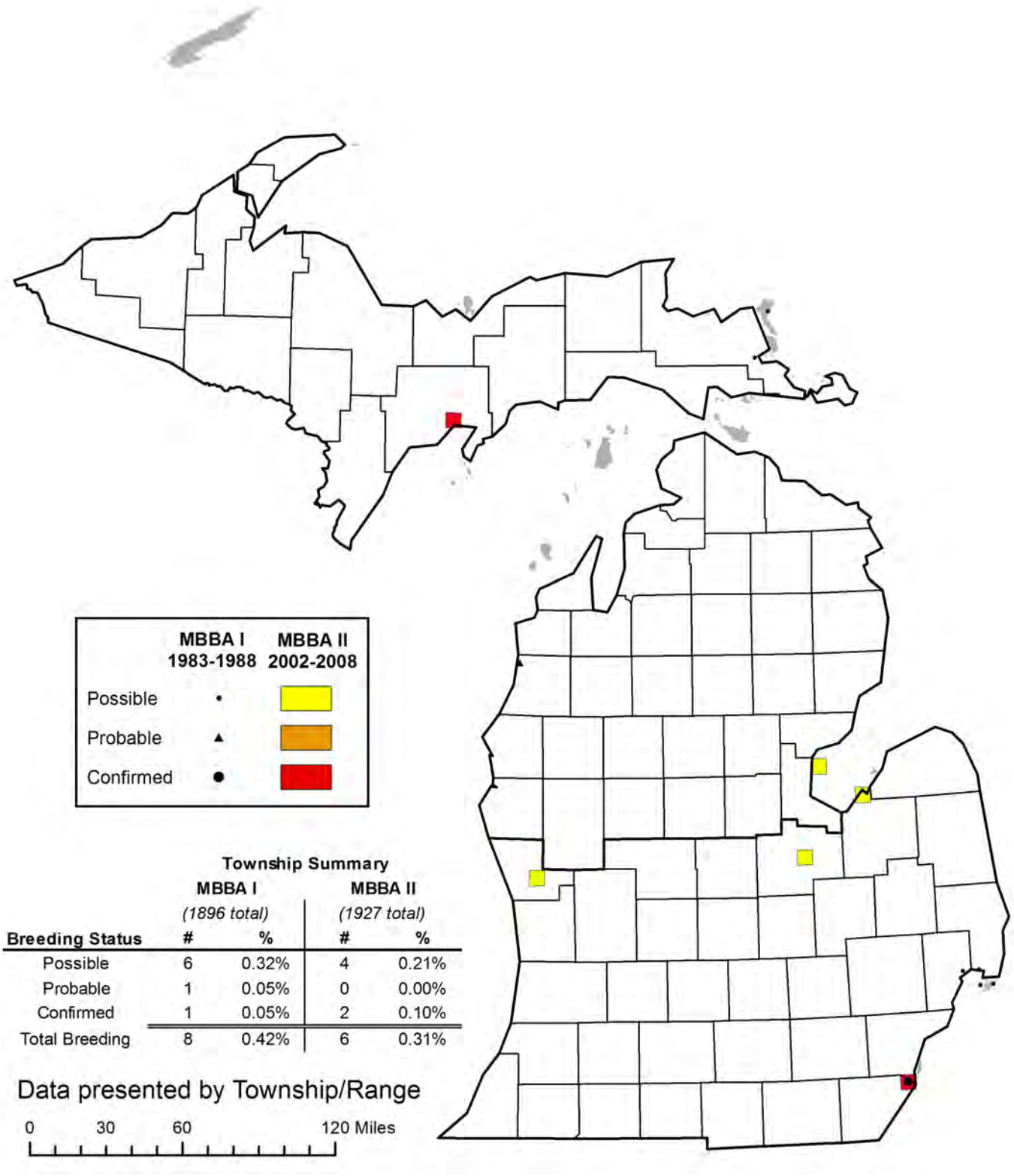
Canvasbacks are continuing to rebound from population lows in the 1980s and early 1990s due to habitat loss and lead poisoning. The ban on lead shot along with increased research and habitat conservation have allowed the breeding population to return to a level above the population management goal of 563,000 set in the North American Waterfowl Management Plan (USFWS 2009). Suspended hunting and habitat conservation allowed the population to exceed this goal and it is now legal to hunt the bird again, though in a limited capacity. In 2009 the continental population was estimated near 700,000, which is up 35% from 2008 (USFWS 2009).

Conservation Needs

The current population of Canvasbacks seems to be increasing again after the large decline of 2008. As one of the most researched waterfowl, the results of continued research and habitat conservation can only serve to help increase populations further. Being migratory waterfowl, Canvasbacks are managed nationally by the federal government. Hunting losses continue to be closely monitored and hunting seasons set appropriately. Like many other waterfowl, habitat loss is the major factor now in conserving Canvasback numbers. In Michigan, water quality is also a factor as Canvasbacks feed on submergent plants which may contain concentrated amounts of toxins. Protecting wetlands and water quality are the top priorities for the conservation of this species.

Canvasback *(Aythya valisineria)*

Brett A. Basler



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	6	0.32%	4	0.21%
Probable	1	0.05%	0	0.00%
Confirmed	1	0.05%	2	0.10%
Total Breeding	8	0.42%	6	0.31%

Data presented by Township/Range

0 30 60 120 Miles

Redhead *(Aythya americana)*

Brett A. Basler



Darlene Friedman ©

One of the most aptly named waterfowl, the plumage of the male Redhead consists of a dark red or burgundy colored head. Females lack this, having a pale brown or tan head. Native only to North America, the Redhead breeds primarily west of the Mississippi River in the western United States and Canada. Disjunct breeding populations also occur east of the Mississippi River in the lower and upper peninsulas of Michigan, southeast Wisconsin, southwest Ontario, western New York and northern Indiana. (Woodin and Michot 2002)

Distribution

While first recorded as breeding in Michigan around 1935 in the marshes of Lake St. Clair (Pirnie 1935), Redheads were noted along southern Ontario's shore of Lake St. Clair as early as 1877 (Zimmerman and Van Tyne 1959). Michigan's marshes most likely held the birds during this time as well. By the mid-1950s, Redheads were also noted breeding along Saginaw Bay (Zimmerman and Van Tyne 1959).

In MBBA I, the Redhead was listed as a regular but uncommon nesting bird. They were confirmed in six blocks in the LP with one each in Bay, Midland and Tuscola Counties near Saginaw Bay, two in St. Clair County along Lake St. Clair, and one in Monroe County on the western edge of Lake Erie. There were three confirmed instances in the UP, one in Chippewa County along the St. Marys River, another near the Wisconsin border in Gogebic County, and one at the Seney NWR in Schoolcraft County (Reeves 1991).

Though listed as confirmed at the Seney NWR in the first atlas, MBBA II does not have any notation of the presence of Redheads at the refuge. However the most recent Wisconsin Breeding Bird Atlas describes Seney NWR as the only site east of the Mississippi River that rivals the number of breeding Redheads at Wisconsin's Horicon NWR, confirming their continued presence (Volkert 2006).

MBBA II indicates that the status of Redheads has shown some decline since MBBA I. The percentages of blocks and townships where birds were found have decreased in both the NLP and UP. Total instances by township went from ten to one and nine to two, respectively. The one confirmed record from the NLP and UP was at Muskeg Lake in Gogebic County. The SLP increased from 10 to 11 townships from MBBA I to MBBA II. There were three confirmed records, two in Monroe County at Point Mouillee State Game Area and one at Shiawassee National Wildlife Refuge in Saginaw County. The SLP also had six records of probable breeding representing pairs of birds. These six locations were Muskegon Wastewater Treatment Plant in Muskegon County, Maple River State Game Area in Gratiot County, Crow Island State Game Area in Saginaw County, St. Clair Flats in Saint Clair County and Pointe Mouillee State Game Area.

Breeding Biology

Redhead ducks begin forming pair bonds in late winter as they begin to return northward in March (Weller 1965). Nesting generally begins in early to mid-May and may continue into late July (Bellrose 1980). The nesting habitat is usually deeper marshes with tall emergent vegetation. The female alone builds the nest, usually overwater. However the Redhead utilizes facultative brood parasitism, laying some or all of their brood in the nests of other birds, to a greater extent than other North American waterfowl; females sometimes may not produce their own clutch (Weller 1959). Broods in Michigan usually hatch by early to mid-July. The average clutch size is seven to eight eggs if the nest is not parasitized. Inter- and intraspecific nest parasitism makes it very difficult to calculate how many eggs a typical Redhead female lays in a season (Weller 1959). As with most of the family *Anatidae*, young usually leave the nest within a day of hatching.

Abundance and Population Trends

The current continental Redhead population is at or near an all-time high of approximately 1 million birds. This is well above the goal set by the North American Waterfowl Plan of 650,000 (USFWS 2009). Most of this increase is due to conservation efforts west of the Mississippi River where the vast majority of Redheads nest.

The population of Redheads in Michigan is most likely stable or has slightly declined since the first atlas. Waterfowl populations can show a great amount of fluctuation due to their migratory nature and the effect of weather on their breeding grounds. The small scattered populations of redheads throughout the state would add more variance to these fluctuations.

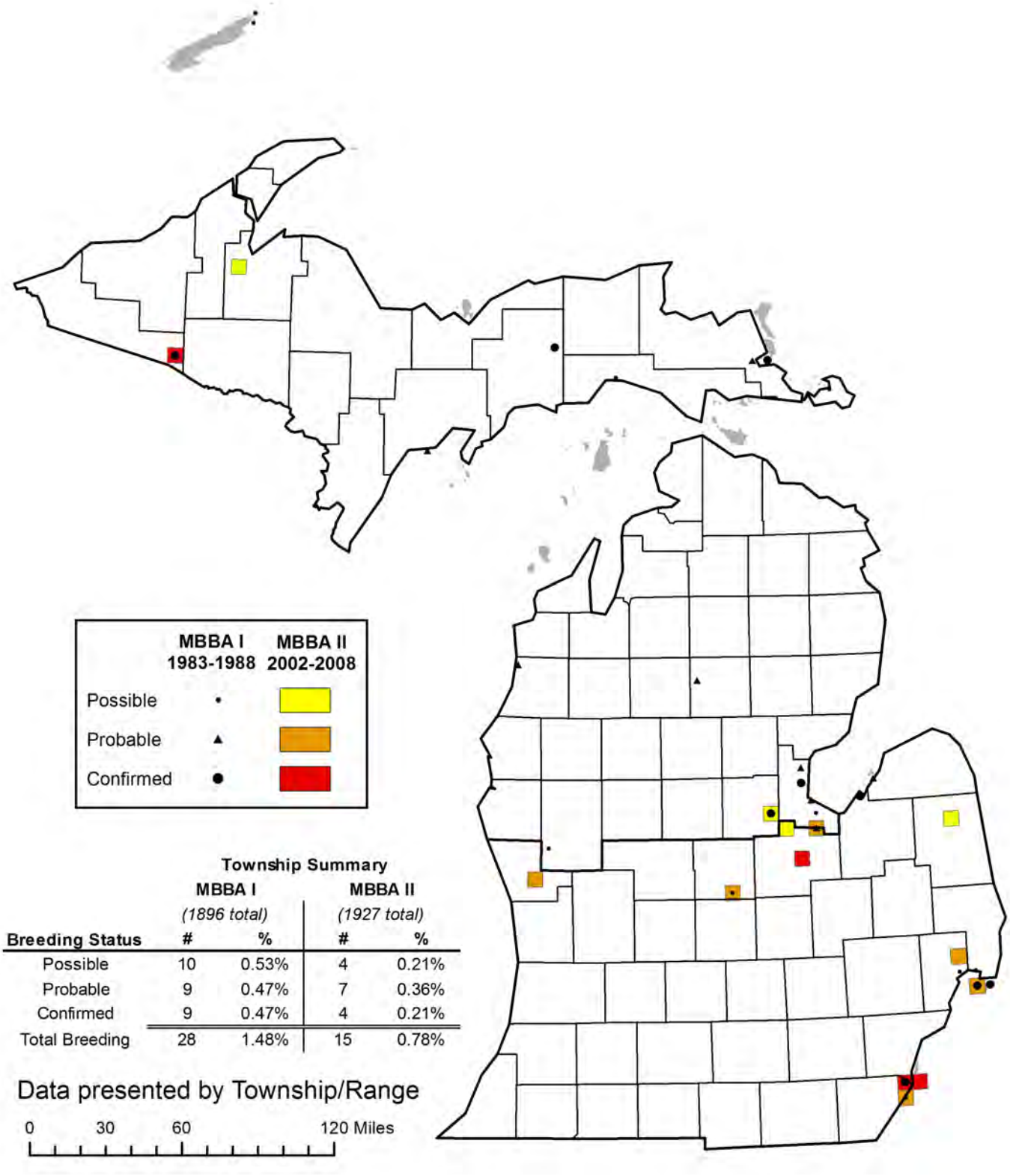
Conservation Needs

Continent-wide, the Redhead is thought to be stable or increasing in numbers, though there has been little research on the effect of habitat management on their populations. Wetland conservation is the most important management

Redhead *(Aythya americana)*

Brett A. Basler

practice for waterfowl and this is especially true for Redheads as they do not nest in upland or prairie areas. If the amount of suitable quality wetlands available to Redheads does not increase or decrease dramatically, it is likely that the population will remain stable in Michigan.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	10	0.53%	4	0.21%
Probable	9	0.47%	7	0.36%
Confirmed	9	0.47%	4	0.21%
Total Breeding	28	1.48%	15	0.78%

Ring-necked Duck *(Aythya collaris)*

Skye Christopher G. Haas



Jerry Jourdan ©

Perhaps a better name for this enigmatic bird would be Ring-billed Duck, as both the drab females and smartly patterned males show a distinctive white ring around a gray and black bill, a feature more prominent than the camouflaged chestnut ring encircling the necks of breeding plumaged drakes. Found only in North America, this is a bird primarily of boreal forest and aspen parkland, though they can also be found nesting in northern prairie potholes. Its range encompasses most of Canada from the Yukon eastwards to the Maritime Provinces and Newfoundland. Localized breeding populations can be found in Alaska, British Columbia, and south in the Rocky Mountains to Arizona. Ring-necked Ducks are also regular inhabitants of the Midwest and New England, breeding in North Dakota, Minnesota, Iowa, and east through Michigan and into upstate New York to Maine.

Distribution

This bird has a curious history in Michigan. Thought of as an invader from the west in the first half of the 20th Century, though the earliest mention of this species is in Kneeland's list of Birds of Keweenaw Point in 1857. However, many of Kneeland's records are known misidentifications or unsubstantiated claims, and there are no further records for the Keweenaw Peninsula through the 1930s (Binford 2006). Barrows (1912) stated that this bird was not known to nest in Michigan and was the least common migrant in the genus *Aythya*, though it was "one of the commonest nesting ducks in Minnesota". The first known breeding record for Michigan was several half-grown broods in Munuscong Bay in eastern Chippewa County sighted by Pirnie (1935) in 1928. By the late 1930s and early 1940s, several more breeding records had been gathered, all from the central or eastern UP, and by 1959 a breeding record was established for the LP (Reeves 1991). An oddly disjunct population in Kalamazoo County was present from 1971-74 (McPeek 1994).

Whether this assessment of the early status of Ring-necked Duck is correct will likely remain unclear. They were known to nest throughout neighboring Wisconsin in the late 1800s, so it is certainly possible that small numbers of Ring-necked Ducks were going undetected in the UP during this time. Certainly this is not reflected in the bird's current status as a regular breeder in the northern portions of the state or as a common migrant in the spring and fall.

In MBBA I, Ring-necked Ducks were found across the UP except for Menominee County, with breeding confirmations in 30 blocks (Reeves 1991). Numbers were lower in the LP, but a notable concentration could be found in the north central counties from Roscommon north to Cheboygan. There were a handful of records for the southern LP, including one confirmation from the St. Clair Flats wetlands complex, St. Clair County.

Listed only as a possible breeder at Sleeping Bear Dunes National Lakeshore in Benzie County in MBBA I, broods were observed on a few of the small woodland lakes there in the 1990s (pers. obs.), though none were found during MBBA II.

The MBBA II found that the status of Ring-necked Ducks has largely remained the same since the 1980s. Overall populations have slightly increased, with birds reported from more townships in both the UP and the SLP, though breeding was not confirmed in the latter. However, there was a decrease of birds in the NLP with birds found in only half the number of blocks as in MBBA I. Other distributional changes included a slight shift from the eastern to western UP. Consistent, however, is the absence of Atlas records for Menominee County where there is a shortage of suitable breeding habitat, though the bird should be looked for and even expected on North and Hayward Lakes in the center of the county.

Breeding Biology

Ring-necked Ducks begin to return to Michigan in March, and peak migration is in April (Chartier and Ziarno 2004). Pairs usually form during migration, and unpaired females are rare in Michigan after 1 May (Sarvis 1972). Typical breeding habitat is small woodland or bog lakes and beaver ponds, with both emergent vegetation and surrounded by shrubs or sedge. More eutrophic cattail marshes can also be used for nesting as long as the water is slightly acidic to neutral in pH (Holman and Eberhardt 1998). The nest is constructed over water, typically in clumps of leatherleaf and sedge (Holman and Eberhardt 1998). A study in Michigan showed a preference for mixed cattail-herbaceous over leatherleaf, though it is not known if this preference was particular to this study site or could be applied to other Michigan Ring-necked Duck populations (Sarvis 1972). Mean clutch size is nine eggs, and the incubation period lasts for 25-29 days; eggs hatch in Michigan from about 11 June-7 August (peak in early July), and the young leave the nest on the day of hatching (Holman and Eberhardt 1998).

Abundance and Population Trends

Overall, populations of Ring-necked Duck appear to be stable and in some cases increasing in North America,

Ring-necked Duck *(Aythya collaris)*

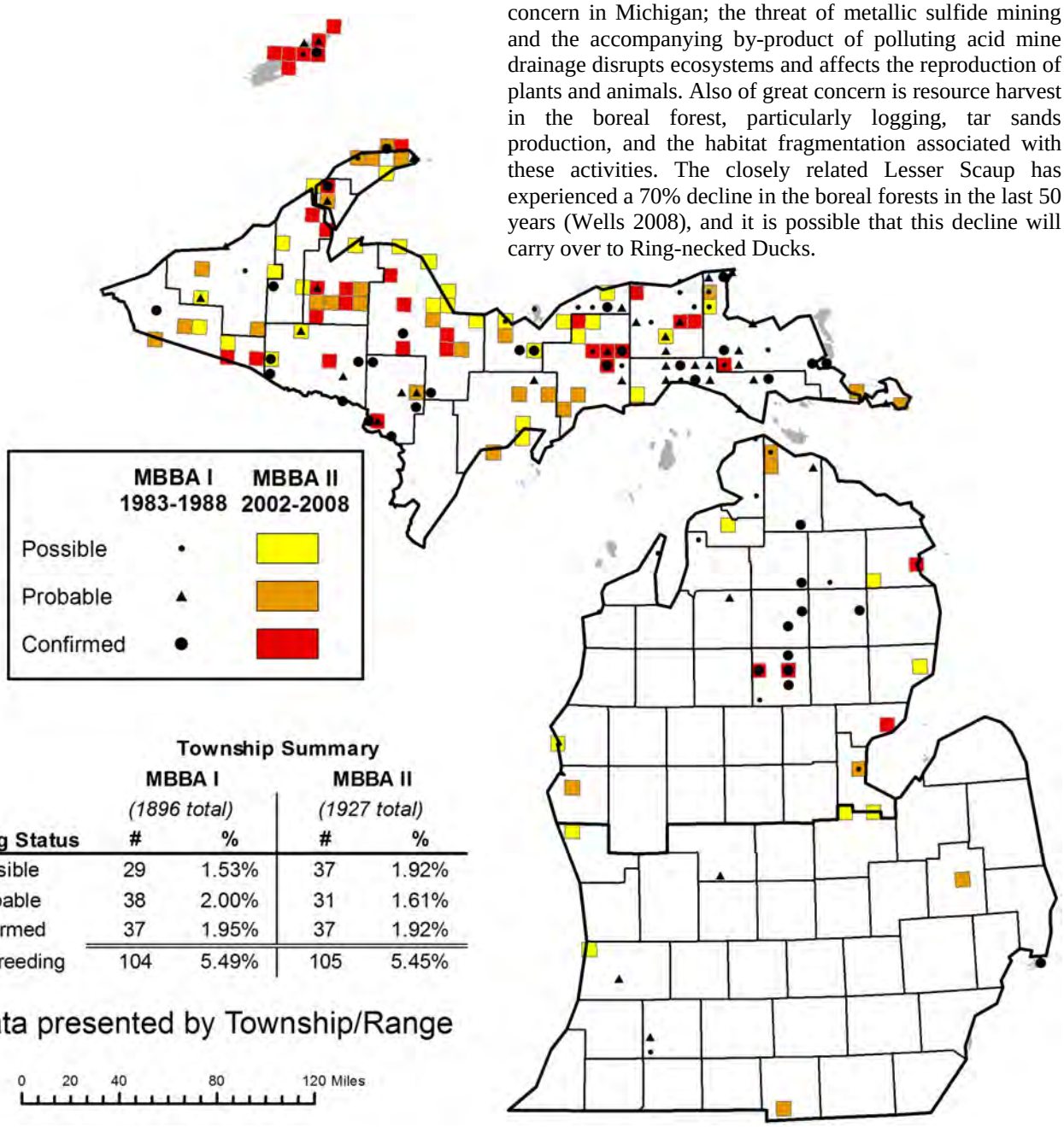
Skye Christopher G. Haas

though estimates are thought to be imprecise. The USFWS has noted an increase in population from an estimate of 34,100 in the 1950s to 903,300 in the 1990s (Holman and Eberhardt 1998). Ring-necked Ducks have increased between the first and second Ontario atlases, and were noted in 58% of the blocks surveyed (Leckie 2007). In Wisconsin, Ring-necked Ducks have localized breeding populations spread over much of the state (Verch 2006).

The status of Ring-necked Duck as a migrant has changed since the time of Barrows (1912). A recent high count in Michigan was an impressive 3,200 on 28 October 2007 at Crystal Lake in Dickinson County (Dombroski 2008). High densities of nesting birds can be found in the glaciated portions of Baraga and Marquette Counties, as well as on the Keweenaw Peninsula and Isle Royale. Of particular note are the densities of breeding birds at Seney NWR where Ring-necked Ducks are one of the most prolific breeding species of waterfowl (D. Olson, pers. comm.). Not well represented on BBS routes or traditional surveys (Verch 2006), numbers may be lower in the eastern UP due to coverage issues as well as difficulty of reaching favorable habitat in the extensive boglands of Schoolcraft, Luce, Chippewa and Mackinac counties.

Conservation Needs

Currently thought to be stable or increasing in North America, it has been suggested that increasing beaver populations are creating favorable habitat for the species (Holman and Eberhardt 1998). Water quality is an important concern in Michigan; the threat of metallic sulfide mining and the accompanying by-product of polluting acid mine drainage disrupts ecosystems and affects the reproduction of plants and animals. Also of great concern is resource harvest in the boreal forest, particularly logging, tar sands production, and the habitat fragmentation associated with these activities. The closely related Lesser Scaup has experienced a 70% decline in the boreal forests in the last 50 years (Wells 2008), and it is possible that this decline will carry over to Ring-necked Ducks.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	29	1.53%	37	1.92%
Probable	38	2.00%	31	1.61%
Confirmed	37	1.95%	37	1.92%
Total Breeding	104	5.49%	105	5.45%

Data presented by Township/Range

Common Goldeneye *(Bucephala clangula)* ***Max A. Henschell***



Darlene Friedman ©

The loud whistling of a Common Goldeneye's wings overhead immediately sets this duck apart from all others in Michigan. This strikingly black-and-white plumaged bird is often seen in the harbors and bays of the Great Lakes during the winter, but for the breeding season moves north into the boreal forests to nest in cavities near small, clear lakes and rivers. Holarctic in range, the Common Goldeneye breeds throughout the boreal forests of the world.

Common Goldeneyes can be found throughout much of North America, from the Gulf Coast north to the treeline in Canada and Alaska and from the Atlantic Coast west to the Pacific Coast. Only in the northern half of this range, from just south of the Canadian border north throughout the boreal forest region, do Common Goldeneyes breed. They migrate south during the winter months out of most of their breeding range and into the lower 48 states, preferring large water bodies and rivers.

Distribution

The Common Goldeneye is a common wintering duck in Michigan and can be found wherever open water might linger (McPeek and Adams 1994). In the summer, they retreat to the northern limits of the state for breeding. Cavity nesters, Common Goldeneyes require mature forests that provide appropriate nesting sites with open water nearby (McPeek and Adams 1994). Breeding habitat selection is primarily driven by the availability of invertebrate prey, such as aquatic insects, mollusks and crustaceans (Eadie et al. 1995).

Michigan hosts very few breeding Common Goldeneyes. The UP, with the most appropriate habitat for nesting, recorded this species in approximately 8% of townships during MBBA II. Common Goldeneyes breed annually in several locations in the UP; the Dollarville flooding in Luce County, and Isle Royale, which supports the highest density of breeding goldeneye in the state. Only nine townships in the NLP, just under 2%, recorded Common Goldeneye during MBBA II, almost all of which were located in the Lake Michigan Watershed. One township in Muskegon County in the SLP had a possible breeding record. Records of Common Goldeneye decreased from MBBA I to MBBA II from 10% to 8% of townships in the UP. Both the NLP and SLP saw increases in breeding records; the SLP had no records during MBBA I.

Regionally, Common Goldeneyes are a rare breeder in Wisconsin; four of the seven townships with records were located in the extreme northern part of the Lake Michigan drainage (Verch 2006). Common Goldeneyes breed throughout most of Ontario, concentrated from the upper Lake Huron drainage north throughout the rest of the province (Mallory 2007).

Breeding Biology

Mate selection begins as early as December when Common Goldeneyes begin their very complex courtship behavior. The male behavior consists of 14 different displays, while females often respond to the males with four different behaviors (Eadie et al. 1995). This is used for both pair formation and pair bond maintenance, and is frequently observed in the state, especially in the spring along newly opened rivers. Copulation of Common Goldeneye is also highly ritualized, often including drinking and bathing before and after copulation (Eadie et al. 1995).

Common Goldeneye nest construction can begin as early as late March; some birds may not build nests until late May. Nests are located in tree cavities excavated by Pileated Woodpeckers, from broken tree branches or the hollow tops of standing trees. Common Goldeneyes will also use nest boxes and will infrequently nest on cliffs (Eadie et al. 1995). Nests are typically located near open water; the Gogebic and Menominee County confirmations were near small rural sewage lagoons at a prison and state park, respectively (S. Haas pers. comm.). Often the nest bowl is formed using materials present in the hole and lined with down. Females tend to reuse nest locations in the following years (Eadie et al. 1995). Brood parasitism with Wood Duck and Hooded Merganser, as well as in other Common Goldeneye nests, has been noted, particularly in systems where nest boxes are available (Eadie et al. 1995).

The female is sole incubator of a clutch of 5-16 eggs. She incubates for 28-32 days, at which time the precocial young hatch. The young remain in the nest for up to two days. After this time, the female calls from the ground below the nest hole. All of the young quickly jump from the nest, after which the female leads them to the brooding territory, a water body that may be several kilometers from the nest (Eadie et al. 1995). The brood is attended by the female. Several Common Goldeneye broods may join to form a crèche if the young are abandoned or the female dies.

Young Common Goldeneye may be abandoned before they can fly, five to six weeks after leaving the nest. The young are typically capable of flight within two weeks of abandonment (Eadie et al. 1995).

Common Goldeneye *(Bucephala clangula)*

Max A. Henschell

Abundance and Population Trends

Bellrose (1980) estimated the North American population of Common Goldeneye near 1.25 million birds. The 2009 USFWS estimate of goldeneyes (including an unknown but likely small number of Barrow's Goldeneyes) for the eastern survey area, which includes Ontario, Quebec, and Labrador was 396,000, which was a decline of 6% from 2008 and 3% below the long-term average (USFWS 2009). Prior to this recent dip, North American population levels of Common Goldeneye were found to be stable (Eadie 1995).

Historically in Michigan, it was estimated that as many as 4,000 pairs could be breeding in northern parts of the state (Bellrose 1980). If this estimate was accurate, and populations stable, then it is possible some breeding locations within the state went undetected during MBBA I (1983-1988). Statewide the total number of townships that Common Goldeneyes were detected in has remained the same (3%) from MBBA I to MBBA II. Only the UP had any change and this was very small having been detected in 11 less townships than in MBBA I.

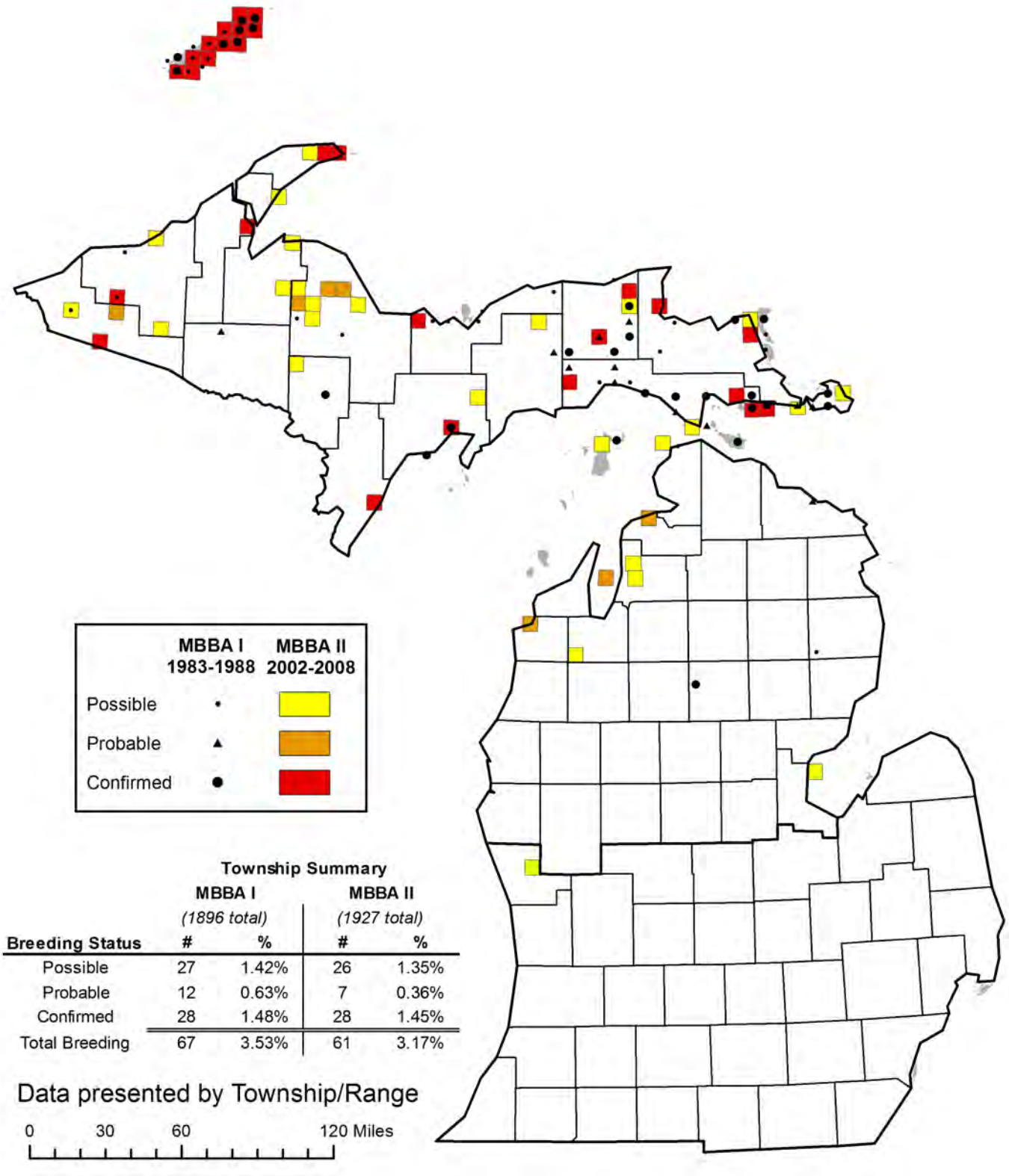
Several seasonal surveys reported Common Goldeneye in Michigan. Surveys of wintering populations at SLP locations such as Allegan County can reach nearly 3,500 birds and as many as 120 birds have been recorded in Marquette during the winter (Wuepper 2008). Populations estimates based on spring breeding waterfowl surveys by the DNR (Luukkonen unpub. data) calculated highly variable estimates during the MBBA II survey period (2002-2008). With a low estimate of 423 in 2008, to a high of 23,811 in 2002, the annual population averaged 6,758 and standard error averaged 89% of the population estimate. While in 2002 the estimate was quite high, since the atlas period the population estimates for 2009 and 2010 were zero, with no observations made during the spring survey. Some birds were observed during the 2011 survey, leading to the most current estimate of 1900 (standard error=1897).

Conservation Needs

While the population of Common Goldeneye appears stable, there are threats to its numbers. Acid rain, PCBs and organochlorines from pesticide runoff are common in its wintering range, particularly in Michigan and New York (Eadie et al. 1995). It appears that these pollutants may not be directly harmful to Common Goldeneyes, but instead reduce amounts of suitable prey for the species. Habitat loss from deforestation in boreal forests and loss of available prey are the biggest threats to this species throughout its North American breeding range. Closely monitoring Common Goldeneye populations may shed light upon losses of boreal forest habitat upon which this duck depends (Eadie et al. 1995).

Common Goldeneye *(Bucephala clangula)*

Max A. Henschell



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	27	1.42%	26	1.35%
Probable	12	0.63%	7	0.36%
Confirmed	28	1.48%	28	1.45%
Total Breeding	67	3.53%	61	3.17%

Data presented by Township/Range

0 30 60 120 Miles

Hooded Merganser *(Lophodytes cucullatus)*

Greg Cleary



Darlene Friedman ©

Although the showy male "hoodie" is well-known as a subject of photographs and paintings, one is more likely to encounter the drab female in Michigan in the summer, often with an impressively large brood of ducklings trailing behind her. This small, cavity-nesting duck has a preference for smaller bodies of water and may be found in streams, beaver ponds, and small lakes throughout the state, especially in the north. The Hooded Merganser is found only in North America, where its breeding range is two-parted. It primarily breeds in the east, in southern Canada from Saskatchewan to Nova Scotia, as well as New England and the Upper Great Lakes. The secondary breeding area is much larger, extending into the Deep South and stopping just a few hundred miles short of the Gulf of Mexico (Bellrose 1980). In the west, it breeds along the Pacific Coast from the Alaskan panhandle to southern Oregon, and inland through Washington to western Montana (Dugger et al. 1994).

Distribution

The Hooded Merganser was common throughout Michigan until the late 1800s, when the species declined drastically due to deforestation and unregulated hunting (Palmer 1976). Thereafter, it began a slow comeback, presumably due to regrowth of forests and reduced hunting pressure (McPeek and Adams 1994). In recent years, additional factors have come into play. Measures to protect mature trees in riparian areas, thereby creating suitable nesting cavities, have been in effect for decades and have benefited the Hooded Merganser, as well as many other birds. Also, nest boxes for Wood Ducks are a popular project for sportsmen, and these boxes are readily used by Hooded Mergansers (Bellrose 1980).

During MBBA I, this species was reported throughout the state, with breeding confirmed in all but the southern two tiers of counties. It was described as uncommon in Michigan except in the eastern UP. In MBBA II, it was observed in more than twice as many townships in the UP, NLP and SLP compared to MBBA I. Observations were more frequent in the UP, observed in 31% of the townships.

In the UP, the Hooded Merganser was observed in 30% of townships during MBBA II, up from 14% during MBBA I. In the central and western UP, it was most common in an area encompassing most of Marquette, Baraga, Iron, and western Gogebic counties. To the east, it was most common in Schoolcraft, Alger, and eastern Delta counties. The far eastern UP is the only area in the entire state in which reported fewer observations of this species between MBBA I and MBBA II.

Although the Hooded Merganser likely remains less common in the LP than in the UP, the LP saw a greater increase in observations between MBBA I and MBBA II LP. In the northern LP, this species was observed in 14% of townships, up from 5% during MBBA I. In the southern LP, it was observed in 12% of townships, up from 4% in MBBA I. Breeding confirmations in the southern LP rose from just six during MBBA I to 33 during MBBA II. The Hooded Merganser has a remarkably uniform distribution of observations across the entire LP, probably because it nests in a wide variety of aquatic habitats, including small ponds, creeks (Dugger et al. 1994), beaver ponds, and river bottomlands (Bellrose 1980).

Breeding Biology

Records suggest that any suitable cavity, including artificial nest boxes, may be used by Hooded Mergansers (Dugger et al. 1994). In northern Michigan, breeding begins in late April or early May. Clutches average 11 eggs. Incubation lasts about 33 days, and when the young hatch, they leave the nest promptly and spend about 10 weeks in the care of the female (McPeek and Adams 1994). During UP field work for MBBA II, fledglings were observed June through July.

Abundance and Population Trends

The total population of Hooded Mergansers is estimated at 350,000, making it one of the least abundant waterfowl species in North America (NAS 2009). In recent years, however, increases have been noted in many parts of its range. Abundance data specific to Michigan are not widely available, as this species is not often detected during the Breeding Bird Survey in this state. However, in Wisconsin, the Spring Duck Survey has documented dramatic increases in Hooded Merganser numbers from 1973-2007, with much of this increase occurring since 2002 (Kreitinger and Paulios 2009). Although many of these Hooded Mergansers are headed for southern Canada, it is likely that many breed in the UP as well.

The Ontario Breeding Bird Atlas, which collected data through 2005, recorded large increases in this species throughout the province during the previous two decades; Ontario BBS data showed an increase of 9.9% per year since 1981. Healthy beaver populations, availability of nest boxes, and changes in tree harvesting practices resulting in more live cavity trees, have been cited as possible reasons for this increase (Cadman et al. 2007). Increases have also

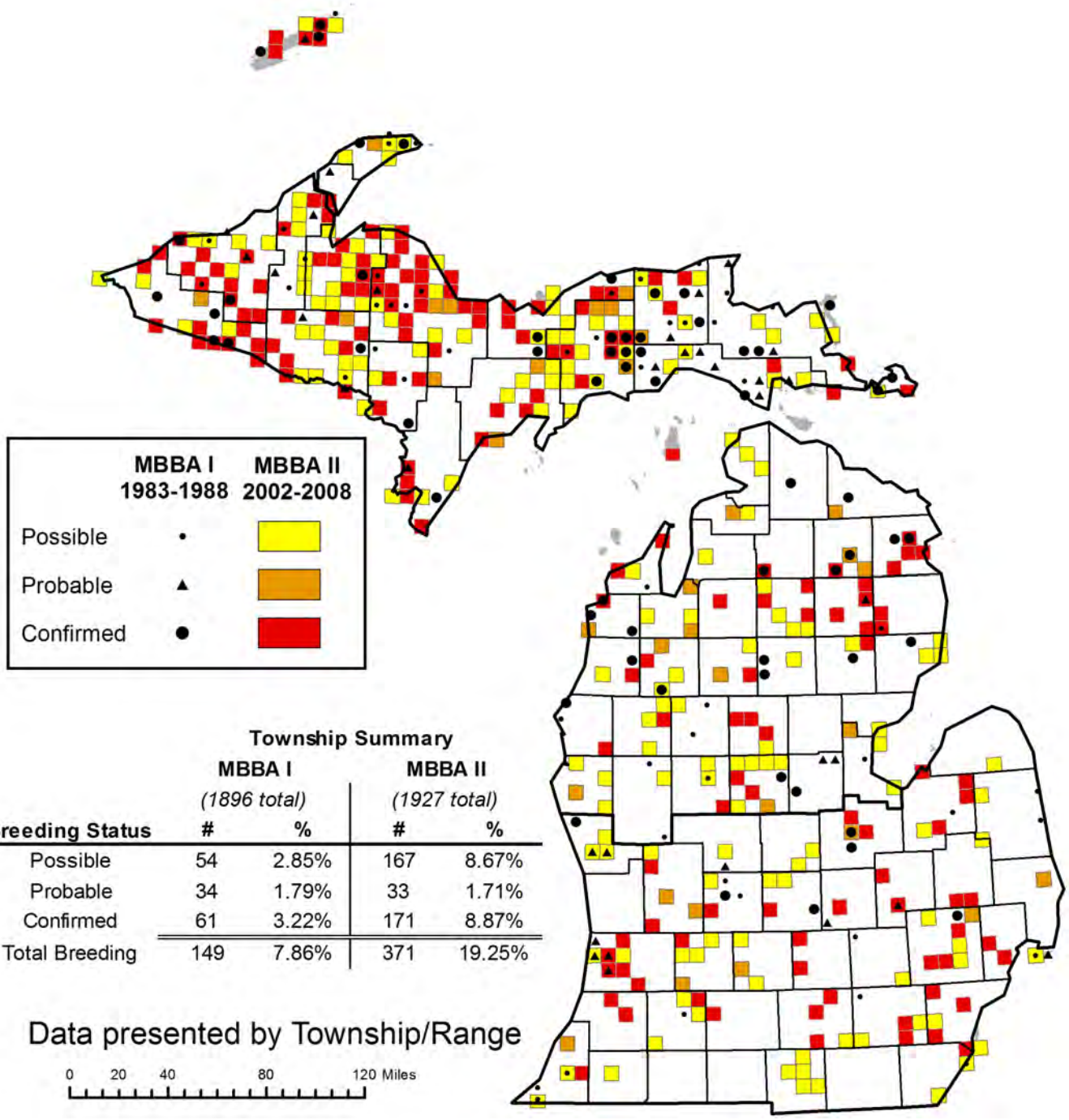
Hooded Merganser *(Lophodytes cucullatus)*

Greg Cleary

been noted in Quebec, New York, and much of New England (McGowan and Corwin 2008). South of Michigan, the Hooded Merganser is common and increasing along western Lake Erie in Ohio but is otherwise widely scattered as a breeder in Ohio and Indiana (Peterjohn and Rice 1991, Castrale et al. 1998).

Conservation Needs

Hunting pressure is relatively light on this species, as it is small and is generally regarded as poor table fare compared to other hunted ducks. In some areas the Hooded Merganser may be vulnerable to acid rain impacts due to its preference for oligotrophic bodies of water, which have low buffering capacity and may suffer die-offs of aquatic life as acid content rises. These effects remain uncertain but should be monitored (Dugger et al. 1994). The Hooded Merganser population is increasing, not only in Michigan, but in much of its breeding range in the eastern U.S. This observation suggests that conservation measures currently in place are sufficient for this species.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	54	2.85%	167	8.67%
Probable	34	1.79%	33	1.71%
Confirmed	61	3.22%	171	8.87%
Total Breeding	149	7.86%	371	19.25%

Common Merganser *(Mergus merganser)*

Skye Christopher G. Haas



Willie McHale ©

One of the more familiar sights to canoeists in the North Woods is that of Common Mergansers. Whether it is a female guiding her brood across a shallow bay, or the same pair of birds one keeps flushing all day, grunting as they fly up around the next bend in the river, they can be found on many of northern Michigan's waterways. Largest of Michigan's breeding ducks, this species is primarily a fish-eater, hunting its prey by sight or tactile probing with its long, thin, serrated bill. Holarctic in distribution, it is known as Goosander in Eurasia. In North America, there are a variety of nicknames for this bird including sawbill, fish duck and sheldrake. A river south of Whitefish Point in Chippewa County is named the Sheldrake. In this waterway, the Common Merganser is a regular breeder and the likely inspiration for its name. Its breeding range in North America stretches from central Alaska eastward, below the tundra line to Newfoundland then arcs southward into the upper Midwest and the Northeast States. In the west, they are common residents in the Pacific Northwest states as well as the Rocky Mountains south to northern New Mexico (Mallory and Metz 1999).

Distribution

Common Mergansers have been abundant in Michigan most likely since pre-settlement times. Barrows (1912) reported the species as a common migrant breeding from Saginaw Bay northward throughout the Upper Peninsula. MBBA I reported Common Mergansers as evenly distributed in the UP, but rather localized in the LP, with concentrations in the Leelanau Peninsula, the Beaver Islands, and north along the coast of Lake Michigan to the Mackinac Straits. There were also a few scattered interior reports. One breeding record was confirmed in the SLP, at the tip of the Thumb in Huron County.

At a time when so many bird species are in decline, it is encouraging that the Common Merganser has increased, with birds found in 12.5% of all Michigan townships in MBBA II, up from 9% in MBBA I. Also encouraging is a range expansion into the interior of the NLP, southwards into the SLP. While the majority of birds are still found in the UP and NLP, SLP records increased from 0.6% to 3.5% of townships, with breeding confirmed in four townships. Particularly notable is confirmed nesting on the Wayne/Monroe County line, a breeding location unknown in historic times.

In MBBA I, Common Mergansers were well distributed across the entire UP. However, in MBBA II the species was not found as often in the eastern UP as in the western and central portions of the peninsula. Whether this is an artifact of increased observer effort in the western UP rather than an actual decline in the east is unknown. Possible declines in the eastern UP were noted by Padding (1991), and thought to possibly result from lake acidification, which is linked to the decline of reproductive success in Common Mergansers (McNicol et al. 1987).

Breeding Biology

One of Michigan's earliest migrating waterfowl, Common Mergansers follow ice-out north, with birds arriving in late February and early March, and numbers peaking by late March in the south to mid-April in the northern reaches of the state (McPeek 1994, Chartier et al. 2004). Nest selection begins within a few weeks after a pair arrives on its territory. Nests are usually located in a tree cavity, typically created by a broken limb or large woodpecker excavation. Occasionally nests are placed in a hole in a riverbank, a cliff cave, or hollow log. Nests are constructed from wood chips, some grasses, and lined with down feathers plucked from the female's breast. Females are known to reuse a nest site for multiple seasons (Mallory and Metz 1999). An average clutch is 10 eggs; incubation begins when the last egg is laid and lasts for 25-28 days. Hatch dates range from early June to late July. The young are precocial, and the female will continue to brood on the nest for 24 to 48 hours, before leading the young to water. Nest cavities are usually near water, but can be found over a half mile from water (Mallory and Metz 1999). There is typically only one brood per season. Like the Red-breasted Merganser, the Common Merganser is frequently a brood parasite to other merganser and duck species (Mallory and Metz 1999). Young from multiple broods often gather into a brood aggregation, also known as crèches.

MBBA II breeding confirmations were primarily from sightings of females with their broods. At least two nests were found during the atlas period, one was in a Pileated Woodpecker cavity in a large dead ash near Lake Michigan (pers. obs.); the other was placed in a chimney-like cavity in a mature broken-off yellow birch snag. The female entered through the top of the tree and dropped down to the nest. This snag was located about 6-7 m above the ground, and about 6-8 m from a small rapidly flowing creek that was a tributary of the Peshekee River, less than half a mile from the main stem of the river (pers. obs.). Drainage systems are thought to be of importance to Common Mergansers as females will move their broods downstream from small ponds and creeks to larger rivers, lakes or bays (Mallory and Metz 1999).

Common Merganser *(Mergus merganser)*

Skye Christopher G. Haas

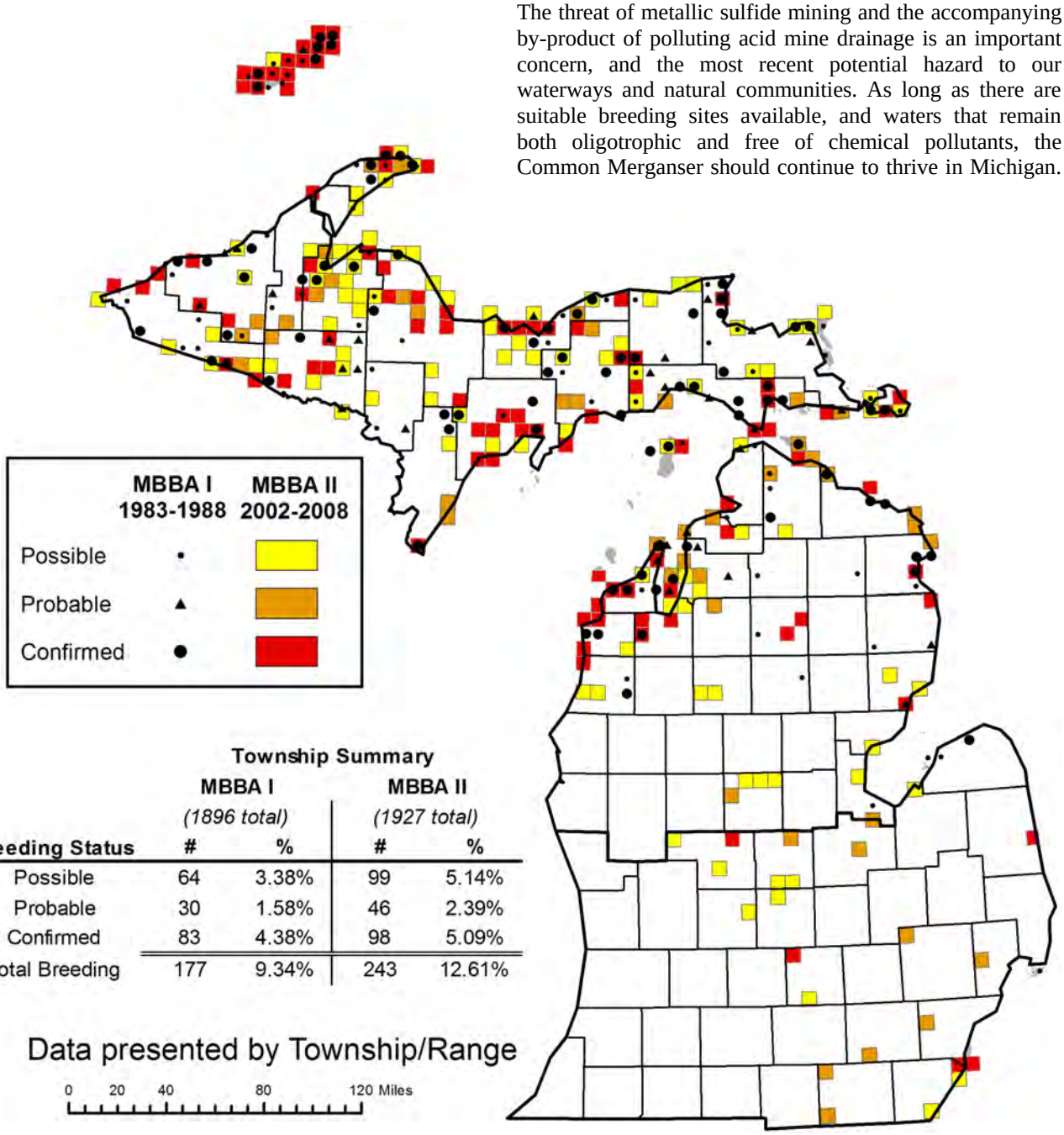
Abundance and Population Trends

The North American population of Common Mergansers is thought to be stable, although declines have been noted in Quebec and Newfoundland (Mallory and Metz 1999). USGS analysis of BBS routes reported a significant increasing trend in population from 1966-2009 of 3% per year (Sauer et al. 2011).

The Michigan population has experienced positive growth since MBBA I. Found in 64 more townships in MBBA II; this species has increased both its numbers and range in the state. The species remains in a solid place as both a breeding and wintering species, as well as a common migrant. As recently as January 2009, 15,000 Common Mergansers were observed at a wintering site on Saginaw Bay (Wuepper 2009), and can be found in large numbers in the winter months over much of the southern portion of the state.

Conservation Needs

As forests continue to mature and provide more nest sites, Common Mergansers will likely continue to increase in Michigan, even around lakes with human residential and recreational development. For a species dependent on aquatic ecosystems, maintaining water quality free of contaminants like dioxins, PCBs, and mercury is essential. The threat of metallic sulfide mining and the accompanying by-product of polluting acid mine drainage is an important concern, and the most recent potential hazard to our waterways and natural communities. As long as there are suitable breeding sites available, and waters that remain both oligotrophic and free of chemical pollutants, the Common Merganser should continue to thrive in Michigan.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	64	3.38%	99	5.14%
Probable	30	1.58%	46	2.39%
Confirmed	83	4.38%	98	5.09%
Total Breeding	177	9.34%	243	12.61%

Red-breasted Merganser *(Mergus serrator)* ***Skye Christopher G. Haas***



Judi Manning ©

Affectionately called "tweezer-bills" by the waterbird counters at Whitefish Point, the Red-breasted Merganser is best known as an abundant migrant along the coastlines of Michigan; it is also an uncommon and localized breeder along northern Great Lakes shores. Males, with their rock-star good looks, are immediately recognizable, but females can be mistaken for the similar Common Merganser. This identification problem, and the tendency of some non-breeding sub-adults to linger on the Great Lakes during the summer, tends to confuse the breeding status of this species. The Red-breasted Merganser is Holarctic in distribution; in North America, it nests across the boreal forests and tundra of Canada and Alaska, southeast to the Great Lakes and New England.

Distribution

The status of the Red-breasted Merganser was likely relatively stable from pre-settlement times up to the mid-20th Century. Barrows (1912) found the species to be absent as a breeder in southern Michigan, but reported nests from Saginaw Bay, and along the Straits of Mackinac shoreline. It is possible that the report from Saginaw Bay may be erroneous; the extensive marshy habitat at this location is unlikely to have ever supported breeding Red-breasted Mergansers.

During MBBA I, breeding confirmations were largely confined to the northern coastal zones of the state. Notable concentrations were found on the Beaver Islands, the Straits of Mackinac, the St. Marys River to Whitefish Bay, and the rocky shorelines of southern Lake Superior and Isle Royale. A surprising number of reports came from the interior of the UP, as well as a report of a brood in Roscommon County.

A major decline in Red-breasted Merganser numbers occurred between the decades of the 1950s and 1960s and the MBBA I period of the 1980s, especially in Lake Michigan (Ludwig 1991). A study by Heinz et al. (1983) reported a minor thinning of eggshells related to organochlorine chemical levels and no real drop in reproductive productivity. However by 1988, a significant decline in the number of nesting pairs was reported on Green Bay, Wisconsin, the Beaver Islands and the Straits of Mackinac (Ludwig 1991). A nest collected on Pismire Island in 1988 consisted of a mix of infertile eggs and deformed embryos. This observation is consistent with studies of other colonial waterbird species affected by PCBs in the region (Ludwig 1991).

MBBA II showed a continuing decline, with Red-breasted Mergansers absent from almost half of the townships occupied during MBBA I. This drop in the population was most notable in the Upper Peninsula with only 10.6% of all UP townships reporting Red-breasted Mergansers in MBBA II, compared to 16.7% for MBBA I. The only areas with somewhat stable populations include areas along the granitic coasts of Marquette County and the Keweenaw Peninsula, including a notable stronghold on Isle Royale.

Breeding Biology

Red-breasted Mergansers show a strong affinity for nesting close to water; nests often are placed on small rocky shrub covered islets on Lake Superior and on vegetated sand or rocky islands on Lake Michigan. While in the extreme western UP a few Red-breasted Mergansers were found in the large rocky rivers of Gogebic County, generally Red-breasted Mergansers prefer Great Lakes shorelines or large oligotrophic lakes. Nest placement is under dense vegetative cover like low-hanging conifer branches, shrub thickets or tall grasses and forbs. Females also nest under logs or driftwood, or between boulders and rock crevasse (Titman 1999), often in association with gull and tern colonies (Lukes 2006). Clutch size averages 9-10 eggs, but varies from 5-24; egg dates range from 6 June to 25 July (Robbins 1991). Only one clutch per year is produced, but birds will renest if the first nest is lost. Incubation is 30-31 days; newly hatched chicks are precocial, leaving the nest shortly after hatching. Parental care, given by the female, consists of brooding, leading the young to good foraging sites, and vigilance against predators. Often one female will care for her own brood and those of other females. These can be referred to as brood amalgamations, or crèches (Titman 1999). The species is also subject to intraspecific brood parasitism; a study on an island in New Brunswick found 64% of the nests contained eggs from more than one female (Young and Titman 1988).

Abundance and Population Trends

The majority of the continental population of Red-breasted Mergansers is in a decline, with BBS data from 1966 to 1989 showing a 4.6% annual decline, and in Canada, a 6.6% annual decline across the boreal shield. In USFWS Region 3, BBS data show a significant annual decline of 8.9%. It must be noted that this dataset may not have the power to detect population trends due to the low level of detectability of this species on BBS routes (Downs and Collins 1996, Titman 1999). However, other studies in the Midwest corroborate this decline. Surveys in northern Green Bay reported 400 nesting pairs on three islands in 1974-1975. By

the beginning of the 1990s, island estimates had dropped to only 12 pairs (Ludwig 1991). Despite occurrence in most townships on the Beaver Island chain in MBBA I, often only one pair per nesting island was reported in MBBA II, down from 15-20 pairs in the 1960s (Ludwig 1991). MBBA II results confirm many townships on the Beaver Islands no longer support any nesting pairs. This site was a major breeding location for this species at the beginning of the 20th Century.

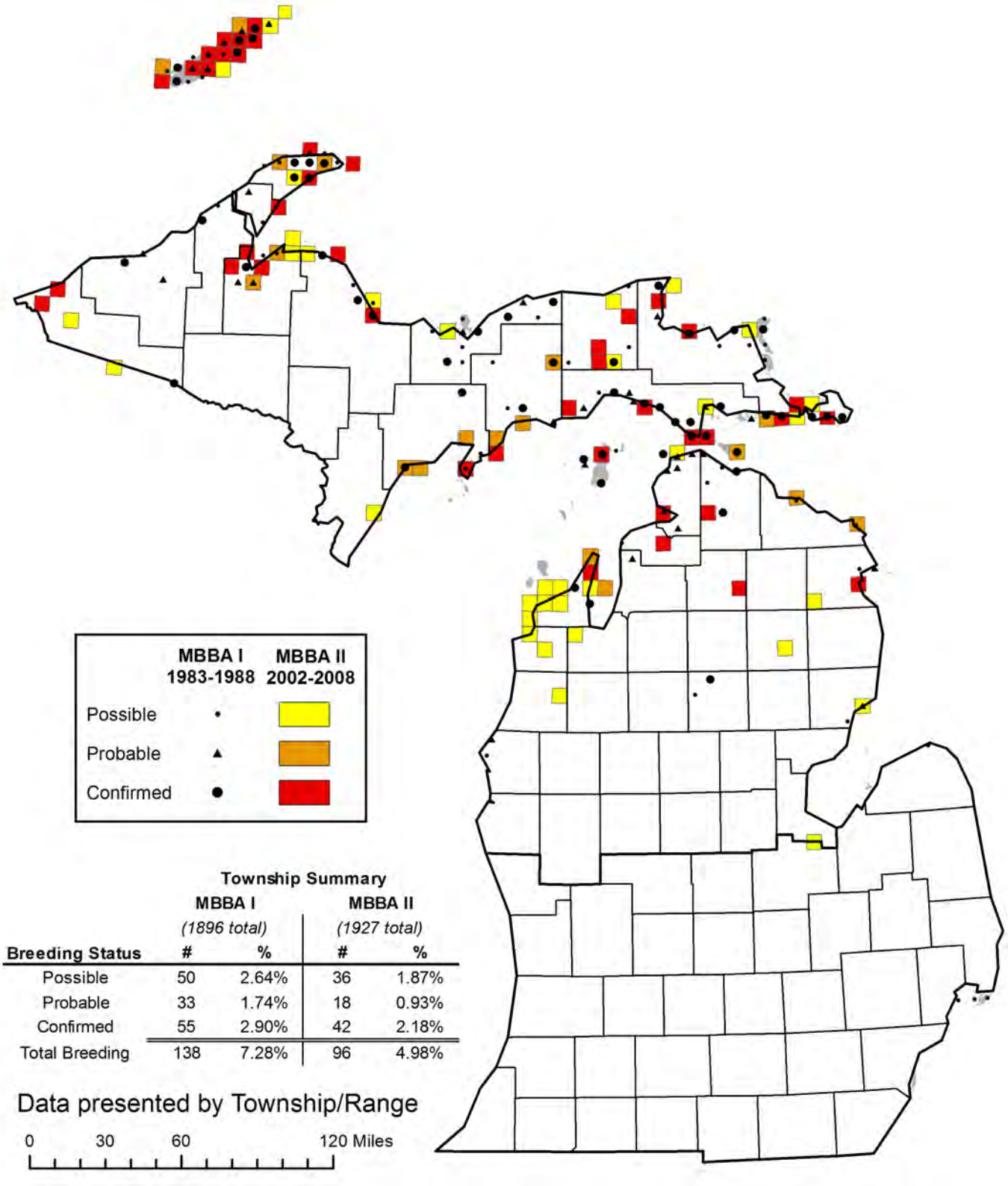
In Ontario, Red-breasted Merganser populations have also declined, although change was most pronounced in the northern interior in the Hudson Bay Lowlands. Populations along northern Lake Superior and in northern Lake Huron appear to be stable at this time. It is interesting to note at a time when most of the population over the Great Lakes have declined, that the merganser population in eastern Lake Ontario increased, mirroring a 14.8% increase in the Atlantic Highlands waterfowl estimates conducted from 1990-2005 (Craik 2007).

Conservation Needs

Evidence suggests the Red-breasted Merganser is declining in Michigan, particularly in northern Lakes Michigan and Huron. Currently listed as a species of Special Concern in Wisconsin, the status of this species in Michigan should be monitored carefully. Although the threat of organochlorine chemicals appears to be declining (Lukes 2006), a new phenomenon is occurring, the eutrophication of Lake Michigan and frequent outbreaks of Type E botulism (Getchell and Bowser 2006). Researchers found dead Red-breasted Mergansers along more than 90 miles of shoreline in northern Lake Michigan that comprised 5% of the nearly 3,000 botulism-E killed waterbirds in fall 2007 (J. Kaplan, pers. comm.). Unprecedented numbers of non-native zebra and quagga mussels filtered the water column, allowing for exaggerated blooms of native cladophora algae; the decomposition of this algae caused sections of the Great Lakes to become anaerobic, allowing botulism-E to thrive (Getchell and Bowser 2006; J. Kaplan, pers. comm.). Department of Environmental Conservation staff in New York estimated that just under 2,500 Red-breasted Mergansers died in similar outbreaks on Lake Ontario in fall 2000 (Grannis 2007). Key conservation needs for this species in Michigan include monitoring of population status in the state and region and specific studies to understand patterns of decline and their causes.

When one stands on a windswept point on the Great Lakes in late fall watching thousands of Red-breasted Mergansers pass by in a day, if not in hours, it is easy to be lulled into a false sense of security about the fate of this species. James Ludwig (1991) suggested that due to this species' sensitivity to environmental contaminants, it would make a good ecosystem monitor. If this is indeed the case, the precipitous decline in Red-breasted Merganser numbers may indicate an ominous specter threatening the health of our northern Great Lakes.

Red-breasted Merganser *(Mergus serrator)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	50	2.64%	36	1.87%
Probable	33	1.74%	18	0.93%
Confirmed	55	2.90%	42	2.18%
Total Breeding	138	7.28%	96	4.98%

Data presented by Township/Range

0 30 60 120 Miles

Ruddy Duck *(Oxyura jamaicensis)*

Richard A. Wolinski



John Van Orman ©

The male is a brightly colored duck during the breeding season- with a bright blue bill, white cheek patch, rufous head, back, and wings, and a short stiff tail that is displayed in an upright position during courtship. The male coloration is similar to that of the female and immature once the breeding season ends, with the species considered a common fall migrant. The stiff tail is often held above the back, giving a distinctive appearance even from a distance.

Distribution

The Ruddy Duck is found throughout the continental United States and central Canada, with abundance greatest in the prairie pothole region. Outside of the core breeding area it is more locally distributed as a breeding species in the marshy borders of larger bodies of water and large natural and managed marsh systems (Brua 2001). In Michigan, non-breeding individuals can be found on sewage treatment lagoons as well as coastal and inland natural wetlands, most often in the southern half of the LP.

The first reference of the Ruddy Duck in Michigan was reported by Sager (1839), with the first breeding record reported from St. Clair Flats by Langille in the early 1880s (Barrows 1912). The next evidence of breeding did not occur until 1949 in Dickinson County (Zimmerman and Van Tyne 1959). The nesting status of the Ruddy Duck was reviewed by Wolinski (1973) at which time breeding had been confirmed in Bay, Dickinson, and Gratiot counties, with additional observations without evidence of breeding for Kalamazoo, Macomb, Monroe, Saginaw, and Schoolcraft. All of these authors indicate that this species is a common spring and fall migrant.

Overall distribution of records mapped in MBBA I and MBBA II show the same general pattern, with sightings confined mostly to the SLP, with two locations in the NLP and one in the western UP during MBBA II only. Only one breeding confirmation was reported in MBBA I, at Fish Point Wildlife Area, Tuscola County. Four areas reported confirmed breeding in MBBA II; two townships encompassing the Pte. Mouillee SGA, Monroe County, the Crow Island SGA, Saginaw County, the Fremont sewage ponds, Newaygo County, and Woodbridge Township in southwestern Hillsdale County. The presence of non-breeding individuals is a complicating factor in the determination of actual breeding distribution and abundance for this species. Atlas data did not contain information regarding the number of birds found within each of the blocks in which the species was found. Small groups of non-breeding individuals or adult pairs represent those blocks with codes of probable, with the presence of a single adult representing those coded as possible. Specific locales for only some of the probable breeding records were provided by observers and include: the Muskegon County Wastewater Treatment System, Maple River SGA, Gratiot County, Wetzel State Park, Macomb County, and the Morenci sewage ponds, Lenawee County.

The total number of occupied blocks increased between MBBA I and II, all in the LP with the exception of one block in the western UP. MBBA I documented a total of nine counties (Bay, Dickinson, Macomb, Mecosta, Monroe, Muskegon, Newaygo, Saginaw, and Tuscola), while MBBA II added an additional eleven counties. Records held in common between both atlas periods total four (Kent, Monroe, Ottawa, and Saginaw).

Breeding Biology

Nest placement is in dense stands of emergent wetland vegetation, including Cattail, (Brua 2001). Nest concealment makes verification by nest contents difficult within large wetland systems and confirmation of breeding is most often by observation of females with young. While the majority of females are paired, up to 73% of males are not, with males appearing to leave the female soon after incubation has been initiated (Brua 2001). Therefore, the observation of single or groups of males may be an indication that breeding has occurred within the block in which the observation was made as the males disperse to smaller wetlands nearby. This species is also known to parasitize the nests of other species and it is possible that mixed broods with Ruddy Duck ducklings may have been missed (Brua 2001, Leckie 2007).

Abundance and Population Trends

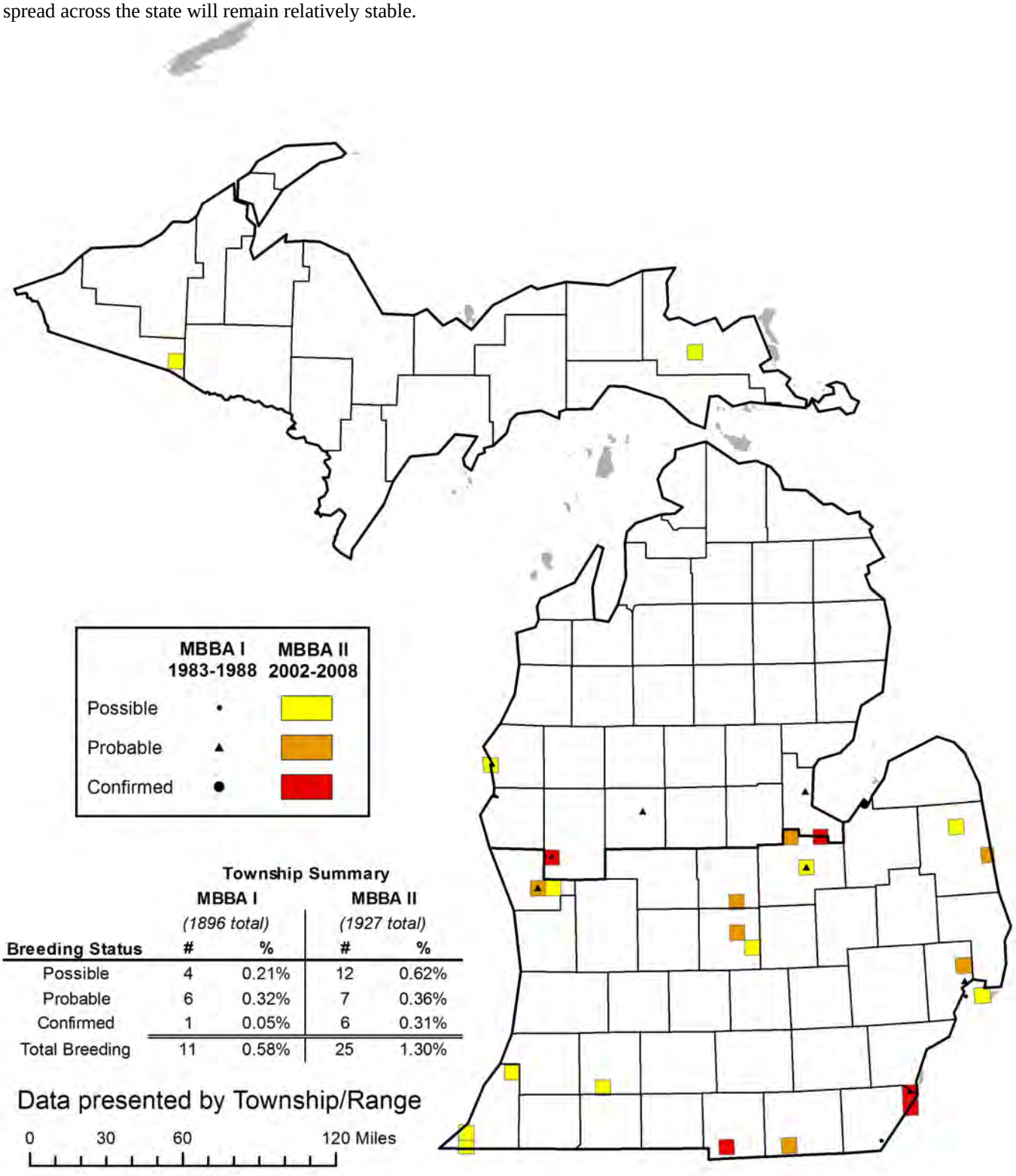
Based upon continent-wide BBS route data the Ruddy Duck population is stable or slightly increasing (Brua 2001). Due to the nature of BBS routes and the favored nesting habitat of the Ruddy Duck, use of Michigan BBS data is impractical for this uncommon nesting species. MBBA II results are consistent with an increase of occupied blocks as found in southern Ontario (Leckie 2007) at about the same latitude as Michigan. In recent years, large numbers have been detected during fall migration at the Muskegon County Wastewater System, including 13,508 in 2007 (Dombroski 2008), 15,000 in 2008 (Byrne 2009), and 13,000 in 2009 (Chartier and Wuepper 2010) though this likely has little bearing on Michigan's sparse and scattered breeding population.

Ruddy Duck *(Oxyura jamaicensis)*

Richard A. Wolinski

Conservation Needs

Given the historical distribution and population level of the Ruddy Duck confirmed by MBBA II there is no specific management action that needs to be taken for this species. Since large coastal and inland marshes are afforded protection it is likely that nesting habitat for this species will remain unaffected and the small number of nesting pairs spread across the state will remain relatively stable.



Ring-necked Pheasant *(Phasianus colchicus)* ***Torrey Wenger***



Allen Chartier ©

The Ring-necked Pheasant is arguably one of humanity's favorite birds. Native to Asia, it has been introduced to every continent, save Antarctica (Giudice and Ratti 2001). North American introduction attempts using a variety of the 23 subspecies began in the 1730s (Giudice and Ratti 2001) with releases in Michigan beginning in 1895 (MacMullan 1960). The Michigan Department of Conservation released thousands of pheasants from 1918 through 1960 (Belyea 1991). The Strauch or Sichuan subspecies was imported and released by the Michigan Department of Natural Resources from 1985 through 1995 (Belyea 1998). While this bird's biggest fans are undoubtedly hunters, the Ring-necked Pheasant's striking plumage makes the male instantly recognizable even to non-birders.

Distribution

Statewide distribution during the MBBA II period follows the pattern established in MBBA I. Pheasants are found primarily in the SLP, with scattered populations farther north. Overall during MBBA II, pheasants were documented in 10% fewer townships and, more tellingly, 37% fewer blocks than during MBBA I. Range contraction has been most severe in the SLP with pheasants found in 14% fewer townships and 41% fewer blocks. However, they seemed to expand their range in the UP, being found in seven new counties. Similar declines were noted during the second Atlas efforts in both Ontario and New York (Leckie 2007, Murphy 2008).

Noticeably fewer breeding attempts were confirmed (i.e., nest with eggs, flightless young with hen) during MBBA II. Of townships with pheasants, 36% reported confirmed breeding during MBBA I while only 12% reported confirmed breeding during MBBA II. MBBA II protocol put less emphasis on confirmation (KNC 2004).

The Atlas map comes with a caveat: observers could not differentiate between released or escaped game-farm pheasants and those belonging to the wild population. Hunting preserves and game bird releases are regulated by the DNR; Ring-necked Pheasant may be raised and released with the proper permits (MDNR 2005, MDNR 2007). Individual pheasants or even small flocks in an area do not necessarily mean that an established population exists there. While captive-reared birds have low survivorship (Leif 1994); atlas protocol cannot determine if a population is ephemeral. Surveys to document successful reproduction and annual survival are needed for confirmation in questionable locales.

Breeding Biology

The male pheasant claims territory around his preferred crowing grounds. A "harem" of two to 18 females assembles within this territory. Breeding is asynchronous, with different females joining and leaving the harem (Giudice and Ratti 2001). The rooster abandons his territory when the last hen begins to lay eggs.

Pheasants are persistent re-nesters, making as many as five nesting attempts, resulting in a breeding season that lasts from March through August; later nests tend to have fewer eggs (Giudice and Ratti 2001). Hens will lay eggs in the nests of other pheasants and also other species of ground-nesting birds, including grouse, turkey, and ducks. Incubation takes about three weeks and the young disperse after two months. Initially, the young are primarily insectivorous, switching to plant matter (primarily grains) at about a month old (Giudice and Ratti 2001).

Abundance and Population Trends

Pheasant populations in Michigan have always exhibited sometimes dramatic fluctuations (MacMullan 1954). Despite its popularity as a game bird and the attendant intensive management, the continent-wide pheasant population has been declining since its peak from the 1930s to the 1950s (Giudice and Ratti 2001). BBS data from 1966 through 2007 show an annual decline of 0.7% survey-wide; in USFWS Region 3, the population has declined 1.7% annually; and in Michigan, the decline has been 3.4% annually (Sauer et al. 2008). In Michigan's experimental Sichuan pheasant releases, it was hoped that this strain would use different habitat than existing pheasants and improve pheasant abundance; however, this did not occur (Luukkonen et al. 1997).

Self-reported hunting results have been trending downwards since 2000. In 2001, an average of 1.0 rooster was flushed from cover per hour with over 55% of hunters believing that pheasant numbers were down from the previous year (MDNR 2002); in 2006, 0.7 roosters were flushed per hour with over 65% of hunters believing the numbers were down (MDNR 2006); and in 2009, 0.4 roosters were flushed per hour and 75% of hunters believed the numbers were down (MDNR 2009). Self-reported numbers may contain bias which may be compounded by the low return rates typical of small game surveys; however, these are the best data available as a measure of hunter effort and success.

Annual population fluctuations are linked to weather patterns; long-term trends are linked to habitat changes (Giudice and Ratti 2001). Adaptable to many conditions, the pheasant nonetheless has several habitat requirements: dense winter cover, especially in years of heavy snows; nesting and brood-rearing cover; and arthropod-rich feeding grounds for the young. Preferably, patches meeting these requirements should be interspersed together in a mosaic

Ring-necked Pheasant *(Phasianus colchicus)*

Torrey Wenger

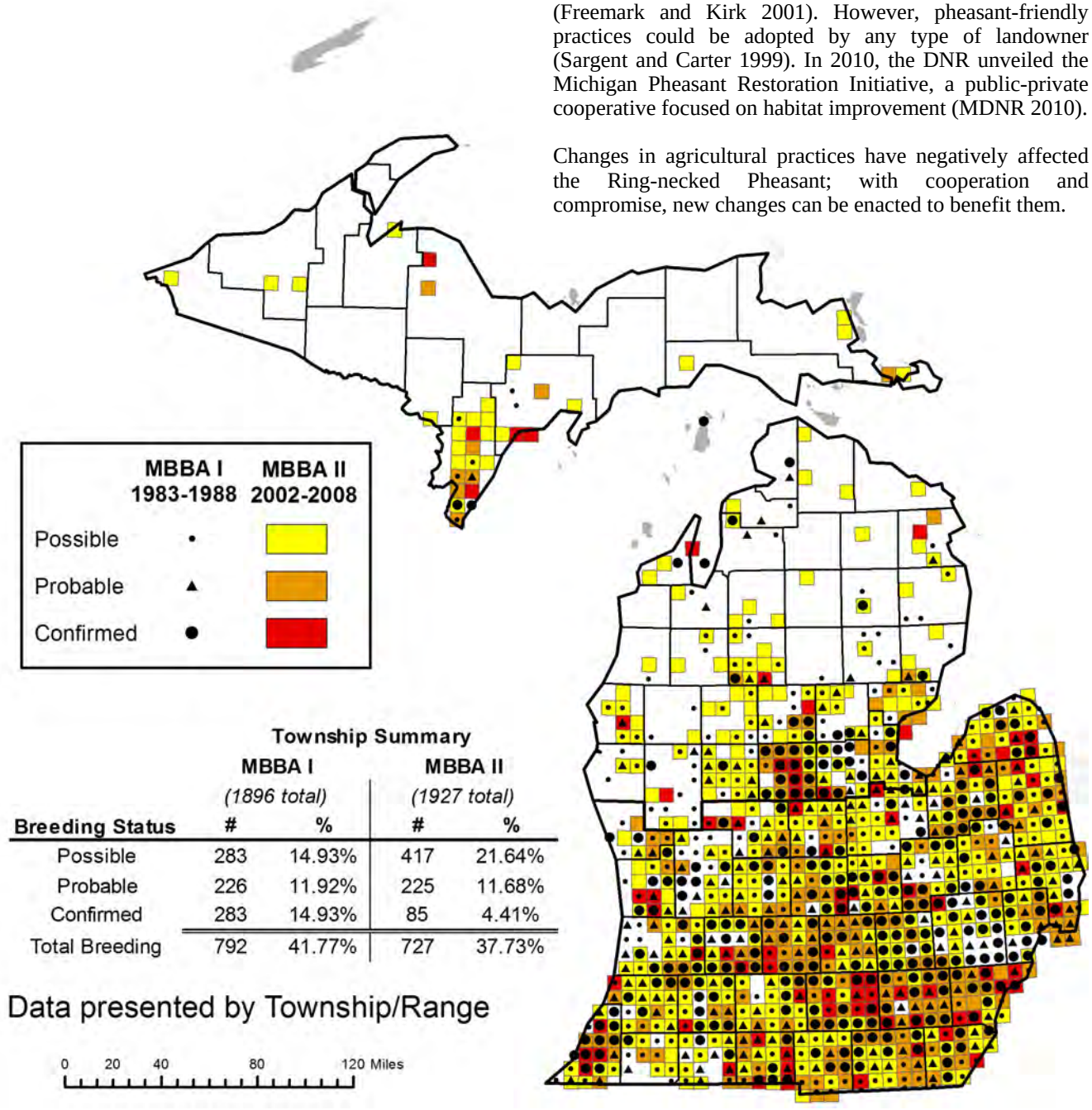
(Giudice and Ratti 2001). The small general farms common prior to World War II fit these needs well; since then, farming has become industrialized with large "clean" monocultures replacing small diversified fields and fencerows (Lobao and Meyer 2001, Robinson and Sutherland 2002). Additionally, modern hay fields are mowed earlier in the season, resulting in destroyed nests and often maimed females (Giudice and Ratti 2001).

Conservation Needs

The Ring-necked Pheasant is a non-migratory game species, managed by state natural resource agencies. Pheasants Forever, a dedicated habitat conservation organization, supports pheasant management efforts nationwide. While pheasant management is not the responsibility of any federal agency, federal programs do exist that benefit it. The USDA Natural Resources Conservation Service (NRCS) operates the Conservation Reserve Program (CRP), which encourages farmers to set aside lands with wildlife habitat as just one of the program goals. The Landowner Incentive Program (LIP) of the U.S. Fish and Wildlife Service is geared primarily towards wildlife restoration.

This species is dependent on agricultural areas, at least in the Midwest (Giudice and Ratti 2001). Conservation will require cooperation among wildlife, agricultural, and land managers. Issues include habitat needs, use of pesticides, and mowing schedules. The rise of organic and small-scale community supported agriculture farms could potentially create habitat for pheasants as well as other species (Freemark and Kirk 2001). However, pheasant-friendly practices could be adopted by any type of landowner (Sargent and Carter 1999). In 2010, the DNR unveiled the Michigan Pheasant Restoration Initiative, a public-private cooperative focused on habitat improvement (MDNR 2010).

Changes in agricultural practices have negatively affected the Ring-necked Pheasant; with cooperation and compromise, new changes can be enacted to benefit them.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	283	14.93%	417	21.64%
Probable	226	11.92%	225	11.68%
Confirmed	283	14.93%	85	4.41%
Total Breeding	792	41.77%	727	37.73%

Ruffed Grouse *(Bonasa umbellus)*

Skye Christopher G. Haas



Joan Tisdale ©

Almost felt first before actually hearing it, one is compelled to stop and listen to the muffled sounds of a Ruffed Grouse drumming on a soggy spring morning. With the sound beginning on the outer edges of our perception, a male grouse first slowly, then with increasing speed, rotates his wings forward and back, creating a small vacuum with the sudden compression and release of air pressure that produces the rolling drum-like sound these magnificent birds use to define their territories. A most handsome bird, one is struck by just how beautifully the cryptic speckled patterning of grays, browns, blacks and reds have combined in an evolutionary triumph of camouflage. The Ruffed Grouse (or simply Partridge as it is known by game hunters) has two color morphs, red and gray, though intermediates can occur, with the color of the tail being the most obvious indicator of classification. A bird of more northerly climes, its range stretches from Newfoundland into Alaska. Tendrils of populations in the west extend southward along the northern west coast, as well in the Rockies into Utah and barely Colorado. In the east, the species' range follows the Appalachian Mountains southward and can be found also in the Ohio River Valley. In the Great Lakes region the bird is widespread in the northern reaches, becoming localized to absent in the southern portions.

Distribution

The Ruffed Grouse was historically found over all of Michigan. It was considered abundant in the mid 1800s, but as of 1883, Cook described declining numbers of grouse (Brewer et. al 1991). As land was cleared by logging and fire, followed by conversion to agricultural lands, the Ruffed Grouse retreated, finding sanctuary in areas where extensive cut-over second-growth forest left behind by the original logging boom had not been burned. Legal market hunting of Ruffed Grouse was also likely a factor in this species 19th century declines with heavy take recorded in the early 1890s, eventually leading to the ban on hunting this species in 1894. While hunting likely played a role, deforestation and habitat fragmentation are believed to be the primary cause of decline for Ruffed Grouse (Brewer et al. 1991). By the beginning of the 20th century, Barrows (1912) wrote that the species was "generally distributed over the entire state, although it becomes yearly less common in the cultivated districts". By the 1930s, cut-over brushlands had matured in widespread aspen-birch forest allowing for a boom in Ruffed Grouse populations, perhaps even exceeding pre-settlement populations (Urbain 1991). However, as widespread aspen-birch forest matured into hardwood and conifer forest, populations likely returned to a more pre-settlement carrying capacity for a mosaic patterned landscape. In the mid-20th Century there was a notable increase in grouse numbers in the LP, as widespread agricultural land use diminished and young forests began to reclaim the southern Michigan landscape (Urbain 1991).

By MBBA I, Ruffed Grouse could be found in nearly every county in the state save for a small handful in the south-southeast corner of Michigan, with just over half of all townships recording grouse in them. Particularly notable is that Ruffed Grouse were recorded in 40.09% of SLP townships with 98 breeding confirmations. Grouse were most widely distributed in the NLP with birds recorded in 61.69% of all townships surveyed, and in the UP, birds were noted in 57.05% of townships, though the actual distribution is likely much wider, and results may be due to survey coverage rather than a lack of birds.

Unfortunately, these inroads to the SLP would not be maintained by the completion of MBBA II. From MBBA I to MBBA II there was a 15.1% decline in the number of townships observed, and noticeable reduction in range in the SLP. Their distribution shrank by nearly two-thirds, with only 14.95% of SLP townships reporting Ruffed Grouse, and only 11 confirmations. The highest densities can be found in the forested game areas of the central thumb and Barry and Kalamazoo Counties in the SWLP, with localized populations elsewhere. The NLP showed a less significant decline with birds recorded in 52.77% townships, while numbers slightly increased in the UP to 66.34%. Undoubtedly forest fragmentation, the maturation of woodlots, and reduction in young forest habitat (especially aspen), and suburban sprawl are the culprits in the retraction of Ruffed Grouse range in the SLP.

Breeding Biology

With the return of spring, the north woods are once again filled with the sounds of drumming cocks displaying both their percussive abilities and shaggy ruffs to prospective mates. Drumming peaks in April, and the pair bond is brief, with the female constructing a nest within a week of copulation. The nest is a bowl-like depression on the forest floor, lined with dead leaves and other vegetation. Only one brood is produced each year, though renesting will occur if the first attempt is lost. Clutch size ranges from 9-14 eggs and can take over two weeks to be completed; incubation lasts for 23-24 days (Rusch et. al 2000). In Michigan, hatching typically occurs in the first week of June, the chicks are precocial and the hatch is near-synchronous, with the surprisingly ambulatory chicks leaving the nest within

24 hours of hatching (Urbain 1991, Rusch et. al 2000). Chicks are capable of limited flight within five to seven days of hatching. Hens are highly defensive of the chicks and will either feign injury or even threaten and rush potential predators. The hen and her brood are very communicative and remain together until September (Rusch et. al 2000).

Abundance and Population Trends

The abundance and densities of this species can be quite variable, being prone to cyclic fluctuations as well as influenced by predatory pressures and environmental instability. It is thought that the cyclic rotation of Ruffed Grouse populations in the Great Lakes states are driven by influxes of avian predators such as Northern Goshawk and Great Horned Owl moving southward in response to Snowshoe Hare declines in the boreal forest (Keith and Rusch 1989, Rusch et. al 2000). BBS analyses in Ontario showed recurring peaks of abundance, with a lapse of two to six years between peaks (Szuba 2007).

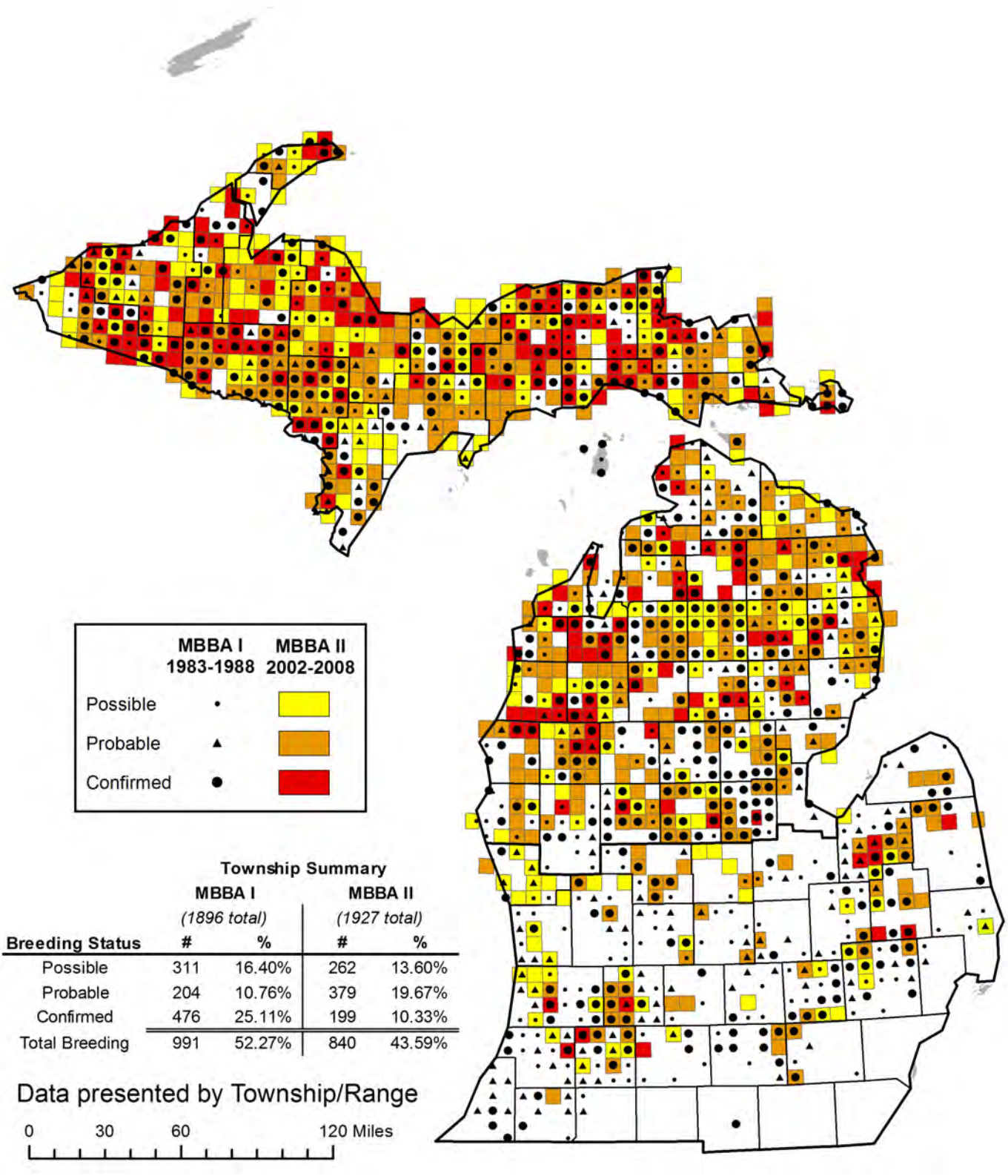
Several states in the eastern U.S. have noted declines in their Ruffed Grouse populations (Rusch et. al 2000). National and Great Lakes regional BBS data have shown significant declines in abundance of Ruffed Grouse from 1966-2000 (Sauer et al. 2008). Partners in Flight (PIF 2007) have estimated the Michigan population to be a little over 80,000 birds, a substantial underestimate as the recent annual take by hunters is over 200,000 in recent years. In analyzing Michigan BBS routes, the data show there has been a significant change in the number of detections per route, though in the case of this particular species, detections of individuals are so low this must be interpreted cautiously (PIF 2007). Michigan DNR reports indicate that seasonal spring drumming surveys from 2008 to 2010 did not show any significant difference state-wide in detection rates (Frawley and Stewart 2009, Frawley and Stewart unpub. report 2010). However, state-wide surveys were not conducted in 2009. Routes were conducted each year in the UP and showed a decline of 17% from 2008 UP surveys compared to 2009, and again a 17% decline from 2009 to 2010 (Frawley and Stewart 2009, Frawley and Stewart unpub. report 2010). More encouraging, is the annual state-wide increase in take from 271,000 in 2006 to 303,000 in 2007 (Frawley and Stewart 2009). This could be suggestive of an over-all stable population, though three continual years of decline in spring drumming surveys in the UP, especially considering the amount of available habitat, is cause for concern (Frawley and Stewart 2009, Frawley and Stewart unpub. report 2010).

Other Great Lakes populations show more mixed results with both declining and stable populations. In Wisconsin, a similar northward retreat in range is noted, and in southwestern Wisconsin drumming surveys declined from 2.42 during 1964-1981, to 1.16 during 1984-2000. Furthermore, these surveys also showed that the cyclic population peaks in northern Wisconsin were lower in the 1980s and 1990s than during the two previous population cycles (Walter 2006). In New York, early succession habitat has declined significantly and grouse populations have reflected this loss with major declines in populations recorded over most of the state with near complete withdrawal from the southeast corner of the state. BBS data has shown significant declines and PIF has listed Ruffed Grouse as a species of high priority conservation concern in New York (Sauer et al. 2008, PIF 2007). Ontario data is more encouraging, recording no real difference in the probability of observation of Ruffed Grouse between their two atlas efforts, nor was there any noted change in range (Szuba 2007). It must be noted though, that regional differences occurred, with several regions of the province showing declines in populations. The probability of observation in the Northern Shield, an Ontario atlas region which spans central Ontario, covering the northern areas of the Canadian Shield, increased by 27%, likely due to increasing aspen habitat (Szuba 2007). Increases in this region, which accounts for more than half of the land area of Ontario does much to off-set declines in other regions.

Conservation Needs

The Ruffed Grouse is one of Michigan's most important game species, and maintaining a healthy population is a conservation priority. The key to robust Ruffed Grouse populations is the maintenance of early successional deciduous habitat through large scale disturbances. It is critical to halt and reverse the decline of young forests, particularly aspen. Problematic for populations in the SLP is the lack of landscape rotations in habitat. With most property being either private residential or agricultural, remaining forested habitat is largely mid-successional in age. On public lands, a combination of timber harvest and fire regeneration should be part of any comprehensive management plan to ensure robust populations. Partnerships across the nation have created the National Ruffed Grouse Conservation Plan (Dessecker et al. 2006) to define conservation needs in each bird conservation region. In addition to purchasing land to create Ruffed Grouse habitat, organizations such as the Ruffed Grouse Society also do valuable outreach to educate private land owners about maintaining suitable habitat.

Ruffed Grouse *(Bonasa umbellus)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	311	16.40%	262	13.60%
Probable	204	10.76%	379	19.67%
Confirmed	476	25.11%	199	10.33%
Total Breeding	991	52.27%	840	43.59%

Data presented by Township/Range

0 30 60 120 Miles

Spruce Grouse *(Falcipennis canadensis)*

Status: *Special Concern (MNFI)*

Damon McCormick & R. Gregory Corace III



Andy Johnson ©

In his seminal work, Robinson (1980) referred to the Spruce Grouse as the *"Fool Hen"*, a pejorative deriving from the species' frequently indifferent reaction to human approach. Across Michigan, however, such close encounters are comparatively uncommon. Breeding within coniferous forest ecosystems primarily within the UP, the Spruce Grouse is behaviorally and audibly less conspicuous than the slightly larger Ruffed Grouse and ecologically distinct from the Ruffed Grouse and the Sharp-tailed Grouse along a habitat continuum of closed canopy coniferous forests to open lands. Similar to the female Ruffed Grouse, female Spruce Grouse have drab plumage characteristics that provide excellent camouflage against a backdrop of dry conifer needles; they are distinguished from their Ruffed Grouse counterparts by a pale terminal band in their rectrices and by the lack of a raised crown when alarmed. Male Spruce Grouse are more dramatically feathered, with black and white dorsal and ventral barring, a pale rufous terminal band and, most prominently, a scarlet superciliary comb (Boag and Schroeder 1992).

Distribution

The conterminous breeding range of the Spruce Grouse extends across most of the Canadian and Alaskan taiga, and dips into the contiguous United States within the northern Rocky Mountains, New England, and Upper Great Lakes (Boag and Schroeder 1992). As a species closely associated with coniferous forests, its presettlement range and density within Michigan was likely impacted by the widespread UP and NLP logging of the 19th Century, with episodic establishment of appropriate habitat thereafter (Robinson 1991). The assessment of Barrows (1912), which reported a stable eastern UP population bordered by declines in the central UP and NLP, roughly presaged the modern day statewide distribution of breeding Spruce Grouse as determined by Atlas surveying.

Although the species is associated with a variety of short-needled conifers across its entire North American range, extensive study by Robinson (1969, 1980) suggested that a preferred UP habitat is stands of jack pine mixed with black spruce and interspersed with small openings of blueberries, trailing arbutus, and decaying arboreal material. However, Robinson's work primarily dealt with one study site, the Yellow Dog Plains of Marquette County, while others have frequently observed birds in a mosaic of boreal forest and more mature, mixed-pine stands dominated by longer lived red pine and white pine within landscapes such as the Baraga Plains (Baraga County), Seney NWR (Schoolcraft County), Raco Plains and Whitefish Point (both Chippewa County) (McCormick and Corace pers. obs.). Although the Spruce Grouse is a year round state resident, some birds undertake short migrations of less than 11 km between their summer and winter ranges (Robinson 1980, Schroeder 1985).

Breeding Biology

The breeding Spruce Grouse is predominantly a terrestrial Tetraonid, favoring perambulation over flight (Boag and Schroeder 1992). Its largely herbivorous diet consists primarily of conifer needles, with a preference for pine over spruce (Crichton 1963, Pendergast and Boag 1970). Nests, which in Michigan are typically initiated in late May, are bowl-like depressions lined with needles or leaves, and are usually located at the base of a conifer affording overhead cover (Redmond et al. 1982, Robinson 1991, Boag and Schroeder 1992). The female incubates a clutch of four to eight eggs for roughly three weeks (Boag and Schroeder 1992). Her precocial, downy chicks are capable of short flight within one week, but generally remain in broods for two to three months before autumn dispersal (Robinson 1980, Schroader and Boag 1985). Although a wide variety of mammalian predators may take Spruce Grouse eggs, predation of adults or their young is primarily limited to *Accipiter* raptors, particularly the Northern Goshawk (Robinson 1980, Boag and Schroeder 1992).

Abundance and Population Trends

Echoing MBBA I results, MBBA II surveying determined the Spruce Grouse to be absent from the SLP, highly localized in the NLP, and broadly, if irregularly, distributed across the eastern, central, and western central UP. In the NLP, the species was documented in only four contiguous townships within the jack pine-dominated convergence of Crawford, Ogemaw and Oscoda counties; the six total block level NLP records reflect a 63% decrease from MBBA I. In the UP, the Spruce Grouse was predominantly located in discrete township-level clusters stretching eastward from southeastern Houghton and northwestern Iron counties to central Chippewa and eastern Mackinac counties. Most of these MBBA II zones of UP occupancy did not overlap with MBBA I results. For example, among the 13 confirmed UP townships of MBBA II, only three registered Spruce Grouse

Spruce Grouse *(Falcipennis canadensis)*

Status: *Special Concern (MNFI)*

Damon McCormick & R. Gregory Corace III

during the first Atlas, and only one in a confirmed capacity. Although total statewide block and township level records from MBBA I to MBBA II rose 29% and 26%, respectively, breeding confirmations actually dropped 5% and 22% during the two periods of sampling. To the neighboring east and north, Atlas results from Ontario (Cadman et al. 1987, Szuba 2007) suggest a similar broad-scale pattern of overall population stability amid substantial shifts in township level occupancy. Owing to difficulties in species detection based upon its behavioral and vocal characteristics, a note of caution should attend the interpretation of regional and statewide Spruce Grouse population flux between MBBA I and MBBA II.

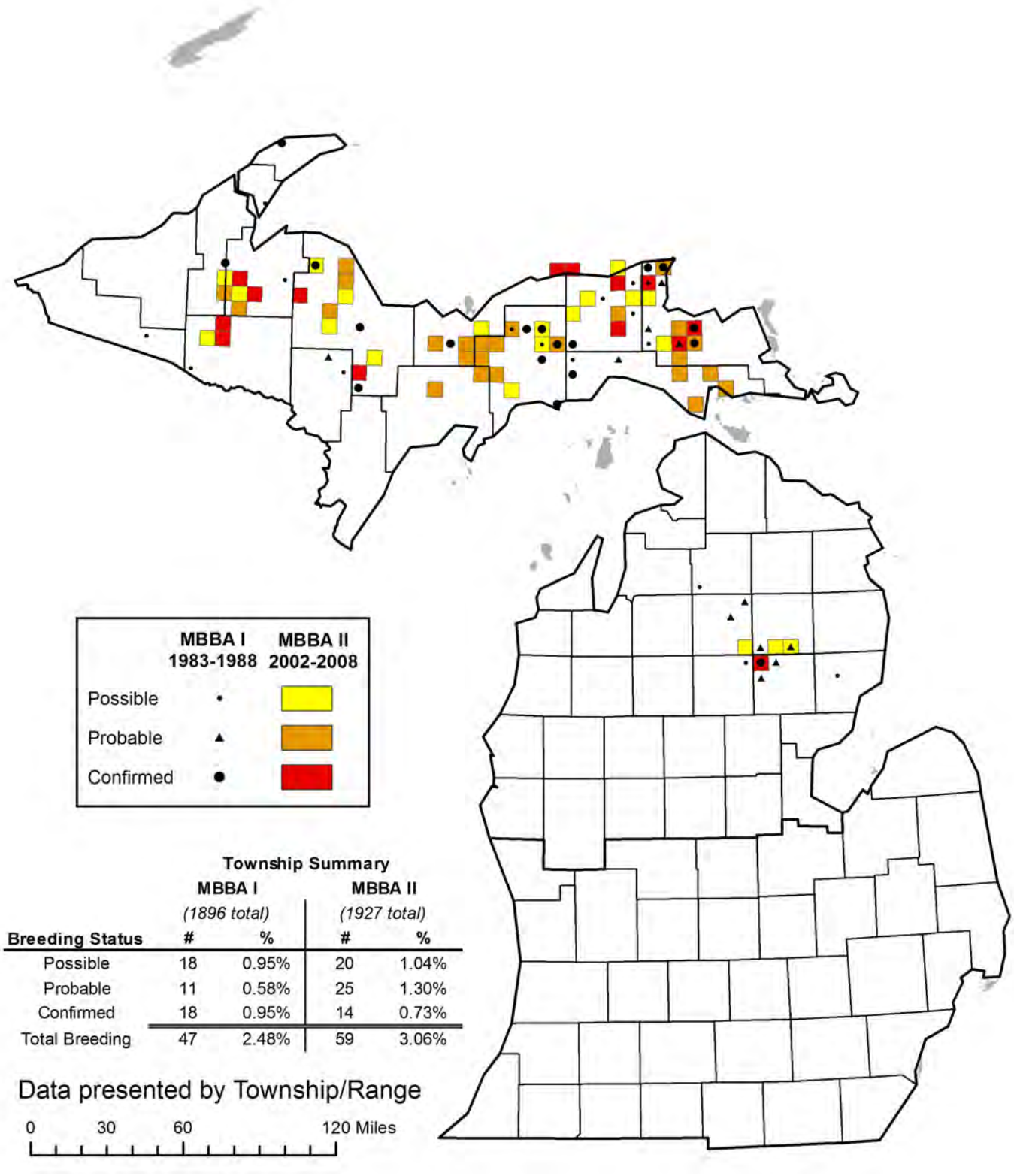
Conservation Needs

The lack of specific or absolute geographic convergence in NLP and UP breeding evidence across Atlases may reflect the dynamic nature of the conifer-dominated habitat of the Spruce Grouse. Historically, these forest ecosystems were maintained by an intricate relationship between forests pests and associated diseases and abiotic disturbances, mainly fire (Frehlich 2002). The frequency and impacts of these events differed, however, over time, space, and forest type. At Seney NWR, for instance, mixed pine dominated habitats utilized by Spruce Grouse were maintained during pre-European times by low severity surface fire events approximately every 50 to 60 years (Drobyshev et al. 2008). In the modern era, fire suppression and the impact of other land uses have altered this regime, and the total area burned by each fire has decreased (Drobyshev et al. 2008). Conversely, areas dominated by spruce or jack pine would historically expect fire frequencies that produced (rather than maintained) habitat within this geographic range, as these fires were more likely stand-replacing canopy events (Frehlich 2002). In recent times, the management of jack pine and other conifer species by even aged silvicultural treatments has become more comprehensively relevant for Spruce Grouse conservation in Michigan. For example, if the maintenance of landscape level heterogeneity among coniferous forest types was more highly prioritized, the intensive, broad scale management of NLP and UP jack pine plantations for Kirtland's Warbler could possibly more benefit Spruce Grouse and many other bird species (Corace et al. 2010). Nonetheless, future conservation efforts on behalf of the Spruce Grouse and its coniferous habitats should not neglect or trivialize the value of natural disturbance forces and events.

Spruce Grouse *(Falcipennis canadensis)*

Status: *Special Concern (MNFI)*

Damon McCormick &
R. Gregory Corace III



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	18	0.95%	20	1.04%
Probable	11	0.58%	25	1.30%
Confirmed	18	0.95%	14	0.73%
Total Breeding	47	2.48%	59	3.06%

Data presented by Township/Range

0 30 60 120 Miles

Sharp-tailed Grouse *(Tympanuchus phasianellus)*

Stephen J. Sjogren

Status: *Special Concern (MNFI)*



John R. Baldwin, USDA ©

Gathering on open-land mating arenas at daybreak, the boisterous spring-time ritual of the Sharp-tailed Grouse consists of foot stomping, tail rattling, spinning with wings out-spread, and intricate vocalizations. Sharp-tailed Grouse (or sharptail), are named for their elongated central tail feathers that give a pointed appearance to the tail. Flocks of this highly social species can be found breeding in early successional grasslands, shrub lands, wetlands and pine-barrens across the eastern Upper Peninsula. Outside of Michigan, several subspecies are found from Wisconsin to Oregon, south to Colorado and as far north as Hudson Bay and Alaska. A game species, their spectacular spring-time courtship ritual is also popular with photographers and bird-watching enthusiasts. Sharp-tailed Grouse habitat is ephemeral and efforts directed at maintaining this conservation-reliant species are focused on managing vegetation succession.

Distribution

Sharp-tailed Grouse are not migratory and Michigan is the eastern limit of the prairie subspecies (Connelly et al. 1998). They currently occupy a range that is considerably smaller and more isolated than during pre-settlement times (Johnsgard 1983).

The first confirmed sharptail in Michigan was the northern subspecies, found breeding on Isle Royale in 1904 (Barrows 1912). There is anecdotal evidence that sharptails occupied habitat in Michigan prior to 1904 (Barrows 1912, Amman 1957, Coues 1874, Monfils 2007). It is possible that sharptails existed in small separated populations, in burned areas, barrens, prairies and wetlands of Michigan prior to settlement (Peterle 1954, Amman 1957, Brewer 1994), and perhaps shifted their distribution and abundance in response to the availability of ephemeral disturbance habitat. For example, in eastern Upper Michigan prior to settlement, burned areas covered approximately 32,375 ha (80,937 ac), and averaged over 1,000 ha (2,500 ac) in size (Comer et al. 1995). A large extent of early successional habitat in the state (Lorimer 2001, Comer 1996, Cleland et al 2004) could have provided sufficient habitat for sharptail. There is little evidence of a significant sharptail population prior to the 1920s when its population expansion was fostered by wildfires and logging. This was followed by several decades of stocking of wild-trapped birds into the Eastern Upper Peninsula and Northern Lower Peninsula (Eagle et. al 2005).

Sharp-tailed Grouse were confirmed in five counties of the eastern UP during MBBA II. They were confirmed breeders in 13 townships, up slightly from 12 townships in MBBA I. In MBBA II, the species was not confirmed in the western UP as in MBBA I. There were no confirmed LP breeding records in MBBA II, compared to one LP record in MBBA I. This range reduction is likely due to habitat loss caused by vegetative succession, fire suppression, new conifer plantations and intensive agriculture (NatureServe 2009).

Individual Sharp-tailed Grouse in Michigan occupy a home range area of approximately 640 ha (1,600 acres), consisting of pine barren openings, large clear-cuts, burned areas, low-intensity agricultural land and non-forested wetlands (Sjogren and Robinson 1997). During the winter, Sharp-tailed Grouse also use jack pine forests and wetlands, although in lowland landscapes such as Seney NWR they are observed in wetlands year-round (Losey et al. 2007).

Breeding Biology

The mating arena, or lek, is typically an elevated area of sparse vegetation (Peterle 1954), although Sharp-tailed Grouse are also found dancing in young stands of jack pine (J. Ries pers. comm.). Leks are usually located in the same place from year to year (Ammann 1957), but when local populations are expanding, new and transient leks are developed (pers. obs.). Sharp-tailed Grouse can be observed displaying from dawn to several hours after sunrise throughout the spring. They lay about 12 eggs per nest with an average Michigan hatching date of 18 June (Ammann 1957). Young are precocious but cannot thermoregulate. They are born with well-developed legs, open eyes, and the ability to forage, while following the adult female (Connelly et al. 1998). Brood break-up usually occurs in September.

Abundance and Population Trends

Sharp-tailed Grouse are monitored each spring by a partnership of agencies and private volunteers (DNR, U.S. Forest Service, Seney National Wildlife Refuge, and Michigan Sharp-tailed Grouse Association). In 2010, surveyors monitored 44 leks and recorded 163 birds (average of 3.4 birds per lek) during the state-wide traditional lek count survey, which was the lowest number of birds counted in eleven years of lek monitoring (Minzey 2008, Maples 2010). Approximately 70% of known historic leks are occupied during any year (Maples 2010). Based on estimated brood and adult survival rates,

Sharp-tailed Grouse *(Tympanuchus phasianellus)*

Stephen J. Sjogren

Status: *Special Concern (MNFI)*

the fall population estimate is about 2.5 times the spring lek count of dancing males (Ammann 1957).

The annual traditional lek survey does not count all the birds at all leks, and represents a minimum population count. There is variation in the number of birds on a lek at any given time based on weather, time of day, season, etc. complicating efforts to document an accurate abundance estimate (Drummer et al. 2011). Beginning in 2009, a new occupancy survey was established within agricultural portions of Chippewa and Mackinaw Counties (Luukkonen et al. 2009). Rather than focus on specific lek locations, one square mile sections were used as sample units. Conducting surveys along perimeter roads of random sections, the survey estimated 93 square miles (55%) of the study area was occupied by sharp-tailed grouse. In 2010, preliminary occupancy data suggests an increase to 149 square miles (89%) of occupied sharp-tailed grouse range within the eastern UP study area (Maples 2010).

Sharp-tailed Grouse populations are not readily monitored during the annual Breeding Bird Survey due to their arena-style early spring mating system, and no range-wide trends were detected. It is apparent that the range occupied by Sharp-tailed Grouse may expand and contract due to population cycling and habitat change (Evrard et al. 2000). While Sharp-tailed Grouse populations are secure at the national level, they have been described as vulnerable in Michigan, due to low populations and decreased habitat (NatureServe 2009). A viable sharptail population for Michigan may require a spring breeding population of 700 males, dispersed over 20,000 ha (50,000 acres) of suitable habitat, as concluded for a similar sharptail metapopulation structure in Wisconsin (Temple 1991).

Conservation Needs

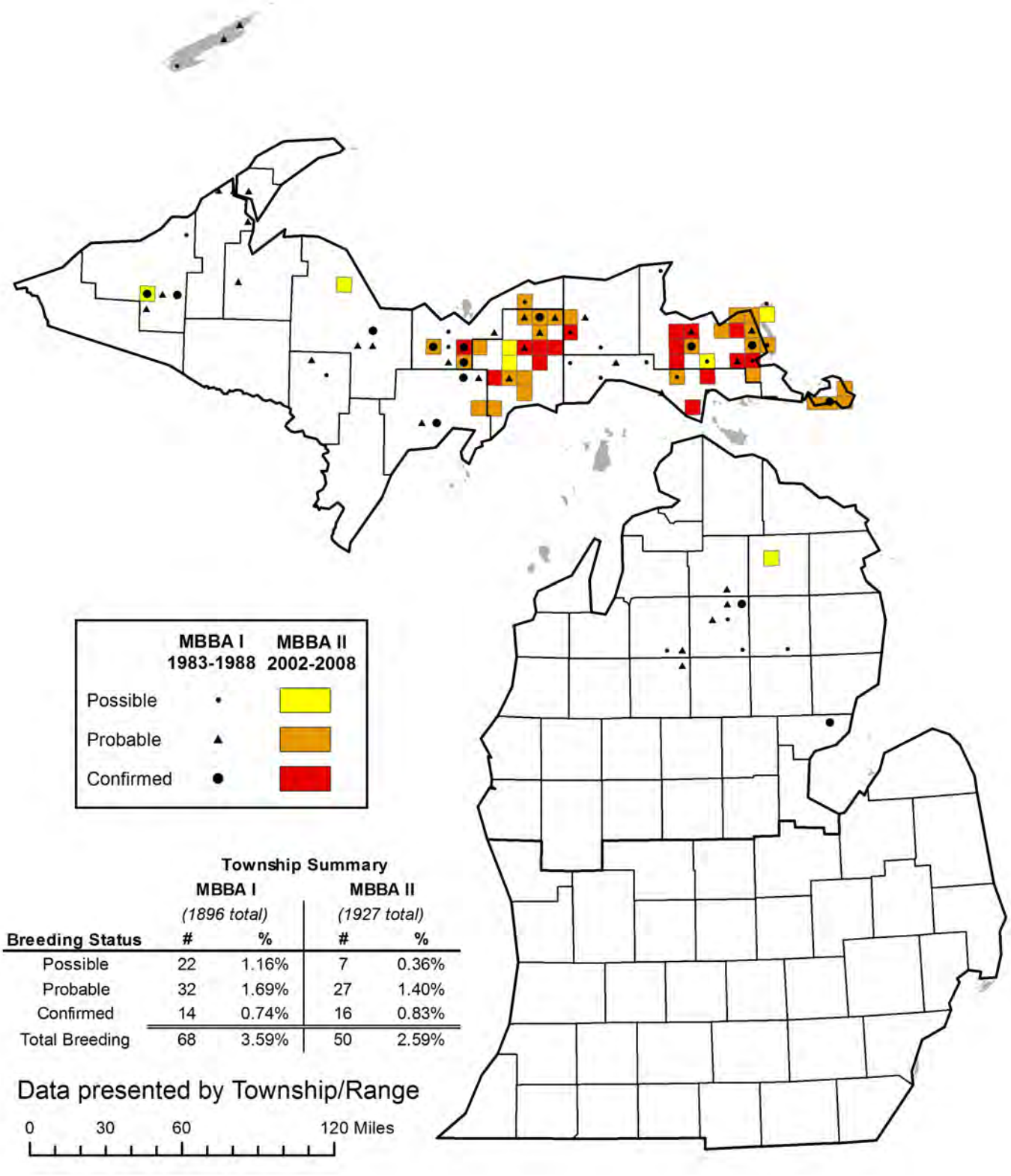
The Sharp-tailed Grouse is designated as a game species by the State of Michigan and a Special Concern species by the Michigan Natural Features Inventory (MNFI 2010). They are listed as a Sensitive Species on the Huron-Manistee and Hiawatha National Forests due to population viability concerns (USFS 2007).

Sharp-tailed Grouse are habitat specialists and respond rapidly to habitat improvements that mimic wildfire, such as large jack pine timber harvest blocks with reforestation and controlled burning (Sjogren and Corace 2006). Their populations will persist if provided the proper balance of disturbance and succession. Aggregated jack pine harvests, even without an increase in harvest levels, create large blocks of suitable habitat for the area-sensitive sharptail (Niemuth and Boyce 2004). Suitable and productive habitat is also established through low-intensity agriculture, maintained with burning, grazing and mowing. Management for Sharp-tailed Grouse can provide multiple benefits including commercial timber production, fuel break maintenance, and habitat restoration for other early successional species such as Kirtland's Warbler, Northern Harrier, and Upland Sandpiper.

The Michigan Sharp-tailed Grouse hunting season was closed from 1997 to 2009. A limited harvest hunting season was opened again in 2010 in the eastern UP. The survey associated with the season will provide a basis for supporting future decisions on hunting regulations in Michigan.

Sharp-tailed Grouse *(Tympanuchus phasianellus)*

Status: *Special Concern (MNFI)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	22	1.16%	7	0.36%
Probable	32	1.69%	27	1.40%
Confirmed	14	0.74%	16	0.83%
Total Breeding	68	3.59%	50	2.59%

Data presented by Township/Range

0 30 60 120 Miles

Wild Turkey *(Meleagris gallopavo)*

Torrey Wenger



Jim Ridley ©

The Wild Turkey has been on a population roller coaster since European settlement. A common forest bird, the turkey was extirpated from Michigan and surrounding states by around 1900 due to forest clearing and unregulated hunting (Peterjohn and Rice 1991, Urbain 1991, Bartelt 2006, Bowman 2007). Reintroduction attempts using game-farm birds typically failed (Eaton 1988). In 1954, the Michigan Department of Conservation released wild birds from Pennsylvania (Urbain 1991). Reintroduction continued through the 1990s. Restoration was considered complete in 2000 (A. Stewart, pers. comm.). Turkeys are now found in nearly all Michigan counties, exceeding its historic range of primarily the SLP (Urbain 1991). The resurgence of the Wild Turkey is a success story of modern wildlife management.

Distribution

In part due to reintroduction efforts, the Wild Turkey has expanded its range since MBBA I. Statewide, the number of townships with turkeys more than doubled. The largest increase was within the ancestral range in the SLP, where the number of townships with documented turkeys rose by 568%; in the NLP and UP, the increases were 22% and 132%, respectively.

The map clearly indicates changes in the reintroduction strategy. Initial releases occurred in the extensive oak forests of the NLP (Urbain 1991), hence the concentration of MBBA I observations. As turkeys proved adaptable to smaller forest parcels, reintroduction efforts shifted to the SLP in the 1980s (Urbain 1991), hence the dramatic increase in that region.

Some recorded individuals may be escaped or released barnyard turkeys. These individuals are not likely to survive (Eaton 1992). Except perhaps at the edge, these birds do not alter the mapped range. Game farms are not a source of escaped birds. While Michigan hunting preserve regulations allow them, no preserves are currently approved (nor are likely to be) for turkeys (MDNR 2007) and the game bird release permit specifically excludes turkeys (MDNR 2005).

Breeding Biology

The winter flocks break up in March or April; males begin displaying while the females form small harems. Once a female has mated, she establishes a solitary nest and lays 10-12 eggs. If the nest is destroyed, the hen will typically attempt a second nest; if the young are predated, she does not (Eaton 1992). Young males remain with the natal flock until fall, young females until the following spring. Turkeys are gregarious at nearly all times of the year with complex social interactions both as individuals and as flocks (Eaton 1992).

Wild Turkeys will occasionally lay eggs in the nests of Ruffed Grouse. They are themselves sometimes parasitized by Ring-necked Pheasant (Eaton 1992).

Abundance and Population Trends

While most turkeys have completed mating behaviors prior to the first BBS routes being run, BBS data do reflect management efforts and the species' response. From 1966 to 2007, turkeys showed a statistically significant annual increase of 12.9% survey-wide; in USFWS Region 3, the annual increase was 15.4%; and Michigan's rate of increase was 14.5% (Sauer et al. 2008).

In Michigan, there are both spring and fall hunting seasons. Each season has a different management goal; the spring season is geared primarily towards the hunting experience while the fall season aims to control the population level (MDNR 2010). The spring harvest has been increasing since 1970 and has totaled approximately 40,000 birds yearly since 2006 (Frawley 2010). The fall harvest has averaged about 5,000 birds annually since 2002; this season has not been offered yearly at all locations open to spring harvest (Frawley 2009).

Conservation Needs

Habitat quality may become an issue. Turkeys rely on hard and soft mast (e.g., acorns, beechnuts, crabapples, hawthorns) during the winter (Sargent and Carter 1999); newly arrived exotic diseases could threaten mast-producing trees, reducing food resources and thereby reducing winter survivorship. For example, beech bark disease was confirmed in Michigan in 2000 and only 1% of trees are resistant (Witter et al. 2005). Oak wilt has been present in Michigan since at least 1992; red oaks are more susceptible than white oaks (Kidd and Mech 1992). Young birds eat primarily insects for the first 4-5 weeks and the invasion of feeding areas by non-native vegetation will reduce the amount of insects available (Tallamy 2004).

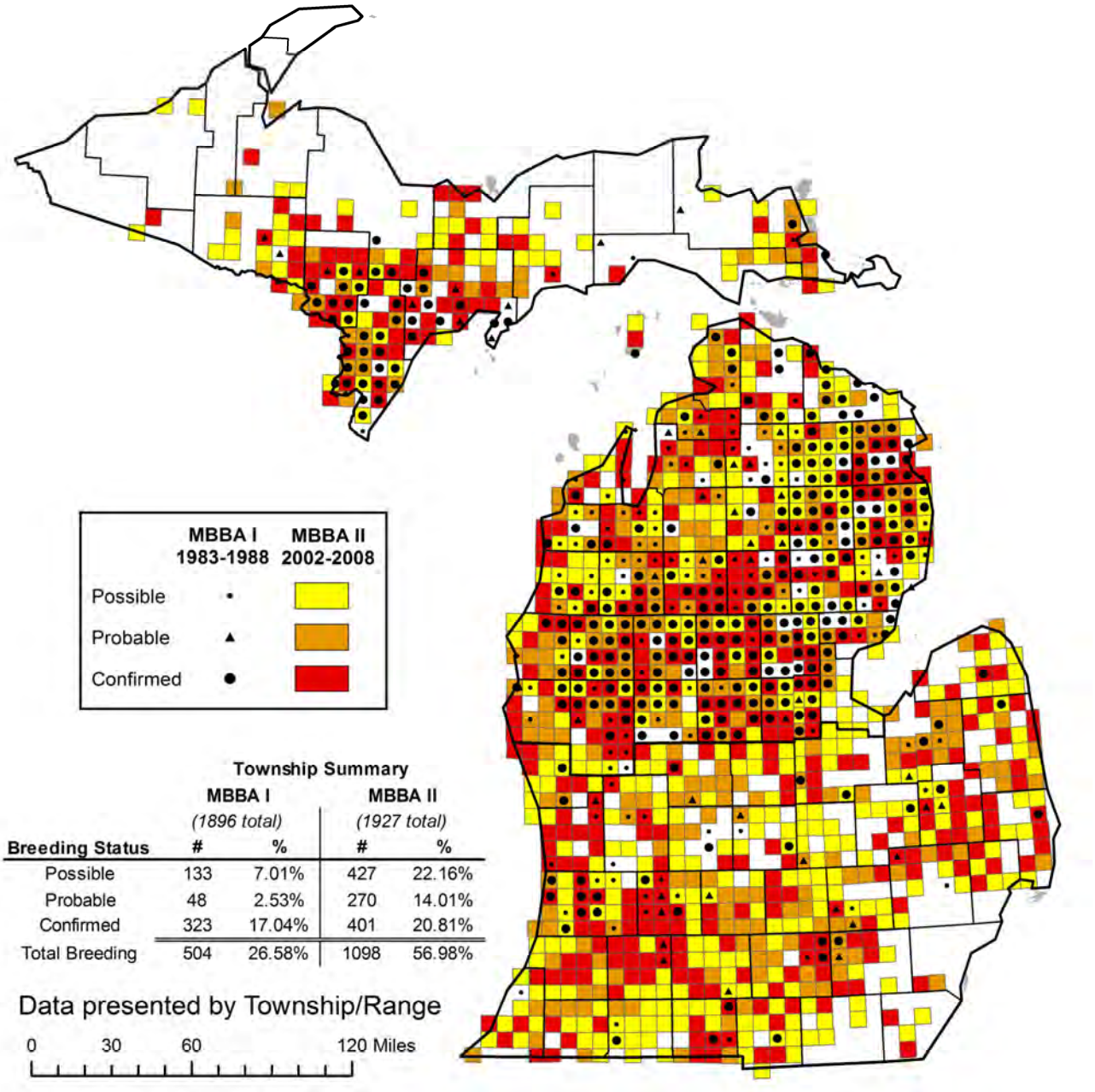
Wild Turkeys are well adapted to Michigan's winters. They can survive two weeks or more without eating during inclement weather (MDNR 2011). People still like to feed

Wild Turkey *(Meleagris gallopavo)*

Torrey Wenger

them, in part to bring them to a viewing station and in part to support the birds. Due to the emergence of chronic wasting disease, it is now illegal to feed free-ranging white-tailed deer and elk in the Lower Peninsula. Thus, all wildlife feeders must be designed to exclude deer and elk (MDNR 2011).

The Wild Turkey is a widespread game species, managed by the DNR and championed by the National Wild Turkey Federation. So long as appropriate habitat is available and hunting pressure is regulated, there should be turkeys present in Michigan.



Northern Bobwhite *(Colinus virginianus)* ***Torrey Wenger***



Steve Maslowski, USFWS ©

The Northern Bobwhite, a bird of early successional habitats, has seen a precipitous population decline since its heyday shortly after European settlement (Duerksen 2006). Bobwhite, also known as quail, typically remain within 1 km (0.62 mi) of their natal area and so require patches of appropriate wintering, nesting, and brood-rearing habitat to occur close together (Brennan 1999). In the human landscape, this habitat mosaic was provided by small general farms; since WWII, farming has become industrialized with large monocultures replacing small diversified fields and hedgerows (Lobao and Meyer 2001, Robinson and Sutherland 2002). This engaging game bird's whistled "*bob white*?" is becoming scarcer in Michigan, the northern edge of its range.

Distribution

Historically, this species occurred within the SLP. A non-migratory ground-dwelling bird, the bobwhite is limited by severe winters and heavy snows. The SLP remains a stronghold, although the number of townships with reported bobwhites decreased by half since the first Atlas, decreasing from 61% of townships to 29%. The NLP and UP also saw decreases.

However, this map needs to be interpreted with caution, especially the isolated northern records. Bobwhites are legal to raise and release on hunting preserves and are used to train hunting dogs to point (MDNR 2005, 2007a, 2007b). It is impossible for most observers to differentiate between released or escaped individuals and those belonging to the wild population. Released birds typically survive less than two months (Perez at al. 2002) but atlas protocol cannot determine if a population is ephemeral. While bobwhites were found where the map indicates, they may not be established in all of these areas. Surveys to document successful reproduction and winter survival are needed for confirmation in questionable locales.

Breeding Biology

As the coveys break up during March, males will give their characteristic whistle throughout the day to attract a female (Brennan 1999). The pair builds a well-concealed nest together and both parents may incubate the eggs, which hatch in about three weeks. The female will sometimes begin a second nest with a second male, leaving the first male to incubate the clutch and raise the 12-14 young alone; male-incubated clutches can be an important source of young birds (Brennan 1999). Hatchlings are primarily insectivorous until about two months of age, when they switch to the seed-heavy adult diet. The young stay with their parents until the fall coveys form, at which point they may stay with their natal group or join a different group. Ring-necked Pheasants occasionally lay eggs in bobwhite nests (Brennan 1999).

Abundance and Population Trends

Northern Bobwhites have been decreasing through the Great Lakes region since at least the 1970s (Duerksen 2006, Kleen et al. 2004, Risley 2007). BBS data (1966-2007) provides disturbing trends: statistically significant annual decreases of 3.0% survey-wide, 2.6% within Region 3, and 8.8% in Michigan (Sauer et al. 2008). Results of whistling surveys conducted by the DNR since 1958 showed a drastic population decline in the late 1970s, related to severe winter weather; the population has recovered but not to earlier levels (Gormley and Luukkonen 1998, Tuovila et al. 2003). While bobwhite populations fluctuate in response to winter severity, long-term declines are related to habitat loss (Duerksen 2006).

The hunting season and bag limits are determined yearly according to population density. A short season is typically offered in the southeastern LP.

Conservation Needs

Management of the Northern Bobwhite lies with state natural resource agencies. Two private organizations, Quail Forever and Quail Unlimited, supports management efforts nationwide; neither has a Michigan chapter. While the bobwhite is not managed at the federal level, programs from which it benefits do exist. The USDA Natural Resources Conservation Service (NRCS) operates the Conservation Reserve Program (CRP), which encourages farmers to set aside lands with wildlife habitat as just one of the program goals. The Landowner Incentive Program (LIP) of the U.S. Fish and Wildlife Service is geared primarily towards wildlife restoration.

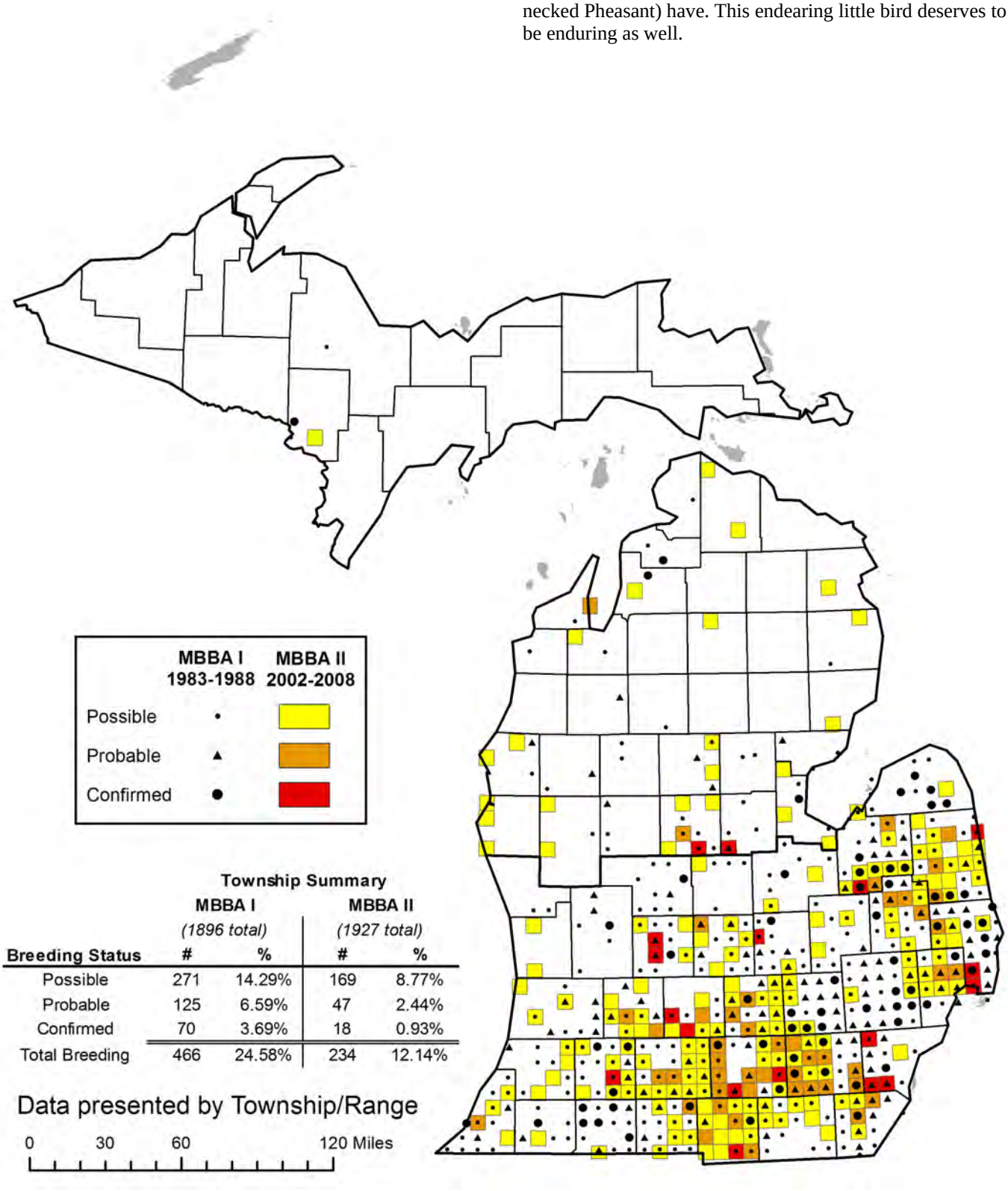
The fate of the Northern Bobwhite is closely tied to the amount of early successional habitat. Maintaining habitat is expensive but effective (Brennan 1999). The Northern Bobwhite Conservation Initiative (NBCI) is a habitat-based recovery plan focusing on nesting and brood-rearing cover; while the northern portion of the range (including Michigan) was not specifically included, general recommendations including "replace non-native cool season grasses with native warm season grasses" are applicable anywhere (Dimmick et al. 2002). NBCI estimates that more than 75% of its population goals will be achieved using farmland, including CRP lands (Dimmick et al. 2002). The rise of

Northern Bobwhite *(Colinus virginianus)*

Torrey Wenger

organic and small-scale community supported farms could potentially create habitat for bobwhite as well as other species (Freemark and Kirk 2001). Conservation will require cooperation between wildlife, agricultural, and land managers, in addition to land use planners.

In Michigan, 97% of the Northern Bobwhite's range is held by private landowners (Tuovila et al. 2003). Any successful management plan must be a cooperative effort between game managers and private landowners. The Northern Bobwhite has not received the same management attention in Michigan that larger game birds (e.g., Wild Turkey, Ring-necked Pheasant) have. This endearing little bird deserves to be enduring as well.



Common Loon *(Gavia immer)*

Joseph D. Kaplan, Damon L. McCormick, & Keren B. Tischler

Status: *State Threatened*



John Van Orman ©
Species sponsored by:
Petoskey Regional Audubon Society.

The retreat of winter ice coincides with the migratory return of breeding Common Loons to Michigan's lakes and reservoirs. It is a journey that many individual loons have undertaken dozens of times, and once paired to old or new partners they are tasked with hatching and fledging one or two offspring over the course of the summer months. The pairs populating the UP and NLP represent the southern breeding periphery of a species whose range stretches across most of boreal Canada to Alaska and northern Europe. Although the loon's arresting plumage, plangent vocalizations, and august demeanor inspire admiration among naturalists and artists alike, within Michigan a degree of incongruity exists between its prominent role as an icon of wilderness and its actual status as a relatively uncommon inhabitant of the state's abundant inland water bodies.

Distribution

Although early naturalists such as Cook (1893) and Hubel (1903) documented the ubiquity of the loon in Michigan, by 1912 Barrows noted that "of late years it is much less common in summer in the more thickly settled parts of the state." Sporadic anecdotal accounts of this nature continued until the 1980s, when formal surveying catalogued the near absence of breeding Common Loons in the SLP (Robinson et al. 1988, Robinson 1991). Today, the species remains distributed across the northern two-thirds of Michigan, with comparatively dense concentrations on Isle Royale National Park and in the western and eastern-central portions of the UP. While a small disjunct SLP population in Barry Co. and Allegan Co. has contracted in size since MBBA I, survey data suggest that nesting occupancy along the contiguous southern periphery of NLP counties has slightly increased over the past two decades.

Breeding Biology

Common Loon pairs establish rigorously defended territories on a wide variety of lakes and reservoirs at least four ha in size (McIntyre 1994). Obligate piscivores, loons often expand their foraging to nearby water bodies if fish abundance on a breeding territory proves insufficient. Nests are constructed on islands, hummocks, or bog shoreline to minimize risk from mainland predators. Incubation lasts nearly one month and is undertaken by both male and female; pairs will often renest if a first attempt ends in failure (Evers 1994). Hatched downy chicks are semi-precocial and develop rapidly over the ensuing nine weeks. Fully-feathered juveniles resemble adults in drab winter plumage and generally fledge from their natal lake after the migratory departure of both parents. These immature birds will spend at least two years on oceanic waters off the southern United States before returning north as potential breeders (McIntyre and Barr 1997).

Although loons are serially monogamous, recurrent challenges from intruders can dissolve partnerships; yearly turnover is roughly 10% and is often precipitated by young adults in search of their first territory and mate (Piper et al. 1997, Evers et al. 2000, Common Coast Research & Conservation unpub. data). Because estimated annual survivorship of color-marked adults in Michigan is over 95%, projections concerning Common Loon longevity currently exceed 35 years (Vucetich et al. 2004).

Abundance and Population Trends

Surveys in the early 1980s that first estimated the Michigan breeding loon population at less than 220 pairs resulted in the formal designation of the species as Threatened within the state. Subsequent surveying in the latter part of the decade moderately elevated this figure to 300 pairs (Michigan Loon Recovery Committee 1992). More recently, an atlas project on Isle Royale increased the number of documented territorial pairs on the island from 40 to over 100. However, the authors concluded that this rise was largely reflective of improved survey techniques rather than an actual upsurge in occupancy (Gostomski 1997, Kaplan et al. 2002). Similarly, a note of caution should attend direct comparisons between MBBA I and MBBA II data: by one metric of likely nesting, confirmed and probable blocks, pair occupancy rose by 18% since MBBA I; 86% of this increase, however, occurred in the UP, where atlasing efforts comparable to Isle Royale's have been undertaken across large stretches of the peninsula over the past decade. While a contemporary estimate of Michigan's breeding population (500-775 pairs) boosts the loon's abundance relative to prior assessments, the present numbers should be weighed in the context of Michigan's bounty of fresh water: there are many thousands of suitable inland lakes across the state that remain uninhabited by breeding loons (Evers 2004, Common Coast Research & Conservation unpub. data).

Conservation Needs

The loss of nesting habitat through shoreline development and modification was undoubtedly the primary cause of the Common Loon's functional extirpation from the SLP. On lakes where suitable nesting sites no longer exist, an artificial nesting platform can function as a viable, if imperfect, surrogate (Piper et al. 2002, Mager et al. 2008); on lakes with extant habitat held in private ownership,

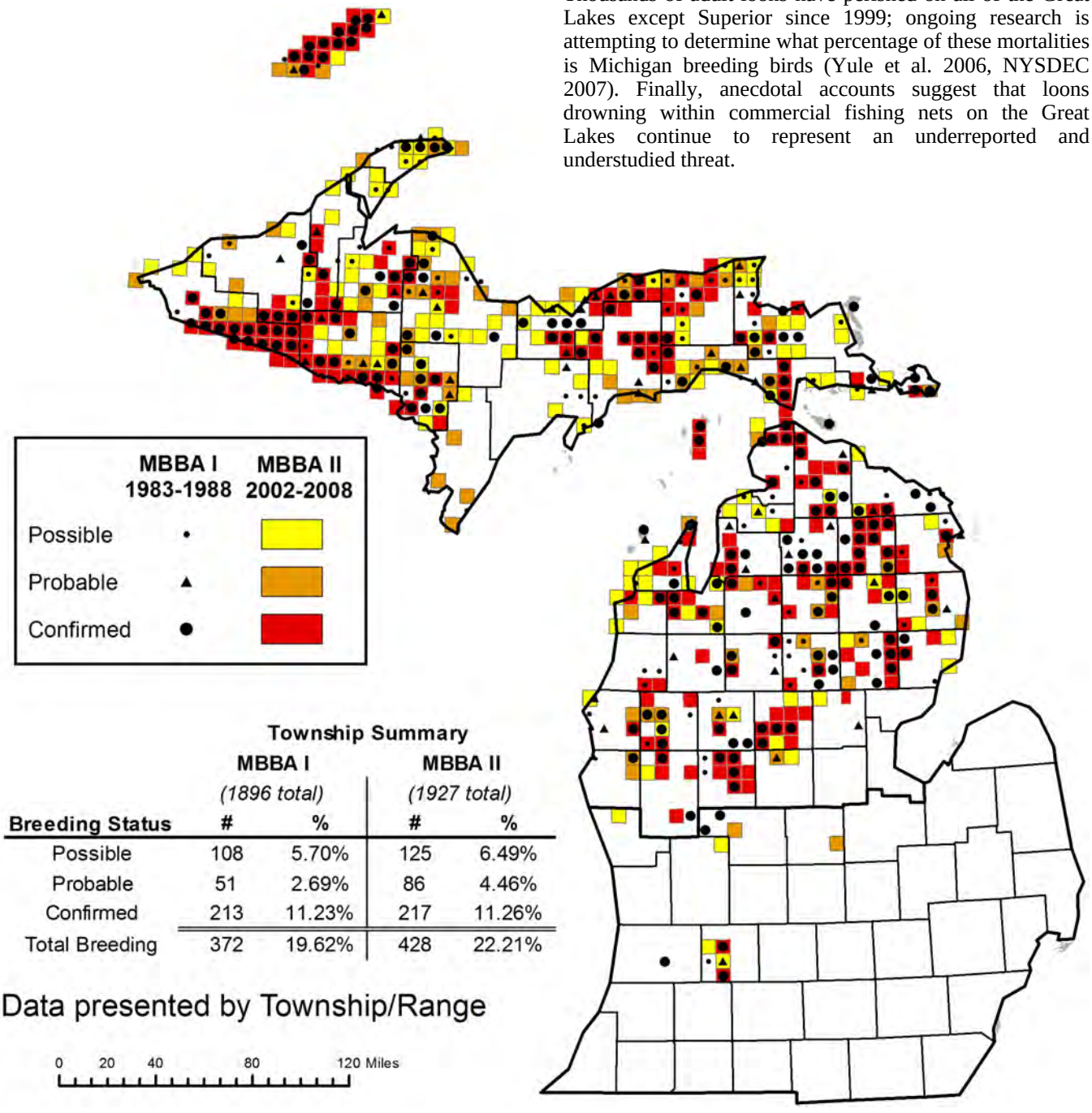
Common Loon *(Gavia immer)*

Joseph D. Kaplan, Damon L. McCormick, & Keren B. Tischler

Status: *State Threatened*

conservation easements can serve to safeguard vulnerable shoreline areas in perpetuity. Because loons are skittish during incubation, preservation of the habitat must function in concert with the absence of human disturbance in its vicinity. It is no coincidence that the state's highest long-term productivity occurs at Seney National Wildlife Refuge where water recreation by visitors is prohibited (Titus and VanDruff 1981, Kaplan 2003). On lakes where loons and people must coexist more closely, lake associations and public agencies can post educational materials at access sites and deploy warning buoys around nesting areas.

Common Loons face a host of potential complications related to their fish-based diet. The accumulation of highly toxic mercury can create physiologic impairments that impede successful reproduction; elevated mercury in fish is closely associated with acidic, low-pH water bodies, which occur throughout much of the UP (Linthurst et al. 1986, McCormick et al. 2006, Burgess and Meyer 2008). The ingestion of lead jigs and sinkers poses a more directly lethal problem, although one that can be remedied through the use of non-toxic alternatives (Franson et al. 2003). On the Great Lakes, the reemergence of type E Botulism outbreaks presents a peril of potentially devastating scope. Thousands of adult loons have perished on all of the Great Lakes except Superior since 1999; ongoing research is attempting to determine what percentage of these mortalities is Michigan breeding birds (Yule et al. 2006, NYSDEC 2007). Finally, anecdotal accounts suggest that loons drowning within commercial fishing nets on the Great Lakes continue to represent an underreported and understudied threat.



Pied-billed Grebe *(Podilymbus podiceps)* ***Damon McCormick***



Jerry Jourdan ©

To early naturalists it was the "hell-diver" or "water-witch", and its idiosyncrasies tended to inspire hyperbole: "These peculiar little spirits of the water present a very radical departure from what the word 'bird' usually brings to mind" (Rockwell 1910). Occupying its own genus within the seven-member North American *Podicipedidae* family, the Pied-billed Grebe, while by no means singularly non-avian, was not mischaracterized by its antiquated appellations. With a pattern of nocturnal migration and a propensity to dive rather than fly in response to threats, the species is almost exclusively encountered upon the marshes and ponds that constitute its summer home (Wetmore 1924, Muller and Storer 1999). A breeding adult, diminutive and drably adorned in brown and gray, nonetheless demonstrates a strident territoriality within its wetland turf, responding aggressively to both intra- and inter-specific interlopers (Glover 1953, McAllister and Storer 1963).

Distribution

The Pied-billed Grebe breeds across the contiguous United States and south-central Canada, and is the most widely distributed *Podicipedidae* in North America (Muller and Storer 1999). Barrows (1912) asserted that within Michigan, which approaches the northern limit of the species' range, "it nests abundantly in every suitable place in the state, from the Ohio-Indiana line to Lake Superior." Subsequent surveys in the 20th Century however, recorded decidedly less than abundant densities in the NLP and UP, and MBBA I documented a significantly higher percentage of breeding Pied-billed Grebes in the SLP, particularly in southwestern counties (Storer 1991).

Breeding Biology

Pied-billed Grebes tend to occupy fresh to moderately brackish waterbodies greater than 0.2 ha, marked by dense stands of emergent vegetation and ample stretches of open water (Muller and Storer 1999). Their cuckoo-like song – "far-carrying, vibrant, throaty barks" – can be vocalized by both sexes, and is associated with courtship and territorial delineation (Deusing 1939, Muller and Storer 1999, Sibley 2000). Once a territory is established, a breeding pair jointly constructs a small floating platform of aquatic vegetation, typically anchored to a stand of dense emergents such as cattails or bulrushes, and within 50 feet of open water (Glover 1953, Otto 1983, Sandilands 2007). Incubation of five to seven bluish- to greenish-white eggs, undertaken by both adults, lasts an average of 23 days (Deusing 1939, Glover 1953, Otto 1983, Muller and Storer 1999). Hatched chicks are semiprecocial, with showy vertical stripes along their neck that echo the pied coloration of their parents' bills (Muller and Storer 1999). Fed on a varied diet of crayfish, aquatic insects, dragonfly nymphs and small fishes, young spend most of their first three weeks near the nest platform; by five to six weeks they are typically capable of self-sufficiency and flight (Wetmore 1924, Deusing 1939, Muller and Storer 1999).

Abundance and Population Trends

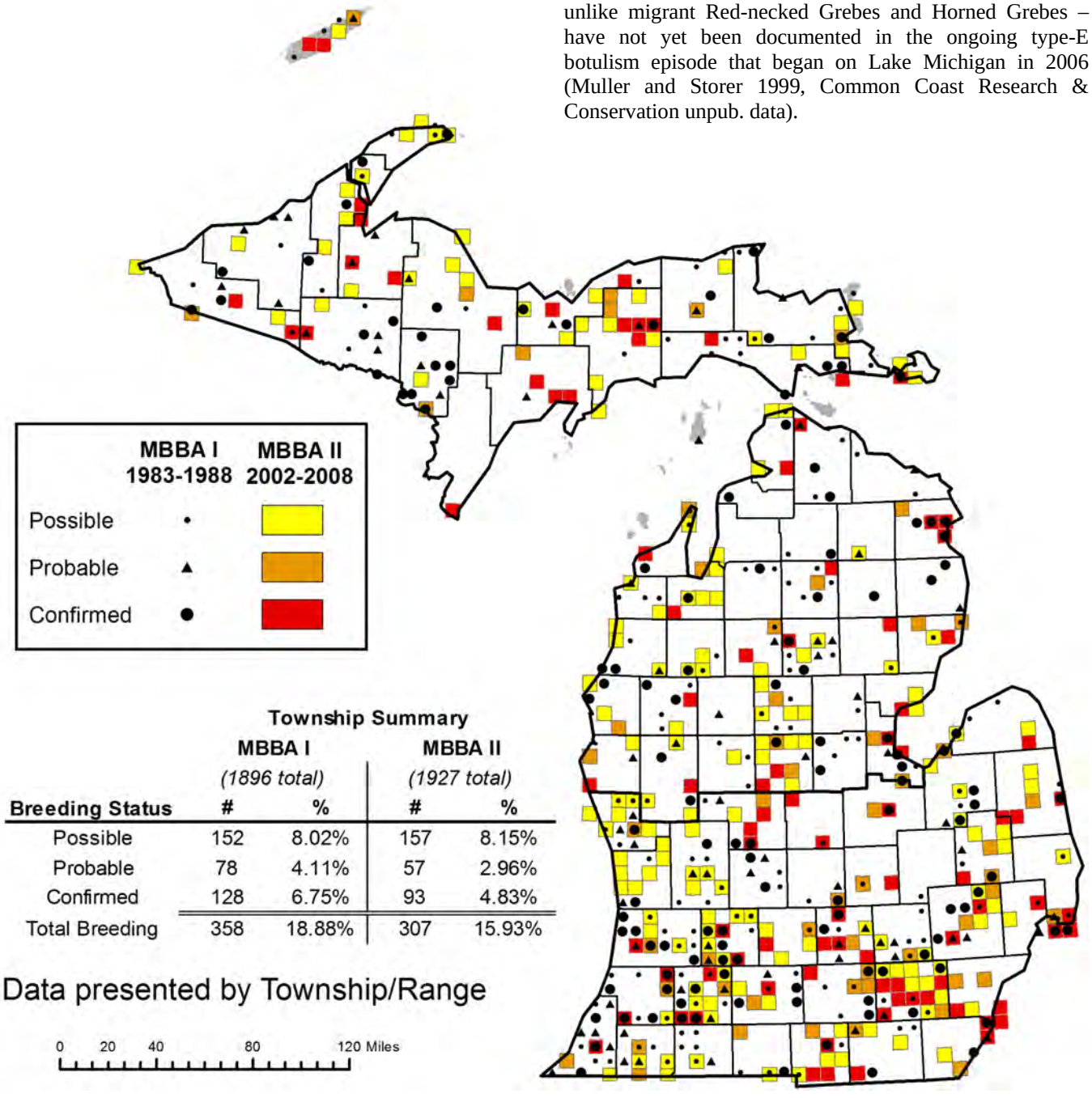
As during MBBA I, the majority of MBBA II block-level records for Pied-billed Grebes occurred in the SLP (56% in MBBA I; 57% in MBBA II). Township-level breeding continuity between Atlases was low, particularly for Confirmed observations: Among 29 and 22 Confirmed UP townships in MBBA I and MBBA II, respectively, only one location – within Seney National Wildlife Refuge – was recorded during both efforts. In the SLP, gains occurred in some southeastern counties, particularly Washtenaw, while many southwestern counties indicated declines, especially within townships bordering Lake Michigan. More broadly, all measures of statewide breeding occupancy declined markedly between Atlases: confirmed block observations (-26%), confirmed township observations (-27%), total block observations (-15%), and total township observations (-14%). These findings are buttressed by a 14% annual decline (1983-2007) in Pied-billed Grebes recorded on BBS routes throughout USFWS Region 3 (Sauer et al. 2008), and by a 6% annual decline (1995-2006) documented across the Great Lakes Basin by the Marsh Monitoring Program; importantly, the latter project utilized broadcast tapes for surveying, a method shown to improve grebe detection by 121% over passive observation (Gibbs and Melvin 1993, Harrison et al. 2008). Owing to the lack of playback in Michigan Atlas efforts, and to the clandestine nature of pied-billed nest sites (in Wisconsin, 74% of Confirmed BBA records involved observations of fledged young), it is probable that the species' breeding activities were undercounted during both MBBA I and II; this likelihood, however, does not alter the significance of the substantial drop in observations between efforts (Brooks 2006). In response to the downtrend in Michigan and across the broader Great Lakes region, the Pied-billed Grebe has been listed as a USFWS Bird of Conservation Concern in both the U.S. portion of the Boreal Hardwood Transition zone, which includes the UP and NLP, and the Prairie Hardwood Transition zone, which includes the SLP (U.S. Fish & Wildlife Service 2008).

Pied-billed Grebe *(Podilymbus podiceps)*

Damon McCormick

Conservation Needs

The agricultural drainage and commercial development of state marshes, swamps and bogs – which eliminated an estimated 11 million wetland acres during the 19th and 20th centuries – certainly ferried the deterioration of Pied-billed Grebe densities reported by Barrows (1912) and other early ornithologists (MDNR 2007). The declines experienced by the species over the past 20 years have likely been negatively influenced by the actual management, or lack thereof, of remaining wetland habitat. Specifically, research evidence suggests that breeding Pied-billed Grebes benefit from comparatively larger and deeper marshes marked by areas of plentiful open water – characteristics achieved by actively reversing excessive vegetative succession and where possible, maintaining stable water levels throughout the nesting season (Glover 1953, Osnas 2003, Harrison et al. 2008). Such hydrologic control is, of course, not feasible on the Great Lakes, where a significant positive correlation has been demonstrated between breeding Pied-billed Grebe observations at survey points along Lakes Erie, Huron and Michigan and the water levels of those lakes, which dropped considerably during the monitoring period of 1997-2002; a small note of optimism for the species' statewide future involves the supposition that a rise in these Great Lakes levels will lead to the recolonization of many refreshed lacustrine marshes (Timmermans et al. 2008). Similarly, although Pied-billed Grebes were reported as casualties in the Lake Michigan botulism outbreak of 1963-1964, they – unlike migrant Red-necked Grebes and Horned Grebes – have not yet been documented in the ongoing type-E botulism episode that began on Lake Michigan in 2006 (Muller and Storer 1999, Common Coast Research & Conservation unpub. data).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	152	8.02%	157	8.15%
Probable	78	4.11%	57	2.96%
Confirmed	128	6.75%	93	4.83%
Total Breeding	358	18.88%	307	15.93%

Data presented by Township/Range

Red-necked Grebe *(Podiceps grisegena)*

Skye Christopher G. Haas



Al Menk ©

Perhaps the most restricted-range breeding bird in Michigan, the Red-necked Grebe was confirmed nesting in only one location in the state during this atlas period. Better known as a fall transient, Red-necked Grebe migration can sometimes be remarkable in late August and early September, when tens of thousands migrate over Lake Superior. However, it is only in a sheltered bay on northern Lake Michigan that the state's birders can get a glimpse of a different side of Red-necked Grebe biology. On the upper reaches of Little Bay de Noc, off-shore reed beds provide a safe haven for this attractive diving bird. Far more common on the prairie provinces of Canada, and ranging up into Alaska, the Red-necked Grebe is near the eastern limits of its North American breeding range in Michigan. The only locations east of Michigan where this species nests are on Manitoulin Island, Georgian Bay, northern Lake Huron, and on the western shores of Lake Ontario near Toronto. The vast majority of Red-necked Grebes winter along the Atlantic and Pacific coast (Stout and Nuechterlein 1999, Hai 2007).

Distribution

Currently found only in Delta County in the Upper Peninsula, this species barely claims a place among the breeding avifauna of the state. Historical records indicate that the species has always been rare throughout Michigan. For example, Barrows (1912) estimated fewer than a dozen records for the state, mostly scattered single birds. It was not until the establishment of lake watches at Whitefish Point and along the north shore of Keweenaw County that Red-necked Grebes were documented as a regular migrant on Lake Superior (Granlund 1994). The majority of spring migrants in the Keweenaw Peninsula move through in a 17 day period with a peak in the last week of April (Binford 2006). Known as a regular spring migrant in modest numbers, counters at Whitefish Point were amazed to observe thousands of birds during the fall when a waterbird count was initiated in 1989 (Dombroski and Leukering 1990, Stout 1991). From 1989-2003, this site averaged an impressive 12,019 individuals in the fall (Bardon 2004). Migration begins in late July with birds moving through into November. Peak flights occur in late August or early September, with high daily counts of thousands of birds (Chartier and Ziarno 2004). By late November and December, Red-necked Grebes are essentially gone from the state, but small numbers can be found in bays and harbors on the northern Great Lakes; some may even attempt to overwinter.

Prior to MBBA I, there was only one confirmed nesting in Michigan. A nest with seven eggs was found on 16 June 1975 at Cedarville Bay, Mackinac County. Though subsequently abandoned, the pair re-nested later that summer and fledged three young (Chamberland 1977). They were not observed at this location in following years. During MBBA I, a pair with young was reported, but unconfirmed, from Bois Blanc Island, Mackinac County (Adams et. al. 1991). Additionally, there were unconfirmed reports from Little Bay De Noc in the 1990s at the site where breeding was confirmed in MBBA II (Adams 1991).

In late May of 2005, a pair of Red-necked Grebes was discovered in a copulatory/post copulatory display (Stout and Nuechterlein 1999) in Delta County (pers. obs.; Byrne 2006). In June, two pairs were present and seemed to be territorial. Breeding was finally confirmed on 28 July: one adult was observed with a chick on its back, while both members of the other pair were seen carrying small fish into a dense reed bed where a nest was presumed to be located. The following year, three pairs were observed at this location, but only one successfully raised chicks (pers. obs., Dombroski 2007). Breeding was noted at this location again in 2007 and 2008, with three and four chicks raised by two pairs in both years (pers. obs.; Dombroski 2008, 2009). Although up to four pairs have been observed at this site, a maximum of two pairs in any year have been confirmed as successful breeders (pers. obs.).

Protected bays with reed beds in northern Lakes Michigan and Huron offer the open and shallow habitat needed for growth of emergent vegetation that Red-necked Grebes require for securing their nests (Stout and Nuechterlein 1999). Proximity to human activity appears to be acceptable to the grebes at their Delta County nesting site as a DNR boat launch facility is located near the small colony (pers. obs.). Tolerance of humans has also been observed in Ontario where this species nests in the heavily used Bronte Harbor (Hai 2007).

A rare breeder in adjacent states and eastern Ontario, the population is at the eastern edge of its range in the western Great Lakes (Stout and Nuechterlein 1999). The Wisconsin atlas found an average of 25-30 pairs annually in the state. But unlike Michigan or eastern Ontario, nesting was in more traditional prairie pothole habitats (Brooks 2006). The majority of the Ontario population is found northwest of Lake Superior to the Manitoba border (Hai 2007).

Red-necked Grebe *(Podiceps grisegena)*

Skye Christopher G. Haas

Breeding Biology

Red-necked Grebes begin to return to northern Michigan in late April. Courtship is sometimes observed on Whitefish Bay in late April and early May, even though these birds are obviously migrants (pers. obs.). It is thought that the majority of courtship displays are conducted on the wintering grounds or during migration - only 15% of Red-necked Grebes arrive to a breeding lake not paired with a mate (Stout and Nuechterlein 1999).

Nest building begins almost immediately upon a pair's arrival to the breeding site (Stout and Nuechterlein 1999). However, it may take up to a month or more after the Red-necked Grebes arrive at the Delta County site for the reed beds where their nests are placed to grow in enough to allow for nest building (pers. obs.) Nest building is completed by both adults, and the pair first piles up more buoyant materials on top of both submerged and emergent vegetation. Once a platform is built, sometimes within just a few hours, nesting material is mounded up with a depression in the middle for egg placement. Incubation takes 22-35 days, and the parents care for the young for six to eight weeks. Egg laying may be delayed up to 42 days in response to potential agonistic interactions with other pairs and destruction of nests due to high water (Stout and Nuechterlein 1999). Both factors may have affected breeding at the Delta site, as birds were present from late April or early May every year, but chicks were never seen before mid-July (pers. obs.).

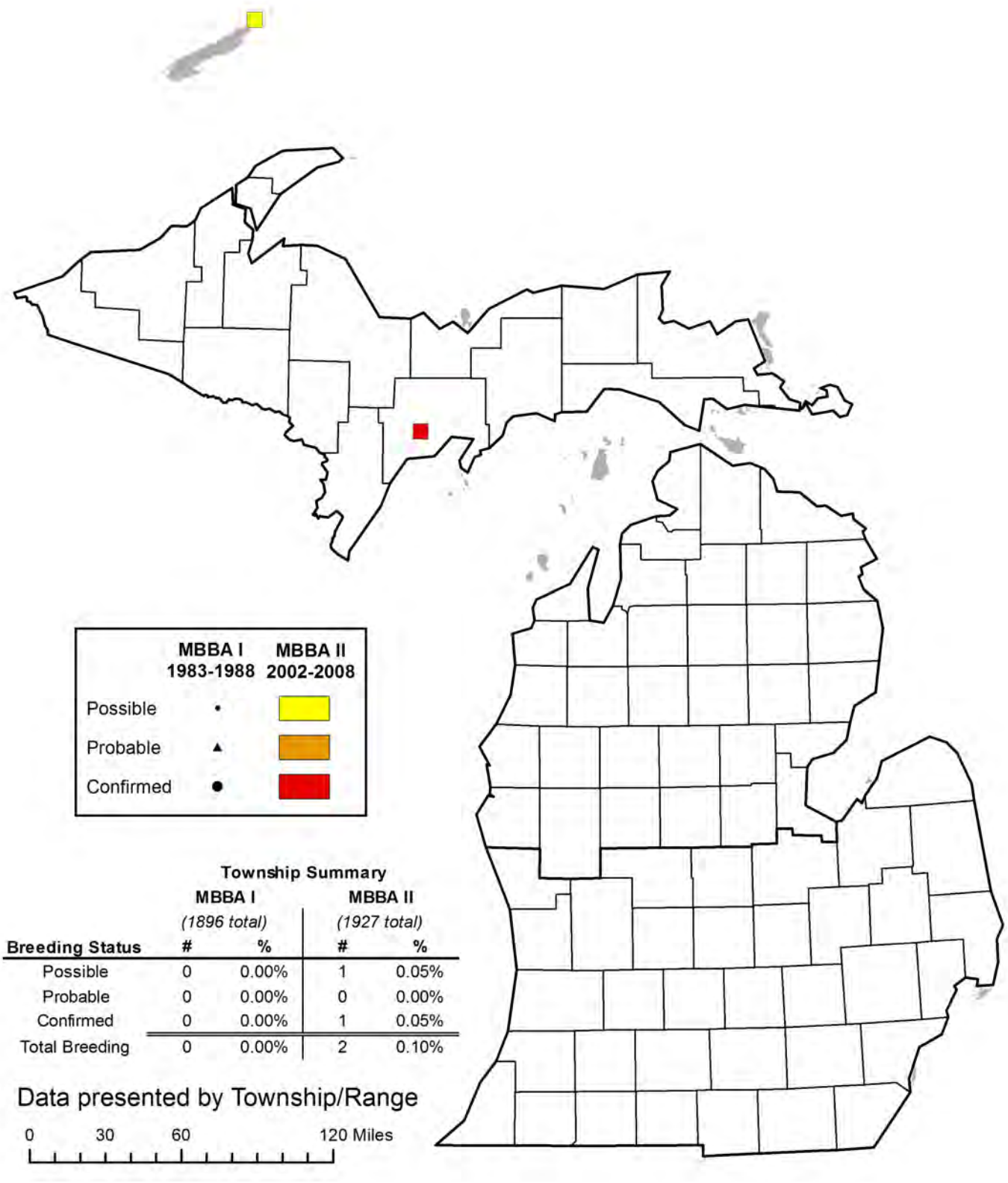
Abundance and Population Trends

As noted, the Red-necked Grebe is one of Michigan's rarest breeding birds, with only two or three pairs present each year since 2005. This is most likely due to a lack of prairie potholes, its preferred habitat for nesting. It is very possible that more nesting pairs occupy the secluded waters of northern Lakes Michigan and Huron. Extensive coastal marshes along the Stonington Peninsula and in the lower St. Marys River waterway could certainly host more pairs, and surveys tailored to specifically look for this species in those locations could yield additional records. The North American population is believed to be stable, although declines have been noted in Alaska and the eastern fringe of the population in Wisconsin and Ontario (Stout and Nuechterlein 1999).

Conservation Needs

The Red-necked Grebe is a rare and tenuous breeder in Michigan. Surveys targeting appropriate habitat are needed to determine if other nesting locations occur in the state. Where appropriate, boat traffic restrictions near nest sites may benefit breeding birds. Additionally, artificial nest platforms are used by this species at the Bronte Harbor colony in Ontario, and these structures may encourage nesting by additional pairs in Michigan. Finally, wetland habitat is required by a number of bird species for nesting and feeding. Wetland loss and degradation is a serious issue in Michigan, as elsewhere, and any efforts to preserve this important habitat will benefit many species and possibly encourage more nesting by Red-necked Grebes in the state.

Red-necked Grebe *(Podiceps grisegena)*



Eared Grebe *(Podiceps nigricollis)*

Allen T. Chartier



Matt Hysell ©

The common name for the Eared Grebe in Europe is Black-necked Grebe. This name points out one significant plumage difference from the similar Horned Grebe, which has a rufous neck. Found as a breeding species across Eurasia, Africa, and North America, the Eared Grebe may be the most numerous member of the family *Podicipedidae* in the world. In North America, it is primarily a western species, occurring from the prairie potholes of western Minnesota to northern Alberta and in the Rocky Mountains and Great Basin south to northern Arizona and California's Central Valley. Eared Grebes winter from the southern edge of the breeding range south through Mexico to northern Central America as far as Honduras (Cullen et al. 1999).

Distribution

Very small numbers summer in Wisconsin, where there is only a single confirmed breeding record (Brooks 2006), and in the Rainy River district of westernmost Ontario, where only a few pairs have bred successfully on occasion (Coady 2007).

In Michigan, birders eagerly seek the Eared Grebe, which is a rare spring and fall migrant and very rare summer resident. Additionally, there are occasional winter records. A well-documented individual at Benton Harbor, Berrien County, on 22 November 1955 was the first sight record in the state (Zimmerman and Van Tyne 1959). The next record, and first state specimen, was a wintering bird that eventually died and was collected from Lapeer County on 20 January 1965 (Payne 1983). From 1981 to present, the Eared Grebe has been reported annually in Michigan; the most reliable site is the Muskegon County Wastewater Management System (Chartier and Ziarno 2004). Winter records have been documented in Michigan but between 1993 and 2008 there was only a single winter report: one on 23 December 2002 at New Buffalo, Berrien County (Murphy 2003).

Successful nesting of the Eared Grebe has not yet been documented in Michigan. During MBBA I, Adams (1991) reported probable breeding at the Muskegon Wastewater Management System ponds, based on observation of apparent territorial behavior. According to the Michigan Bird Survey, single summering birds were present during four of the six years of the MBBA I period (Newaygo County in 1984, Muskegon County in 1985, Muskegon County in 1987, and Midland County in 1988). Just after the first atlas period ended, there was an intriguing report at the Dow Ponds, Midland County, of two birds present into late June 1990, disappearing in July, then reappearing in August with another individual in juvenile or winter plumage (Granlund 1994). Summer individuals were reported from Three Oaks Sewage Ponds, Berrien County, in 1993 (Granlund and Whaley 1994), the Muskegon Wastewater Management System in 1995, 1996, 1998, 1999, and 2000 (Kielb 1996, Kielb 1997, Byrne 1999, Byrne 2000, Byrne 2001), the Calumet Sewage Ponds, Houghton County, and Southfield, Oakland County, in 2000 (Byrne 2001).

During MBBA II, reports came from only three locales. The confirmed breeding record from the Bay County portion of Crow Island SGA consists of a bird building a nest on 21 May 2008; it was subsequently abandoned in early June (M. Willard, pers. comm.; Dombroski 2009). The probable breeding record from Schoolcraft County consists of a bird from the North Indian Lake marshes described as agitated, observed on 30 May, 4 and 14 June 2004 (R. Annelin, pers. comm.). The possible breeding records from the Muskegon Wastewater Management System, Muskegon County, consist of individuals present during summer in 2003 (Byrne 2004), 2004 (Byrne 2005), 2007 (C. Weng, pers. comm.), and 2008 (Dombroski 2009). Because emergent vegetation is scarce at this locale (pers. obs.), it appears very unlikely that Eared Grebes will ever breed there. More likely, this site is used as a staging area during fall migration as the water chemistry more closely resembles that of the saline lakes used for staging in the western U.S. and does not provide typical freshwater breeding habitats this species prefers.

Breeding Biology

In Michigan, Eared Grebes arrive as widespread individuals in spring, generally during April and May; occasional March arrivals have been recorded, with the earliest on 11 March 2006 in Monroe County (Reinoehl 2006).

The Eared Grebe prefers shallow freshwater lakes and ponds with emergent vegetation for breeding but is also known to use sewage lagoons, reservoirs, prairie sloughs, and highly alkaline water, as long as there is an abundance of small invertebrates on which to feed. This species primarily breeds in colonies, sometimes quite large, but occasionally isolated pairs will nest in marginal habitats (Cullen et al. 1999). The latter is the case in Michigan.

Nest building occurs from April to August, with great variation across the North American range. Courtship displays are noisy and conspicuous, which should make confirmation of nesting easy. The nest is a floating platform of vegetation attached to emergent vegetation.

Incubation begins after the first of two to four eggs is laid and the precocial young hatch following 22-23 days of incubation. Chicks are dependent on the parents for food for the first week after hatching and parental care generally ceases after about 20 days (Cullen et al. 1999).

In the main part of its range, the majority of the population departs the breeding grounds immediately after nesting (June and July) to stage in large numbers on a small number of hypersaline lakes, primarily in the Great Basin. Here they undergo a partial molt; this portion of their post-breeding movements is termed a "molt migration," primarily a behavior found in waterfowl and some shorebird species. From these staging areas, Eared Grebes depart for the wintering grounds in December and January (Cullen et al. 1999).

In Michigan, Eared Grebes generally remain into early November, with the latest recorded on 23 November 2001 at the Muskegon Wastewater Management System (Chartier 2002). Numbers are greatest during fall, with a maximum of 13 reported on 8 September 1997 at the Muskegon Wastewater Management System (Chartier 1998).

Abundance and Population Trends

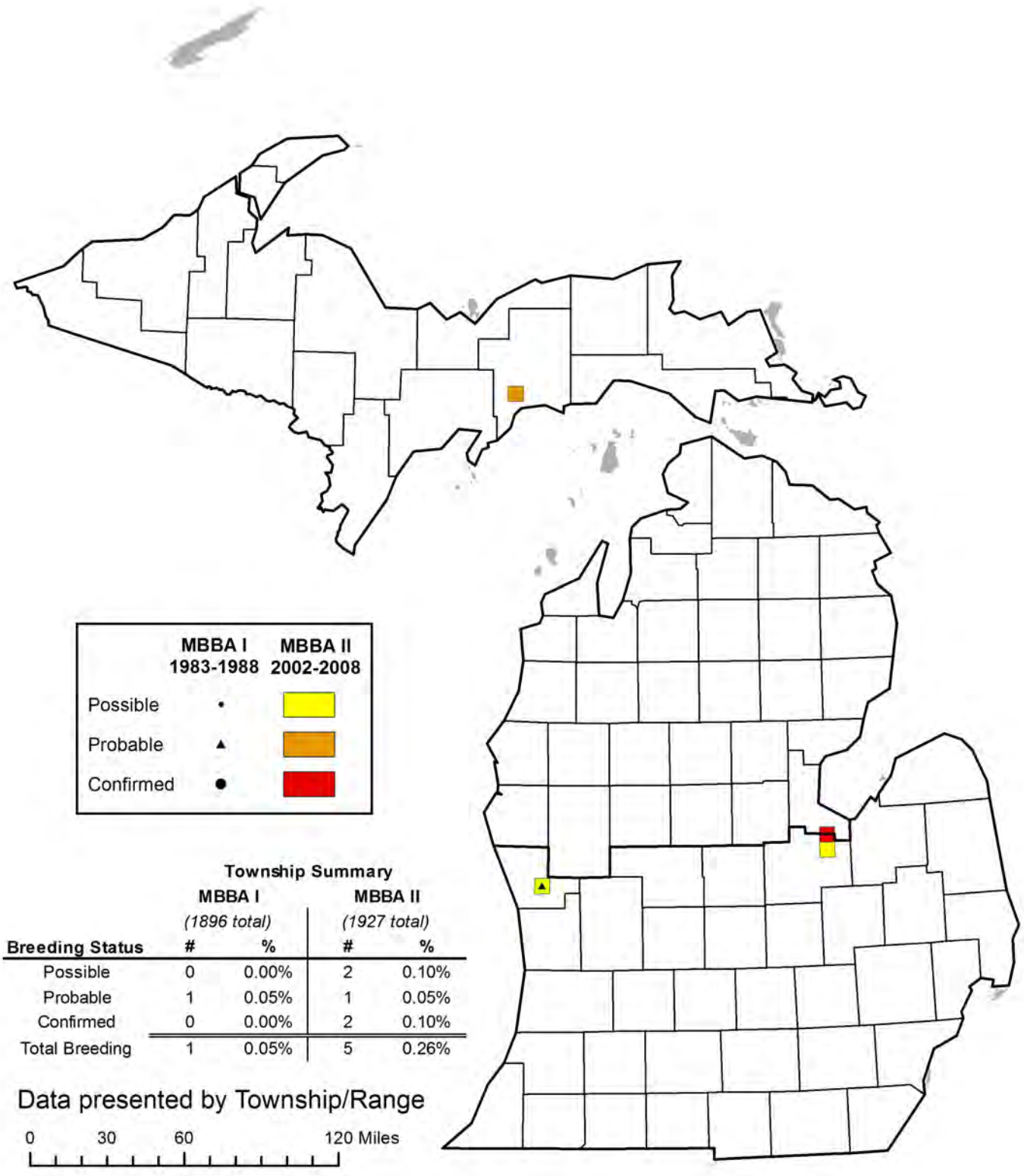
Using recently developed aerial surveys of the main post-breeding staging areas, the North American Eared Grebe population was estimated at 4.1 million in fall 1997 (Cullen et al. 1999). Breeding Bird Surveys do not adequately census this species and therefore do not provide any useful data on population trends. Aerial surveys at staging areas appear to be the best method for detecting trends but none have been detected since these aerial surveys were initiated. In Michigan, breeding is likely sporadic and very rare, probably limited to one or a few pairs statewide in any given year.

Conservation Needs

As a wetland breeding species, the Eared Grebe is vulnerable to habitat loss and pollution. They are most vulnerable on the staging grounds, where the majority of the population is concentrated on a few saline lakes, making them vulnerable to habitat alteration and die-offs due to disease. Where regular breeding occurs, it is important to maintain an abundance of wetlands with emergent vegetation because colony locations change frequently (Cullen et al. 1999).

Eared Grebe *(Podiceps nigricollis)*

Allen T. Chartier



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	0	0.00%	2	0.10%
Probable	1	0.05%	1	0.05%
Confirmed	0	0.00%	2	0.10%
Total Breeding	1	0.05%	5	0.26%

Data presented by Township/Range

0 30 60 120 Miles

American White Pelican *(Pelecanus erythrorhynchos)* ***Francesca J. Cuthbert***



Jerry Jourdan ©

Weighing up to 15 pounds (6.8 kg) and with a wingspan of nine feet (2.7 m), the American White Pelican is among the largest birds in the world. In the U.S., this species is found primarily in the western and southern regions of the country, but its range is slowly moving eastward into the Great Lakes. The first confirmed breeding in Michigan was in 1999 during the third Great Lakes Colonial Waterbird Census when a research team (Cuthbert et al. 2003) found nests with eggs and young on an island in Delta County.

Distribution

A major region of the breeding range of the American White Pelican in North America is the northern Great Plains. Although significant breeding extends into Minnesota (Wires et al. 2006), the first nesting in the Great Lakes was not confirmed until 1994 in Green Bay, Wisconsin (Cutright et al. 2006). This population grew to more than 800 pairs by 2007 (Cuthbert unpub. data) and birds produced in Wisconsin are likely the source of Michigan's breeding pelicans as well as the origin of Michigan summer non-breeding records. Wood (1951) identified at least 14 definite records of this species in Michigan prior to 1950 but all were described as transients. These observations were scattered throughout the state but most were in the LP and were associated with the Great Lakes as well as several inland sites (e.g. Houghton Lake). During MBBA I, the only observations for this species were from Manistee and Monroe counties, and Isle Royale National Park. At this time, the species was still a non-breeder. By the time of the current MBBA II survey, pelicans were nesting irregularly and in small numbers on one island in Michigan. Sightings, however, were reported from nine counties inland in the SLP and at coastal sites in lakes Michigan and Huron in both the NLP and UP. Recent observations by F. Cuthbert and N. Seefelt indicate there is potential for pelicans to nest at other locations in the state. For example, since 2005, groups of 6-20 pelicans have been recorded on three islands in the Beaver Island Archipelago and flocks of up to 15 birds have been seen at other locations in northern Lake Michigan.

Breeding Biology

American White Pelicans arrive in the Great Lakes region in late April. They nest in colonies on islands < 4 ha in size and typically share these sites with other species of colonial nesting birds. Pelican colonies in Wisconsin's Lake Michigan waters range from several up to 300-400 pairs. The nest is a shallow depression in the ground and usually there is no lining. Nests are typically found in bare areas of sand or loose cobble and may be under woody vegetation.

The clutch size is typically two eggs and incubation is about 30 days; young usually remain at the colony site for almost three months. Unlike the Brown Pelican, American White Pelicans do not dive for their food (Knopf and Evans 2004). They typically feed in marshes or along lake edges; they forage in groups, surround fish in shallow water and then scoop up prey in their pouches.

Abundance and Population Trends

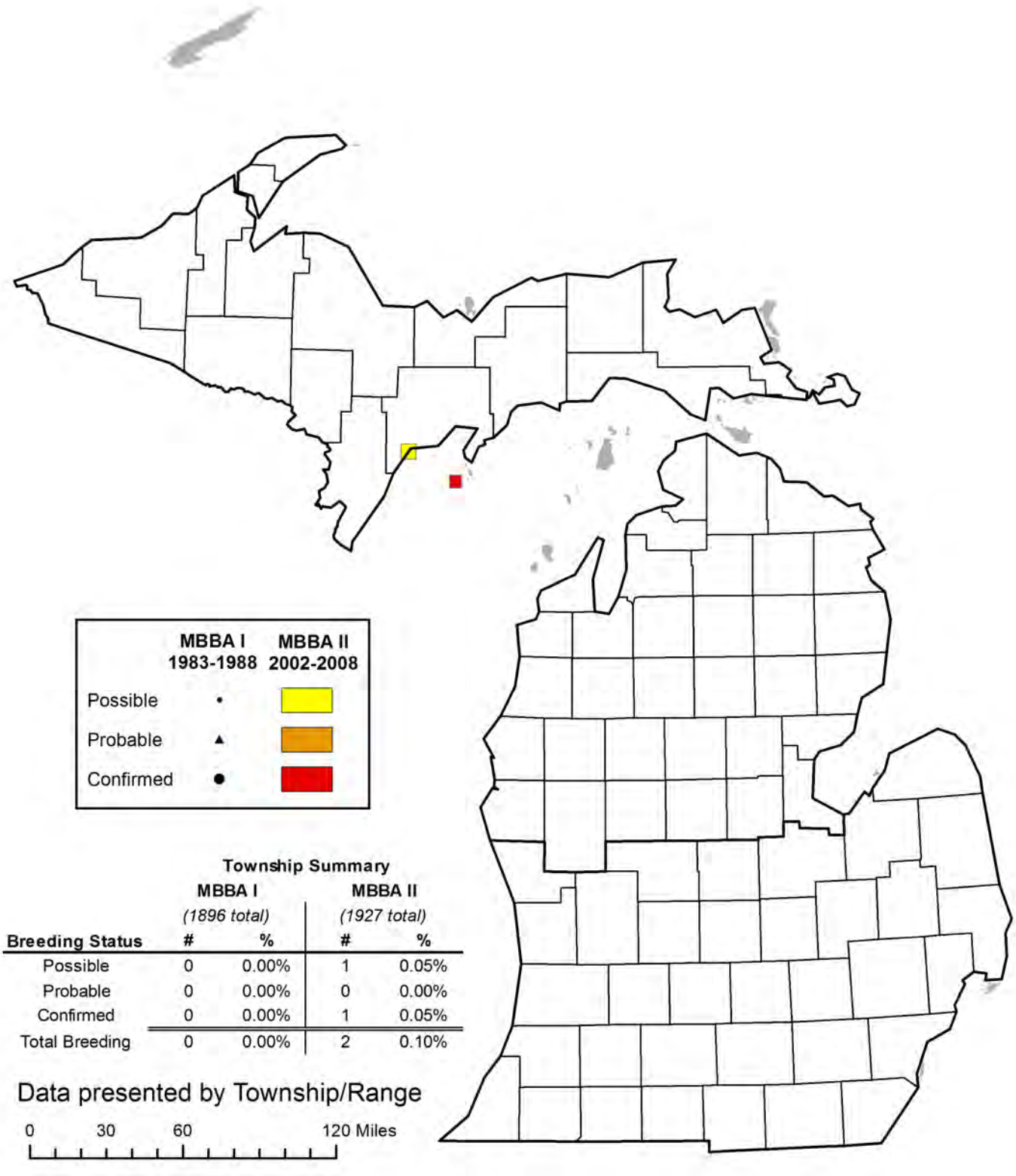
Wood (1951) described the American White Pelican as a rare straggler and summer visitant in Michigan. This status continued through the MBBA I. Beginning in the 1990s, pelican sightings increased in Michigan and this is demonstrated by the MBBA II survey data. The first nesting of this species in Michigan was discovered on Little Gull Island (Delta County). On 18 June 1999 ten nests were recorded (Cuthbert et al. 2003). This site was revisited in 2000, but only three juveniles were present. On 17 May 2006, while conducting an aerial survey for nesting waterbirds, F. Cuthbert (unpub. data) photographed 15 adult pelicans on Little Gull Island. On a return flight on 29 June in 2007 (Cuthbert and Wires 2008) nesting birds were observed. Aerial photos confirmed 17 nests and three eggs could be identified below three different adults standing in their nests. Estimates from the Great Lakes Colonial Waterbird Census confirm that the pelican population in northwestern Lake Michigan (Wisconsin and Michigan) had a total of 162 pairs in 1999 and 858 pairs in 2007. Therefore, the trend in breeding pelican numbers over the past decade has increased significantly in Wisconsin but only by a few pairs in Michigan.

Conservation Needs

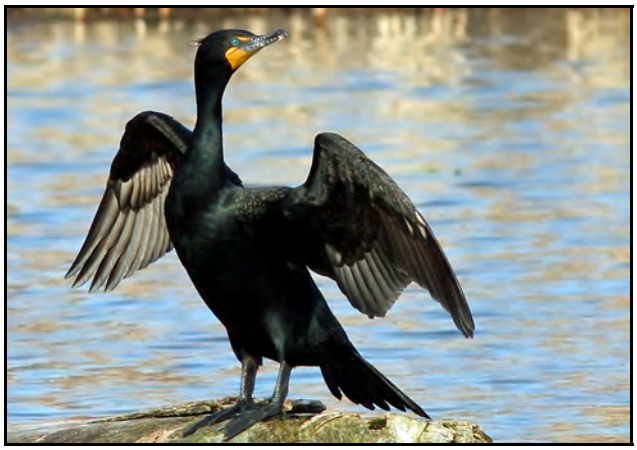
Until the early 1960s, the continental population of American White Pelicans was considered threatened by combinations of changing water levels, human disturbance and possibly contaminants. The population has since recovered and continues to increase at >3%/year (Knopf and Evans 2004). Although pelicans in Michigan are sensitive to the same threats as reported elsewhere in their range, the most important conservation action to encourage breeding by this species is to prevent all human access to islands used by pelicans. Any site used for nesting or extended roosting by non-breeding pelicans during the breeding season (especially May and June) should be identified as a potential breeding site and protected as such.

American White Pelican *(Pelecanus erythrorhynchos)* ***Francesca J. Cuthbert***

Because this species is a recent breeder in Michigan and not well established, human presence at nesting or roosting sites will likely cause desertion (Knopf and Evans 2004; Carney and Syderman 1999).



Double-crested Cormorant *(Phalacrocorax auritus)* ***Nancy E. Seefelt***



Darlene Friedman ©

The Double-crested Cormorant is a bird of inconsistencies; some people admire this species, while others malign it. Celebrated as a conservation success story, cormorants have recently come back from the brink of extinction in the Great Lakes. Cormorants are disliked, however, primarily by those who perceive these birds as damaging to sport and commercial fisheries. The Double-crested Cormorant is the most widely distributed of the North American cormorant species, with a breeding range extending from the Pacific Coast (Alaska to Mexico) to the Atlantic Coast (Newfoundland to the Caribbean) (Hatch and Weseloh 1999). There are six allopatric breeding populations, including the West Coast, Alaska, Bahamas, Florida, Atlantic, and Interior populations (Hatch 1995). Of these, the Interior Population, which includes the Great Lakes Basin, is the largest and contains more breeding pairs than all other populations combined. This population is strongly migratory and winters along the southeastern Atlantic Coast and Gulf Coast (Root 1988), and also at aquaculture facilities, lakes, rivers and impoundments in inland areas of the southeastern United States (Stickley et al.1992, Mott et al.1998).

Distribution

Early reports state that cormorants were abundant across their range in the 1800s (Lewis 1929), and were present in the Great Lakes Basin (Wires and Cuthbert 2006). However, by 1900, large declines had occurred and cormorants were not known as a breeding species in the Lake Michigan Basin (Barrows 1912, Ludwig et al. 1989). But during the early 1900s, cormorant populations began expanding in the Upper Great Lakes, and the earliest record regarded as an official breeding record was obtained in 1913 from western Lake Superior (Postupalsky 1978). By the 1930s, several breeding colonies were active in northern Green Bay, Lake Michigan (Baillie 1947, Ludwig 1984). Due to persecution, commercial fishing practices and the general use of organochlorine chemicals, cormorant populations declined again from the 1940s through the early 1970s (Baillie 1947, Ludwig 1984, Ludwig et al. 1989). Waterbird surveys from 1959 through 1969 found no cormorant nests in Lake Michigan and the U.S. waters of Lake Huron; sometime between 1960 and 1962, cormorants were extirpated as a breeding species in Michigan (Ludwig 1984).

During the MBBA I period, cormorants were widely distributed throughout the LP and UP. During the MBBA II period, observations again documented this wide distribution but a greater percentage of blocks and townships reported breeding locations (possible, probable and confirmed) for this species. Although inland sites reported larger numbers of possible and probable breeding locations in MBBA II as compared to MBBA I, coastal and island habitats provide much of the breeding habitat for cormorants in Michigan. The most important factors influencing nesting by cormorants in Michigan appear to be access to abundant forage fish, typically about 6" in length, and safe nesting sites free from mammalian predators (F. Cuthbert, pers. comm.). All Michigan colonies are currently located on islands in the Great Lakes system, with the exception of one small colony on an inland lake in Oakland County (Byrne 2004, Chartier and Ziarno 2004). Fluctuating water levels, however, can result in changes in available habitat because these dynamics encourage alterations in plant community structure (Albert 2003), changes in the length of available shoreline habitat (Morris et al. 2003), and provide greater connectivity to other habitats that may allow mammalian predators access to colonies (Seefelt and Gillingham 2004). In addition, human disturbance, in combination with the number of nest sites available, social interactions with other species, and food shortages, help regulate waterbird populations (Croxall 1987). In Michigan, these biotic and abiotic factors, combined with current cormorant management activities and illegal acts of vandalism, will continue to influence the distribution and abundance of breeding birds.

Breeding Biology

This species is gregarious and nests in colonies ranging from just a few pairs to several thousand. Cormorants nest on the ground and in trees. Their nests are typically composed of sticks, but often include other natural materials (e.g. grass, leaves, feathers and bones) to human made goods (e.g. plastics, glass and rubber). Cormorants begin to return to Michigan in April, with most initiating breeding activities in May (but some as late as June). Young fledge as early as late June, but most are not capable of flight until July or early August. Migration begins shortly after fledging and most adults and subadults leave Michigan in August or September. However, it is not uncommon for a few cormorants to remain in Michigan in October or as late as early November.

Abundance and Population Trends

On a continent-wide scale, in 2002, the population estimate for breeding cormorants was greater than 740,000 birds (Kushlan et al. 2002). More specifically, the distribution and abundance of colonial waterbirds, including

cormorants, in the Great Lakes has been documented by decadal surveys in 1976-77 (Scharf 1978), 1989-91 (Scharf and Shugart 1998), and 1997-1999 (Cuthbert et al. 2003). Currently, the fourth decadal waterbird census is near completion (Cuthbert and Wires 2008). One trend that has been well documented by these census efforts is the population growth of cormorants in the Great Lakes through the third survey period (1997-1999; Cuthbert et al. 2003). However, the number of cormorants has remained relatively stable in the Great Lakes between the third and the current census periods (Cuthbert and Wires 2008). Aggressive cormorant management in several areas, especially in Lake Michigan, may soon cause the number of cormorants to decline in the state. For example, during the early 2000s, several colonies in northern Lake Huron (Mackinac County) were eliminated by cormorant control measures, both legal and illegal (F. Cuthbert, pers. comm.).

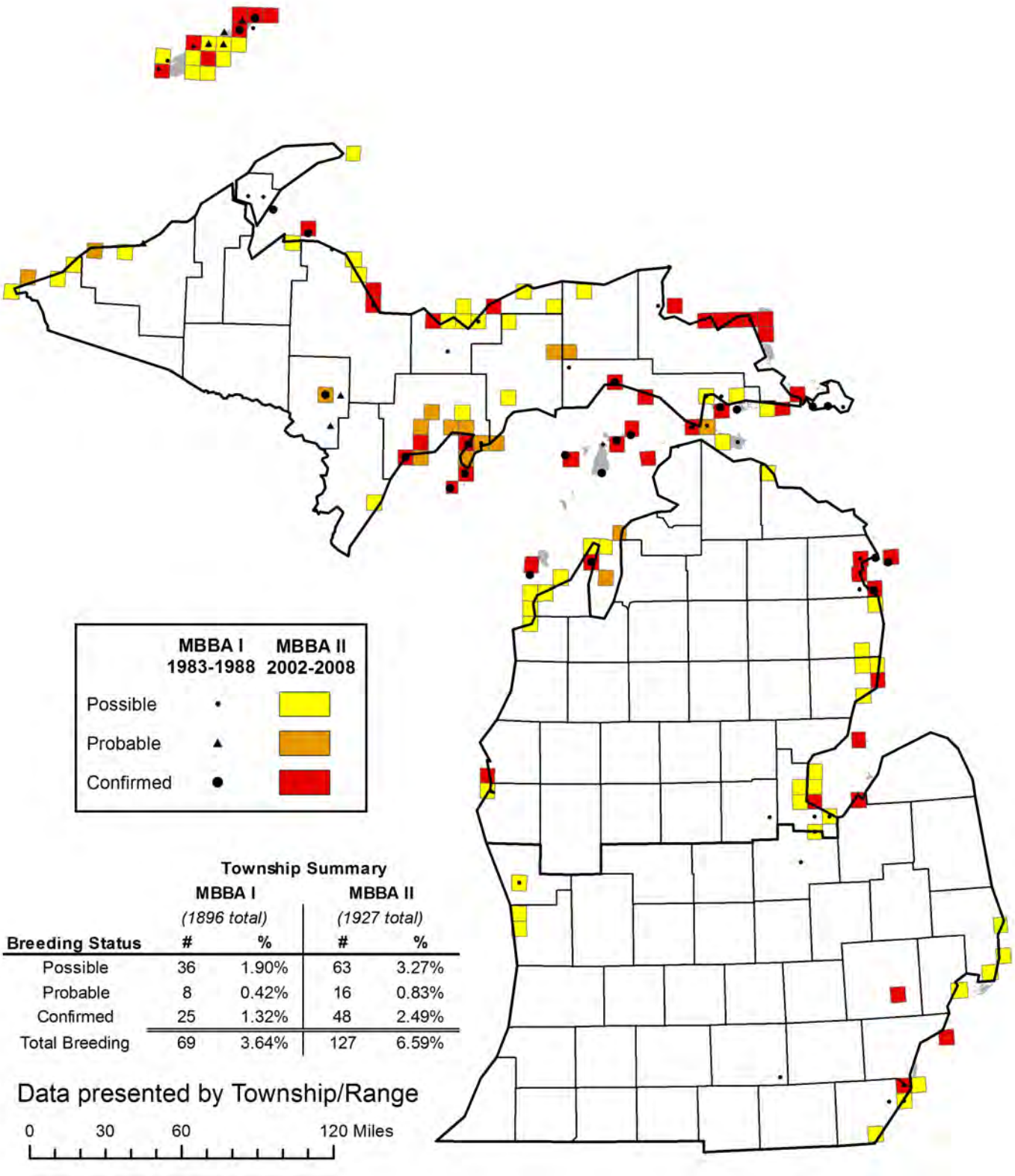
Conservation Needs

Several conservation issues currently apply to cormorants due to changes on both the wintering and breeding grounds. For example, the catfish industry of the southeastern U.S. has been contracting since its peak in 2003; the number of catfish aquaculture operations declined 39% between 2008 and 2009 (Hanson and Sites 2010). In the past, fish at these facilities have supported wintering birds (Glahn and Brugger 1995). In addition, changes in the fish community of the Great Lakes could potentially impact the birds. At one time, alewife (*Alosa pseudoharengus*) was the most abundant prey item in the diet for many breeding birds (Hatch and Weseloh 1999). However, the round goby (*Neogobius melanostomus*), a fish that can be found at extremely high densities across the Great Lakes basin, has become a primary food source (Somers et al. 2003, Johnson et al. 2007, pers. observation). This switch to a relatively poor food source could influence cormorant reproductive success. Beyond this, recent outbreaks of disease, including Newcastle's disease and Type E botulism (USGS 2010) both have the potential to decrease cormorant numbers across the region. Newcastle's disease primarily impacts fledgling birds at the breeding colonies, while botulism can become an issue in the latter half of the summer, as well as during fall migration.

In addition, Double-crested Cormorant populations are currently managed throughout Michigan. These efforts are legal and under the jurisdiction of the Federal Public Resource Depredation Order (PRDO) (USFWS 2003). This depredation order was renewed in 2009 and extended to 2014 when an in-depth assessment of the interior population and the effects of the PRDO will be conducted. Across the Great Lakes Region, much of the control actions are centered on reducing the number of breeding birds, by killing adult birds, and reducing reproductive success of breeding pairs, through egg oiling. During the egg oiling process, eggs are coated with food grade vegetable oil to plug pores in the eggs, thus suffocating the developing embryo without damaging the eggs. Adults will continue to incubate these eggs well past the typical hatching date. In addition, birds are harassed during migration in an effort to protect spawning fish on inland lakes and the Great Lakes. Harassment usually involves chasing birds with motorboats, using pyrotechnics to startle birds, and shooting at and sometimes killing birds to reinforce the effectiveness of harassment activities. Cormorant management activities are under review in many areas of Michigan and the surrounding states and provinces. However, all activities should be strictly monitored to deter unlawful actions by members of the public attempting to control cormorant numbers, which could potentially drive cormorant numbers below viable population levels. How management actions will change in the coming years remains uncertain.

Double-crested Cormorant *(Phalacrocorax auritus)*

Nancy E. Seefelt



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	36	1.90%	63	3.27%
Probable	8	0.42%	16	0.83%
Confirmed	25	1.32%	48	2.49%
Total Breeding	69	3.64%	127	6.59%

Data presented by Township/Range

0 30 60 120 Miles

American Bittern *(Botaurus lentiginosus)*

Michael A. Sanders

Status: *Special Concern (MNFI)*



Al Menk ©

The smallest of the *Botaurus* bitterns, the American Bittern is also known as "stake-driver," "thunder-pumper," and "mire-drum," because of its strange and resounding vocalizations (Gibbs et al. 1992), which are unmistakable when encountered in Michigan during spring and summer months. The species is a secretive, cryptically-colored heron of freshwater marshes and coastal wetlands that breeds across the northern half of the United States and the southern half of Canada, and winters along the southern coastal United States and throughout Mexico and much of Central America (Keller and Castrale 1998).

Distribution

The American Bittern was historically more common in Michigan than it is today. Barrows (1912) considered it "one of the most abundant of our waders," and Wood (1951) listed it as "a common summer resident." Major changes in its distribution and abundance occurred during the period 1960-1990 as populations declined statewide (Adams 1991). A four year statewide survey of Michigan's coastal wetlands detected American Bitterns at only 24% of 108 sites (Sanders et al. 2007).

Geographically, American Bitterns are most common in the UP and the eastern side of the NLP, although sporadic MBBA II observations extended to the southern tiers of SLP counties. Current breeding strongholds include the NLP's Saginaw Bay and the UP's Keweenaw Peninsula, Seney National Wildlife Refuge and eastern Chippewa County.

Breeding Biology

Many basic biological aspects of the American Bittern are not well understood due to the species' secretive nature and inaccessible habitats (Gibbs et al. 1992). They typically arrive in southern Michigan during the first two weeks of April, and occur statewide by late April and early May (Monfils 2004). American Bitterns seem to prefer larger, cattail-dominated freshwater marshes with water depths less than 10cm (Keller and Castrale 1998), and within these habitats utilize stealth rather that pursuit when foraging for insects, amphibians, crayfish, and small fish. Encounters with the species are usually vocalizing males or silent individuals observed in flight.

Cryptic nests are commonly placed above shallow water on elevated platforms made of various emergent vegetation such as cattails, sedges and grasses, although some have been documented in upland fields as far as 100 m from water (Keller and Castrale 1998). Males may be polygamous, nesting with several females within a single territory (Baicich and Harrison 1997). The semi-altricial young leave the nest after one to two weeks, but remain nearby to receive supplemental feedings for another two weeks.

Abundance & Population Trends

MBBA II data indicate a continued decline in American Bittern numbers when compared with results from the first atlas period. Total block-level occurrences dropped by 27% (271 from 371) despite an increase in overall coverage during MBBA II. There was a decrease in American Bittern observations by township; 5.24% indicated the species' presence in MBBA I while only 3.77% recorded the birds during MBBA II. A downward trend is also evident in block data; only 11.48% of the blocks reported American Bittern for MBBA II, while 16.67% documented these birds during MBBA I. Regionally, the greatest decline occurred in the SLP, where habitat loss and degradation have been most frequent, and where block-level records fell 56%. Statewide breeding confirmations dropped from 23 to only nine, six of which were recorded in the UP.

BBS data indicate a significant decline (-5.13% per year, $P<0.1$) in American Bittern numbers throughout the Upper Midwest from 1966-2007 (Sauer et al. 2008). National results showed a significant decrease of 1.9% annually during the same period (Sauer et al. 2008). Although BBS data are useful for suggesting trends and patterns, they should be viewed with caution as secretive wetland bird species are generally unrepresented in large scale survey efforts. Habitat loss is likely responsible for much of the documented decline in bittern numbers, although pesticides and agricultural runoff may also be contributing factors (Keller and Castrale 1998). The American Bittern is currently listed as a species of Special Concern in Michigan, and is considered endangered in Indiana, Illinois, and Ohio (Keller and Castrale 1998).

American Bittern *(Botaurus lentiginosus)*

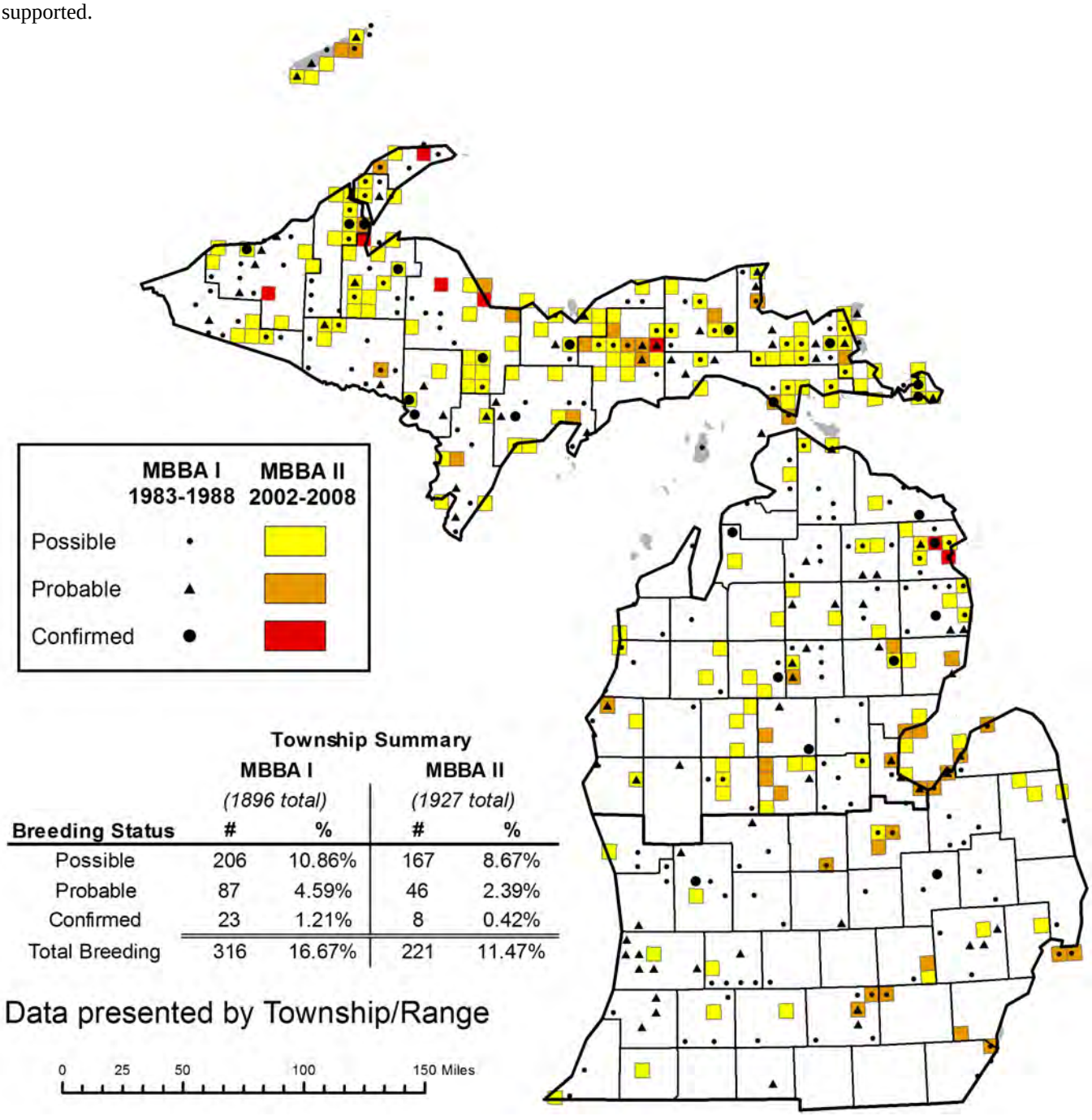
Michael A. Sanders

Status: *Special Concern (MNFI)*

Conservation Needs

The primary factor in American Bittern declines would seem to be the loss of wetland habitat: nearly half of Michigan's original wetlands have been eliminated since European settlement, with many of the remaining areas seriously degraded (Cwikiel 1998, Monfils 2004). Consequently, preservation and proper management of large freshwater marsh habitats (>10ha) with dense emergent growth is the most urgent conservation need for the American Bittern (Kleen et al. 2004). Wetland protection programs which allocate funds for wetland restoration and protection on both public and private lands should be supported.

Although little is known about the effects of contaminants on bitterns, many prey species including crayfish and amphibians are demonstrably vulnerable to agricultural pesticides (Gibbs et al., 1992); similarly, the invasion of non-native vegetation such as purple loosestrife, reed canary grass and common reed could very likely have negative impacts upon the species' habitat (Kleen et al. 2004, Monfils 2004). Additional research into the biology of the American Bittern, which would better illuminate pathways toward effective conservation, is greatly needed.



Least Bittern *(Ixobrychus exilis)*

Michael Sanders

Status: *State Threatened*



Carl Manning ©

The Least Bittern is extremely difficult to locate due to its secretive nature, inaccessible habitats and lack of territorial defense calls (Woodliffe 1987). Roughly half the size of the more familiar American Bittern, this small heron is one of Michigan's most inconspicuous marsh inhabitants. Least Bitterns breed from the eastern half of the United States south to Central America and the West Indies (Kleen et al. 2004). Its wintering range extends along the Atlantic coast from Maryland to Texas, through the Rio Grande Valley, and into the Baja Peninsula (Gibbs et al. 1992); the northern winter limit of Least Bitterns is considerably farther south than that of the hardier American Bittern (Gibbs et al. 1992). The eastern UP represents the northern limit of the species' North American distribution (Cornell Lab of Ornithology, 2010).

Distribution

Least Bitterns were historically common in Michigan. The Least Bittern was "an abundant bird in all suitable places in the state" in 1900 (Barrows 1912). Wood (1951) described it as a common summer resident in southern Michigan but rare and local throughout the Upper Peninsula. Adams et al. (1991) indicated that a decline in Least Bitterns in the state between the late 1950s and early 1980s was largely due to habitat loss. The species was detected at only 10% (11 of 108) of sites inventoried during a four year statewide wetland bird survey of coastal wetlands (Sanders et al. 2007).

Breeding Biology

Least Bitterns are more habitat specific than the larger American Bittern, preferring freshwater marshes with equal ratios of emergent vegetation and open water (i.e. hemi-marshes) (Gibbs et al. 1992, Monfils 2003). Yocum (2003) indicates a preference for marshes dominated by cattails, while Brown and Dinsmore (1986) suggest that the species may be area dependent, requiring a minimum of 4.9 hectares for suitable breeding habitat.

A Least Bittern nest is an elevated platform consisting of aquatic vegetation and sticks suspended above shallow water (Gibbs et al. 1992, Peterjohn and Rice 1991). They are placed in tall, dense stands of emergent vegetation over water 10-75 cm deep, and are typically located only a few meters from a nearby opening (MNFI 2007). After hatching, the semi-altricial young can fledge at four to five days, but remain nearby to be fed for three to four weeks (Baicich and Harrison, 1997). Population densities within suitable habitat may be high (Keller and Castrale 1998); Yocum (2003) observed 16 active nests within a 105 acre impoundment at Nayanquing Point State Wildlife Area along Saginaw Bay. Departure dates are uncertain because of the secretive nature of this species, but probably begin in September and continue into October (Adams 1991). During migration, Least Bitterns can be observed in small marshes and narrow strips of cattails bordering ponds and lakes (Peterjohn and Rice 1991).

Abundance and Population Trends

Results from MBBA II indicate that the overall range of the species has changed little from MBBA I. Least Bitterns have remained most common in the SLP, with the number of observations declining northward into the NLP. Relative strongholds continue to be the St. Clair Delta and areas along Saginaw Bay. The species remains rare in the UP, where only seven observations were reported, although one was a confirmed breeding in southern Delta County along Lake Michigan. This latitudinal pattern might be explained by the lack of large expanses of suitable habitat in the Upper Peninsula (Sanders et al. 2008).

Total block-level occurrences of Least Bitterns dropped by 16% (from 114 to 96) despite an overall increase in coverage during the MBBA II effort; similarly, township-level observations fell 21% (from 104 to 82). Breeding confirmations dropped 50%, with only 10 reported during MBBA II, seven of which occurred in the SLP.

Analysis of BBS data from 1966-2007 show a substantial annual drop in Least Bittern numbers, although not at a level of statistical significance (-7.3% annually, P = 0.27) in the Upper Midwest region (Sauer et al. 2008). While these and other large scale surveys do not adequately census secretive marsh birds, BBS data are useful for suggesting trends and patterns (Monfils 2003, Kleen et al. 2004); it is evident that Least Bittern numbers are in decline across the Great Lakes region. The Least Bittern is currently endangered in Illinois and Indiana, and threatened in Michigan, New York, Ohio and Ontario (Woodliffe 1987). Habitat loss, particularly the drainage of wetlands for farming and urban development, is likely the primary factor in the species' decline.

Conservation Needs

The protection and proper management of large shallow wetlands with abundant emergent vegetation is the most urgent conservation need of the Least Bittern (Gibbs et al. 1992). Roughly five million acres of palustrine wetlands

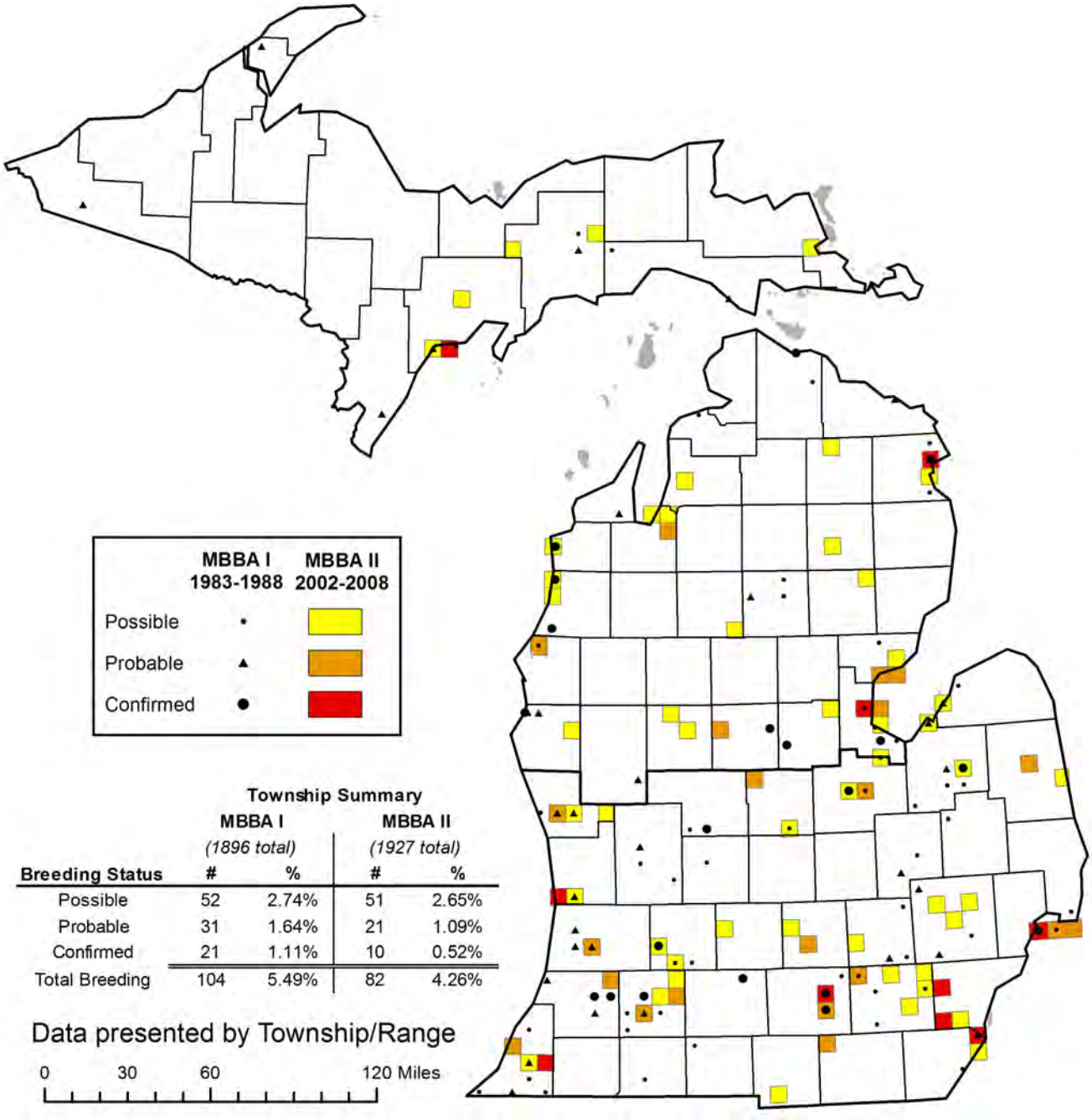
Least Bittern *(Ixobrychus exilis)*

Michael Sanders

Status: *State Threatened*

were eliminated in the United States from the mid-1950s through the mid-1970s (Gibbs et al. 1992); within Michigan, Cwikiel (1998) reported that nearly half of the state's pre-settlement wetlands have disappeared, including almost 70% of its coastal lowlands. Additionally, several prime breeding areas along the Great Lakes were eliminated due to high water levels in the mid-1980s (Adams 1991).

Extreme water level manipulations at management areas may impede Least Bittern nesting success and recovery efforts (Yocum 2003), while the overall impact of exotic and nuisance species such as purple loosestrife and common reed is uncertain but likely negative (Gibbs et al. 1992, Monfils 2004). Managing wetlands explicitly for the hemi-marsh stage would improve conditions for Least Bitterns and other wetland species (Evers 1994, MNFI 2009), especially if such areas were protected from chemical contamination and other forms of pollution that harm the birds and their food supplies (Gibbs et al. 1992).



Great Blue Heron *(Ardea herodias)*

Nancy Seefelt



Jim Ridley ©

Few birds have the stature and presence to truly symbolize our wetland habitats as does the Great Blue Heron. This magnificent wader is one of Michigan's most recognizable denizens of marshes, rivers and lakeshores. The Great Blue Heron, the most widespread of all North American waders, is found on both Atlantic and Pacific coasts, as far north as the Maritimes and southern Alaska (Butler 1992). During the breeding season, this species is equally at home in the interior of the continent, including the Great Lakes, as well as the southern U.S., Caribbean and Mexico. If open water is available, some individuals may be found relatively far north during the winter; however most birds migrate to the southern U.S. Some Great Blue Herons will winter as far south as Panama and the northern countries of South America (Butler 1992).

Distribution

The Great Blue Heron is relatively common in Michigan, as it is throughout the Great Lakes Region. However, based on MBBA data, this species may be declining in the state. In MBBA I, almost 30% of blocks surveyed recorded this species, but fewer than 24% documented Great Blue Herons during the MBBA II period. Over 61% of the townships reported occurrences in MBBA I, compared to fewer than 54% in MBBA II. Furthermore, the number of blocks reporting confirmed breeding herons declined in all regions of the state between MBBA I and MBBA II. In the SLP, the number of possible breeders increased between the atlases; however, Great Blue Herons often fly great distances between nesting locations and feeding grounds (Butler 1992). Therefore, herons sighted in townships or blocks may not actually be nesting in those same townships or blocks. Although the map indicates that herons may breed in each of Michigan's counties, it is likely that nesting colonies are much more restricted in the state. Currently, there appears to be a concentration of nesting herons in the southeastern and southwestern LP, the western portion of mid-Michigan, and on Great Lakes Islands near the Straits of Mackinac. In addition, breeding has been confirmed at scattered locations in the NLP and UP. This distribution is similar to the distribution in MBBA I.

Breeding Biology

Although some Great Blue Herons remain in Michigan throughout the winter, most are migratory and return to the SLP by mid-March; others may not return to the NLP and UP until mid-April. Great Blue Herons typically nest in colonies and build large stick nests in trees sometimes as high as 30 meters (over 98 feet) above the ground (Butler 1992). Nests often exceed one meter (> three feet) across. In areas that lack mammalian predators, such as remote islands, herons may build their nests on or near the ground (pers. obs.). Colony size can range from a few nests to several hundred pairs (Scharf 1978, Scharf and Shugart 1998, Cuthbert et al. 1997). In Michigan, eggs are laid in April or May, with fledging observed as early as May or as late as early July (Scharf 1991, Butler 1992). Fall migration commences in August but many birds remain throughout Michigan until late October (Barrows 1912).

Abundance & Population Trends

Distribution and abundance of colonial waterbirds, including Great Blue Herons, in the Great Lakes has been documented by decadal surveys in 1976-77 (Scharf 1978), 1989-91 (Scharf and Shugart 1998), and 1997-99 (Cuthbert et al. 2002). Currently, the fourth decadal waterbird census is near completion (Cuthbert and Wires 2008). In addition, many Great Blue Herons nest at interior locations in the state; these breeders have not been censused as regularly as their Great Lakes counterparts. According to the decadal surveys, coastal breeding pairs of Great Blue Herons increased by 60% in Michigan waters of the Great Lakes between 1977 and 1989 (Scharf and Shugart 1998). By the 1997 survey year, the number of herons had declined in the U.S. portion of the Great Lakes (Cuthbert et al. 2003). Furthermore, according to the most recent decadal survey (2007-09), the breeding population of Great Blue Herons has declined in lakes Michigan and Superior between 1997 and 2008 (Cuthbert and Wires 2008). The most recent decadal survey (2007-09) indicates that there are between 500 and 700 pairs of Great Blue Herons nesting in the Michigan waters of the Detroit River and Lakes Erie, Huron, Michigan and Superior (Cuthbert and Wires 2008). This represents the lowest breeding number since the censusing began in 1977.

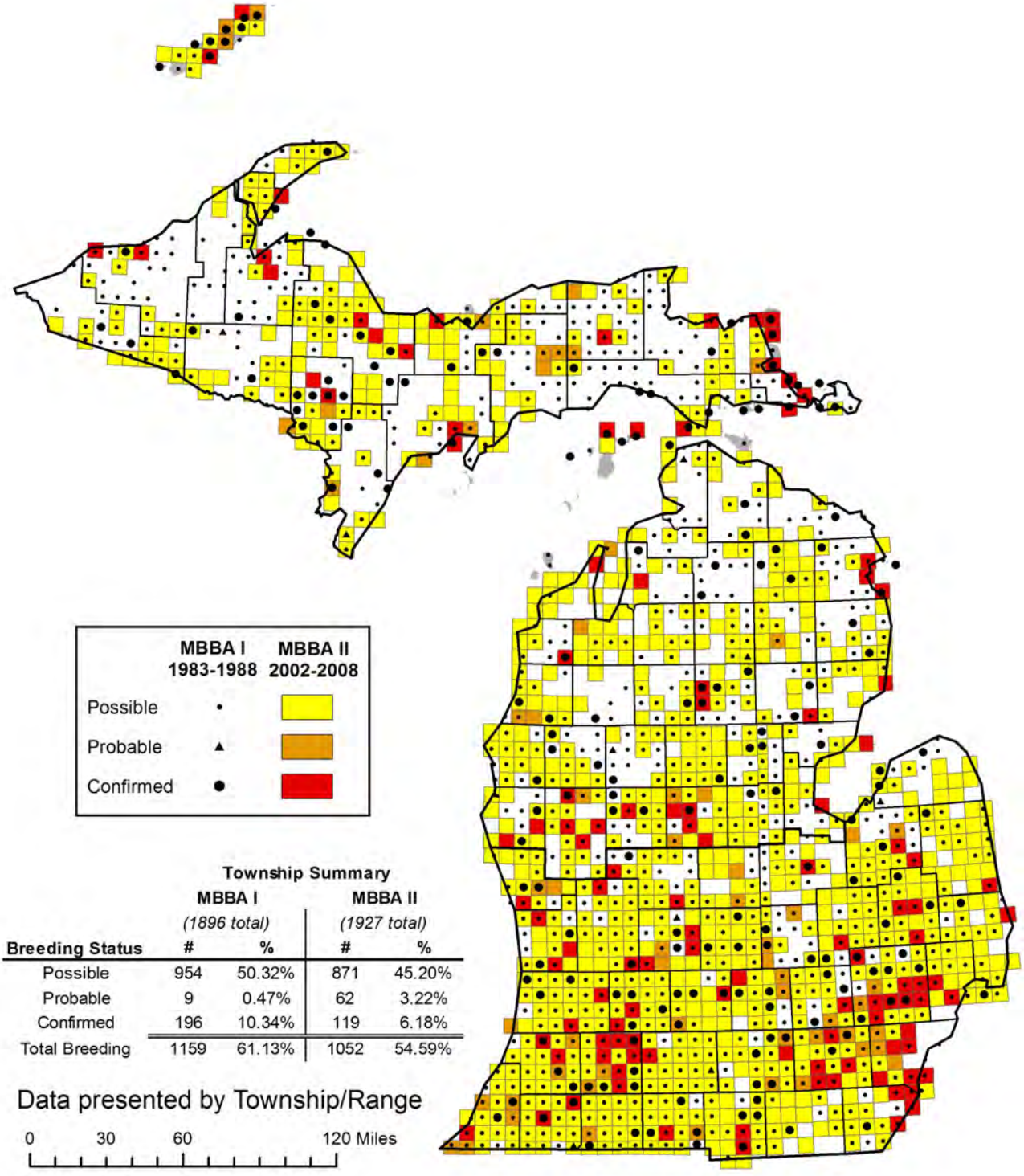
Conservation Needs

As with many colonial waterbird species, water pollution and colony disturbance by humans have negative effects on breeding success (Butler 1992). However, general clean-up of contaminants and protection of breeding colonies have reduced the impact of these factors in many locations. Disturbance by predators (e.g. raccoon, Great Horned Owl) can also interfere with nesting success. Loss of foraging and breeding habitat is another factor that may lead to the

Great Blue Heron *(Ardea herodias)*

Nancy Seefelt

decline of this species and other co-nesters, whether the changes are due to fluctuating water levels, development or disruptions in food web structure (Kushlan et al. 2002). Finally, because Great Blue Herons often nest with other species, including cormorants, management actions or research aimed at other species have the potential to negatively impact Great Blue Heron reproductive success. Disturbances associated with these actions at the breeding colonies, especially early in the nesting season, can lead to site abandonment (Butler 1992).



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	954	50.32%	871	45.20%
Probable	9	0.47%	62	3.22%
Confirmed	196	10.34%	119	6.18%
Total Breeding	1159	61.13%	1052	54.59%

Great Egret *(Ardea alba)*

Francesca J. Cuthbert



Jim Ridley ©

According to A.C. Bent (1926), the Florida plume hunters called the Great Egret the "long white;" "as it springs into flight with neck and legs extended, and flaps majestically away on its broad white wings, it seems to be the longest, the slenderest, and the most ethereal of the herons." Today, the Great Egret is a powerful symbol of early conservation efforts mounted to safeguard it and other species from overhunting for their feathers in the 1800s. Protection in the early 1900s is credited with population recovery and establishment of the Great Egret as a breeding species in Michigan approximately 50 years ago. This cosmopolitan species now breeds locally in the U.S. north to the Canadian border and winters primarily in the southern states and along the Pacific Coast as far north as Oregon (McCrimmon et al. 2001).

Distribution

Great Egrets reach the northern edge of their U.S. distribution in Michigan. Historically, there is no evidence that this species nested in Michigan until the 1950s. For example, Barrows (1912) and Wood (1951) did not report Great Egrets as breeders in Michigan at the time of their studies, but Kelley et al. (1963) confirmed nesting in 1954 by nine pairs on Stoney Island (Detroit River) and seven on Dickinson Island (Lake St. Clair). These colonies appear to have persisted into the mid-1970s when W. Scharf et al. (1978) documented egrets at these sites in 1976. Although these colonies were no longer active at the time of the 1989-91 Great Lakes Colonial Waterbird Census, Sharf and Shugart (1998) reported new colonies in Saginaw Bay and at Pte. Mouillee State Game Area, Monroe Co.

MBBA I confirmed breeding in six townships, all in the SLP. At the time of MBBA II, observations clearly demonstrate that the distribution of breeding Great Egrets is still concentrated in the SLP, especially southeastern and southwestern Michigan. For example, confirmed breeding increased from five to nine townships between the two atlas survey periods. However, results from MBBA II also document that this species has recently expanded north in the state as Great Egrets were confirmed breeding in four townships in the NLP and two in the UP. In contrast, during the MBBA I period, there were no confirmed breeding records in either the NLP or the UP.

The Great Egret is a colonial nester with colony size ranging from a few pairs to more than 100 nests. In Michigan, egrets typically nest on forested islands or at forested inland sites and often co-occur with Great Blue Herons or Double-crested Cormorants. Black-crowned Night-Herons may be present in the lower canopy.

Breeding Biology

Spring arrival of Great Egrets to Michigan begins in late March but the peak return is in April. Clutches of 3-4 eggs are laid in early to mid-May. Nests are platforms constructed of sticks and twigs located on or near the top of trees or woody vegetation; height of nest above ground is variable and occasionally birds nest on the ground (McKrimmon et al. 2001). The incubation period is approximately 26 days, and nestlings are able to fly at about 51 days of age (McKrimmon et al 2001). Egrets forage in shallow water, often coastal wetlands. Their diet is variable and includes fish, invertebrates, amphibians, and occasionally small mammals (McKrimmon et al 2001). Post-breeding, individuals disperse widely, likely accounting for many reports of Great Egrets throughout Michigan in the fall.

Abundance and Population Trends

Historical records do not provide evidence of breeding by this species in Michigan until after the 1940s. Various reports (Scharf et al. 1998, Cuthbert unpub. data, Brewer et al. 1991) indicate an increase in number of nesting birds since at least the mid 1970s through MBBA II. For example, townships with confirmed breeding increased from six to 15 between MBBA I and II and townships with possible nesting increased from 41 to 91.

Additional evidence of a growing population is provided by the decadal Great Lakes Colonial Waterbird Census. In the period 1989-1991, Scharf and Shugart (1998) reported egret colonies at five coastal sites and estimated 47 pairs at four sites plus 25-50 at Pte. Mouillee State Game Area. A single pair was found in Alpena Co. on Gull Island. During the third Great Lakes Colonial Waterbird Census in 1997-99, Cuthbert et al. (2003) estimated 377 pairs of egrets nesting at only two coastal sites in Michigan: Little Charity Island and the Confined Disposal Facility, both in Saginaw Bay. Data from the fourth Great Lakes Census (2007-09) showed that coastal nesting egrets increased to over 500 pairs at four sites in Lake Huron and two on Lake Michigan (Cuthbert unpub. data). Estimates for inland colonies are not available.

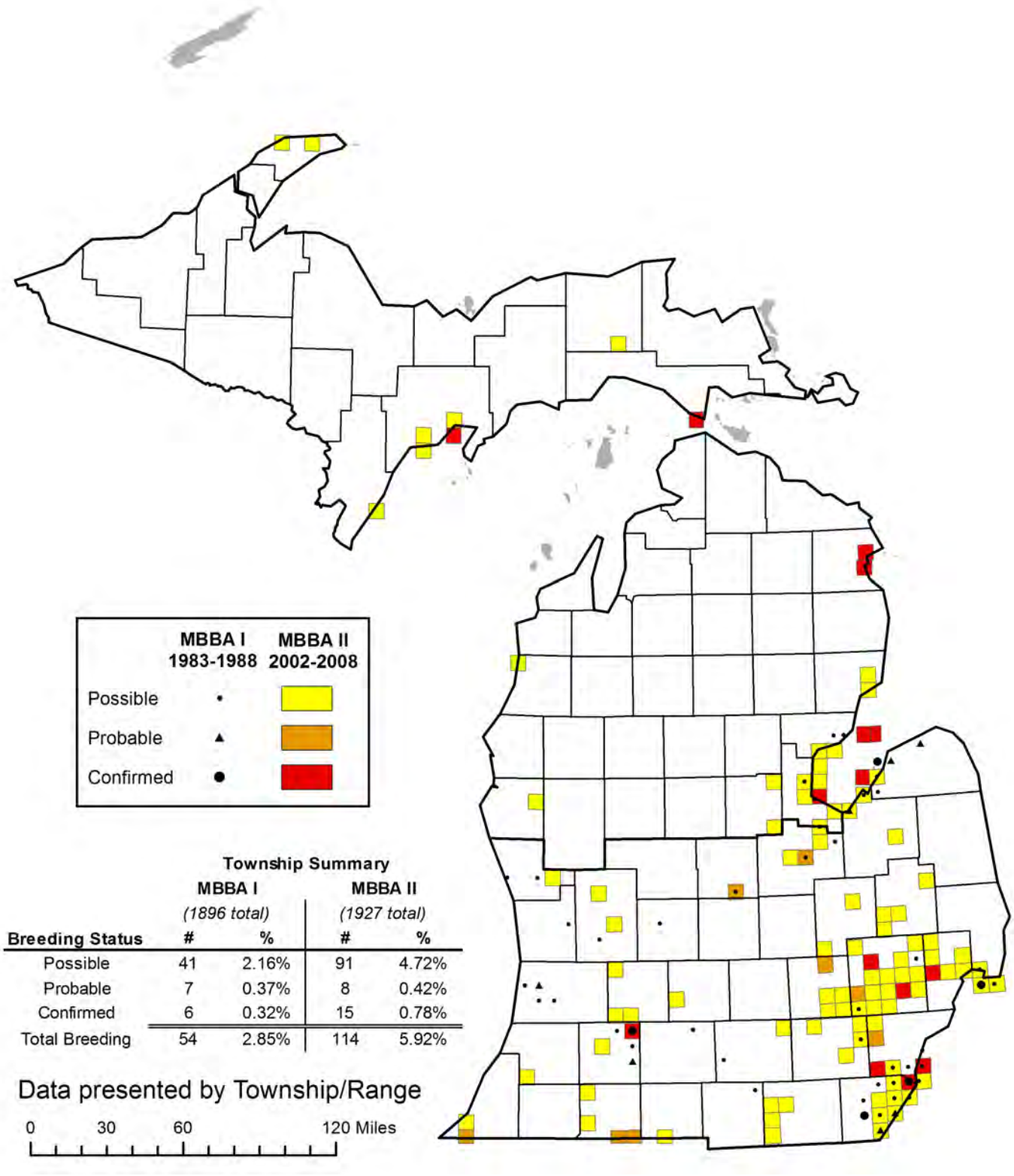
Conservation Needs

Although once close to extirpation in the U.S., the Great Egret has recovered to historical numbers and expanded its range (McCrimmon 2001). However, this species remains vulnerable to a number of threats such as contaminants, loss of wetlands and nest trees to development, and shooting at

Great Egret *(Ardea alba)*

Francesca J. Cuthbert

aquaculture ponds and fish hatcheries (McCrimmon 2001). Great Egrets nest inland in Michigan but may prefer Great Lakes islands where predation by mammals (e.g. raccoons) and other disturbance is minimized. Because colony sites are few in number, they should be protected from habitat loss and human intrusion.



Green Heron *(Butorides virescens)*

Damon McCormick



Alice Van Zoeren ©

Species sponsored by: Quentin & Barbara Schultze

Although adorned in a gaudy pastiche of forest, slate, rufous and cream, the Green Heron's preference for thickly-vegetated wetlands renders it a relatively uncommon sight in Michigan. It is about one-third the size of its more conspicuous relative, the Great Blue Heron, with a comparatively shorter neck and legs and an altogether stockier build.

Distribution

In addition to most of Central America, Green Herons breed throughout the eastern half of the United States and along its west coast; Michigan represents the northern limit of their range (Davis and Kushlan 1994). Although noted on Isle Royale in Kneeland's (1859) survey, Barrows (1912) and other early naturalists reported the species to be prevalent in the SLP and rare elsewhere in Michigan, perhaps due to a preference for deciduous wetland shrubs and trees over their coniferous counterparts (Peck and James 1983). Nonetheless, Kelley (1975) speculated that Green Herons occurred regularly in the UP, and Chu (1991) concluded that MBBA I data probably reflected "a real increase in the number of individuals summering in the northern part of the state." However, because Green Herons tend to wander widely after breeding (Kushlan 1981), some of the numerous possible MBBA I records from the NLP and UP may have represented dispersed birds from downstate or elsewhere.

Breeding Biology

Green Herons feed both day and night in a variety of wetland environments, hunting small fish, invertebrates and insects in shallow water with dense vegetation (Meyerreicks 1962, Recher et al. 1983, McNeil et al. 1993, Davis and Kushlan 1994). One of the few tool-using birds, they will often drop feathers, mayflies and other small objects onto the water's surface in an effort to lure fish (Keenan 1981). Audubon (1843) observed that "During the love-season they exhibit many curious gestures, erecting all the feathers of their neck, swelling their throat, and uttering a rough guttural note like '*qua qua*', several times repeated by the male as he struts before the female." Of an intermediately social nature, Green Herons can nest both solitarily and, less frequently, in loose colonial aggregations (Kaiser and Reid 1987). Breeding pairs will jointly construct a nest of small twigs, typically above water in swamp or marsh thicket, and concealed by overhead branches (Reed 1927, Meyerreicks 1962, Davis and Kushlan 1994). Both parents incubate three to five eggs for approximately 20 days; hatched downy young are semialtricial and can fly within four weeks (Meyerreicks 1962, Gavino and Dickerman 1972). Although two clutches have been documented in more southerly regions, Michigan pairs likely nest only once per season (Davis and Kushlan 1994).

Abundance and Population Trends

(Click to view trends from the BBS)

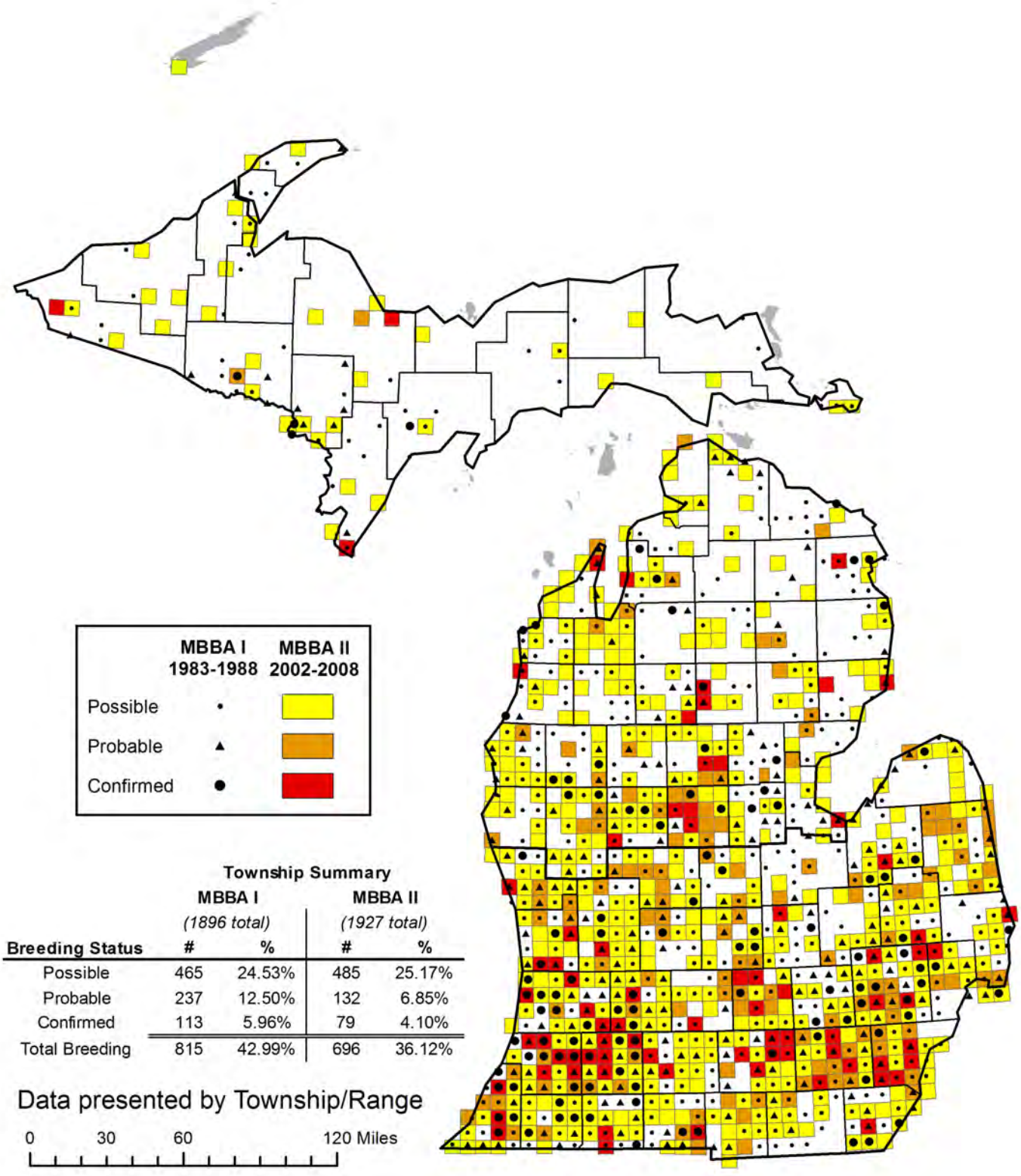
As during MBBA I, the majority of MBBA II block level records for Green Herons occurred in the SLP (73% in MBBA I; 70% in MBBA II), with clusters of relatively high densities in the southwest counties of Kalamazoo and Van Buren, and the southeast counties of Wayne and Washtenaw. Total township observations between Atlas efforts dropped 16%; confirmed and probable townships fell 30% and 44%, respectively, while block level numbers experienced slightly larger declines. These figures stand in contrast with the findings of the Marsh Monitoring Program which found no significant population trend for the species across the entire Great Lakes region from 1995-2006 (Harrison et al. 2008), and with the recent conclusion of the Wisconsin BBA that Green Herons are "doing well" in this neighboring state (Gostomski 2006). However, both studies – as well as BBA accounts for Ohio and Illinois – stress the difficulty in accurately censusing a species whose secluded habitats and predominantly solitary nature render it unrecorded on most BBS routes and excluded from most surveys of colonially nesting waders (Peterjohn and Rice 1991, Kleen et al. 2004). Although these considerations also weigh upon the reliability of MBBA data, the decline in aggregate evidence of breeding Green Herons between Atlas efforts suggests some measure of actual retraction within Michigan over the past fifteen years.

Conservation Needs

The unregulated agricultural drainage and commercial development of the state's swamps, marshes and bogs – which by one estimate eliminated over 72% of Michigan's 11 million wetland acres during the 19th and 20th centuries – has been replaced with a suite of legislative measures that frequently call for the creation or restoration of habitat in compensation for the loss of other wetland acres (Michigan Department of Natural Resources 2007). Because some evidence suggests that these mitigative efforts often result in compensatory wetlands of lower quality than the original acreage, and because wetland integrity has been shown to correlate with species richness in the Great Lakes region, it is possible that Michigan's Green Heron population is suffering under the state's current protection scheme (Steiner 2003, Stapanian et al. 2004). As such, survey efforts designed to identify associations between specific wetland types and Green Heron breeding occupancy and productivity within them would likely provide a clearer picture of the species' statewide conservation needs.

Green Heron *(Butorides virescens)*

Damon McCormick



Black-crowned Night-Heron *(Nycticorax nycticorax)* ***William C. Scharf***

Status: *Special Concern (MNFI)*



Joan Tisdale ©

Known by the elegant black and white of its adult plumage and its red-eyed stare, the Black-crowned Night-Heron is a voracious and stealthy predator of fish, frogs, mice, and especially young gulls, terns and other birds. Many potential prey animals should heed its *"quawk"* call in the night. A widespread species, it is found nesting on every continent except Australia and Antarctica (Davis 1993). They are colonial breeders, and are often found breeding and foraging with other species of herons as well as other species of colonial nesting waterbirds.

Suitable wetland habitat for nesting and foraging influences Black-crowned Night Heron distribution. Sites of Black-crowned Night Heron colonies in Michigan include Great Lakes islands with suitable shrubs for nesting and proximity to coastal wetlands. Inland swamps and marshes continue to attract Black-crowned Night-Herons during the nesting season, usually with only small colonies confirmed away from the Great Lakes in Michigan. Wintering distribution includes the coastal southeastern U.S. with some going as far as the Caribbean (Byrd 1978).

Distribution

Black-crowned Night-Herons in Michigan historically have had their colonies along the shores and islands of Lake Erie, the Detroit River, Lake St. Clair and Lake Huron with new colonies since Scharf (1998) expanding into northern Lake Michigan, Lake Huron, the St. Marys River and eastern Lake Superior. They seek nesting on islands or other similar insulated spots protected from predators. Twelve breeding colonies were documented on the Great Lakes islands or along the shoreline of the NLP and UP during MBBA II. This seems to indicate an increase in northward nesting for this species. A noteworthy coincident change has been that new colonies established in Ontario are northward of the traditional nesting areas by 72 km (48 mi) (Cadman 2007). Many newer observations in MBBA II are from inland swamps, marshes, riverine habitats, or other non-Great Lakes sites in the SLP, but only one of these is a confirmed breeding record. Many similar inland observations from MBBA I, especially in the NLP, were vacated between MBBA I and MBBA II.

Breeding Biology

Black-crowned Night-Herons are primarily nocturnal. Most birds leave colony sites at night; foraging and courtship take place at night. They return to the colony before sunrise (Davis 1993). Wetland nests near foraging sites are normal, but it has been shown in Wisconsin that Black-crowned Night-Herons may fly up to 24 km (14 mi) to feed (Hoefler 1979). Small trees and brush such as white cedar, aspen, cottonwood, box elder, willows, wild plum, elderberry, dogwood, and mulberry are chosen nest sites. Trees in one colony varied in height from 11-16 m (32-51 ft.) (Hoffman and Prince 1975). In contrast, the herons have also nested in cattails (pers. obs.). At Michigan latitudes, this species is single brooded, but will re-nest if disturbed or attacked by predators. Yearling herons, with brownish streaked plumage, are known to be breeders (Custer and Davis 1982), but most birds typically breed at age two or three. The cryptic brown plumages of juvenile and first summer birds coupled with thick vegetation make them inconspicuous and hard to count. In mixed heron species colonies, Black-crowned Night-Heron nests are usually smaller and located closer to the trunk among the lower branches of trees tending to cause the censuses, both aerial and ground, to underestimate their true numbers (Erwin 1980).

Abundance and Population Trends

Records of breeding distribution in MBBA I show confirmed nesting in 15 townships: 4 in the UP, 6 in the NLP, and 5 in the SLP. In MBBA II, nesting was documented in 25 townships: 10 in the UP, 8 in the NLP, and 7 in the SLP. This represents an increase of 67% since MBBA I. The statewide increase in colonies of this species has been from the UP and NLP. An upsurge in the number of nests to 210 in one NLP Great Lakes colony (Cuthbert and Wires 2008) can be attributed to nearly ideal habitat at the Saginaw Bay Confined Disposal Facility (CDF) where an increase in woody nesting vegetation and a convenient food supply of nestling gulls and terns occur at the same site.

Conservation Needs

MNFI has listed Black-crowned Night-Herons as a species of Special Concern. Illinois and Indiana list them as endangered (Kleen et al. 2004, Castrale et al. 1998). The North American Waterbird Conservation Plan (Kushlan et al. 2002) considers the continental populations of Black-crowned Night-Heron to be declining. The northeastern U.S. populations have declined by 50% since 1970 (McGowan et al. 2008). Loss of wetlands is probably the major cause of the species' decline. Strict enforcement of wetland protection, continuance of strictures against removing vegetation near the riparian zone, and zoning to keep industrial, commercial and residential development away from the water's edge will preserve nesting and foraging

Black-crowned Night-Heron *(Nycticorax nycticorax)*

William C. Scharf

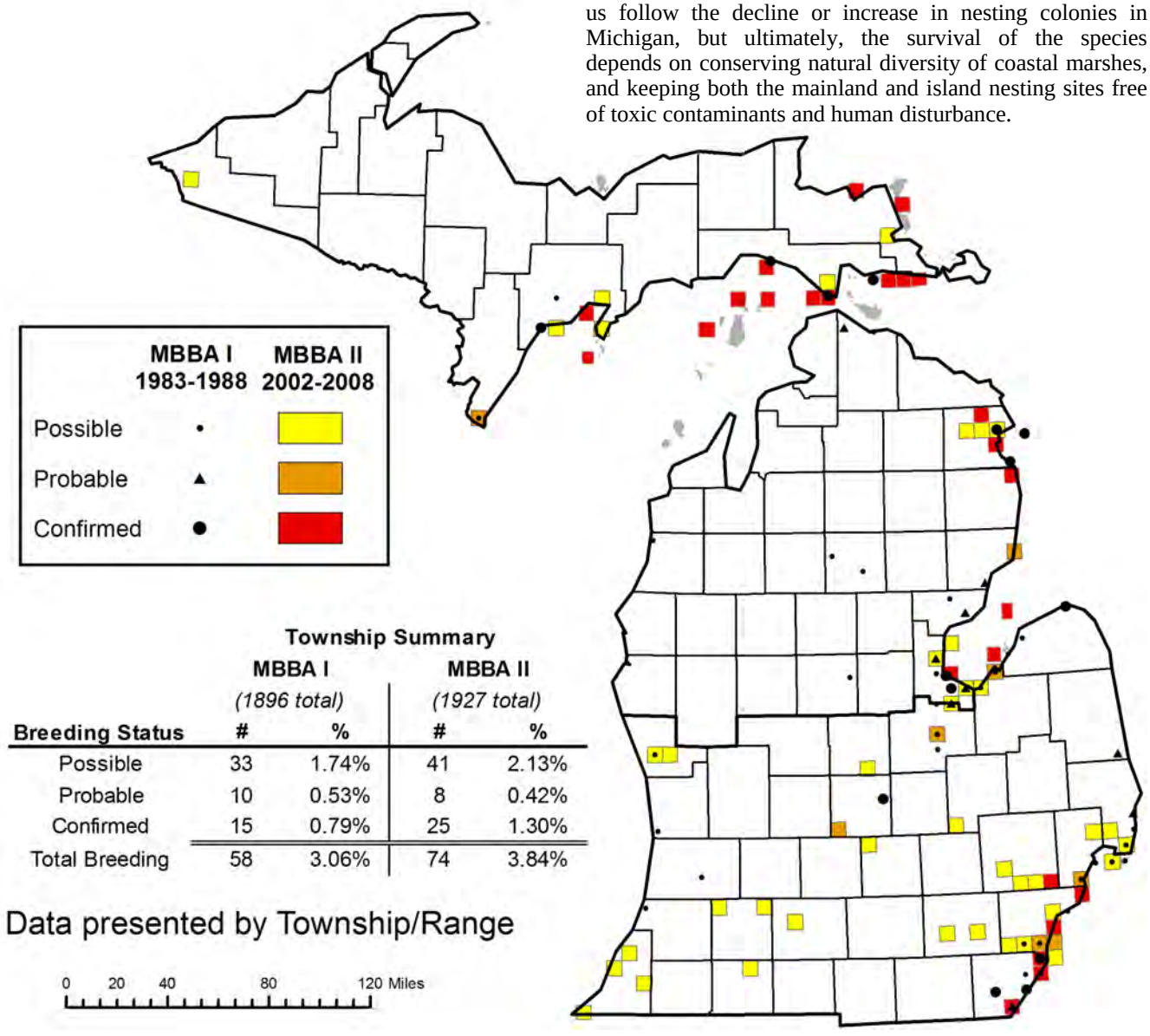
Status: *Special Concern (MNFI)*

habitat. Unfortunately, much damage to riparian zones has already occurred from a variety of human impacts. The largest Black-crowned Night Heron colony in Michigan, the Saginaw Bay CDF, has been considered for a county park. Intensive recreational development is incompatible with colonial bird nesting.

Additionally, the prolific cormorant population must be checked at some locations. Recently initiated control programs by USDA Animal and Plant Health Inspection Service personnel in cooperation with tribal management teams and Michigan DNR biologists may accomplish such reductions. This could free former habitat for Black-crowned Night-Herons at sites where cormorants have displaced herons such as at Goose Island in northern Lake Huron (pers. obs.). The aquatic habitat that produces fish, frogs, invertebrates, and, indirectly, the gull and tern chicks that are prey for nesting herons, should be monitored for ecosystem health.

Due to their place high on the food chain, Black-crowned Night-Herons accumulate toxic environmental contaminants, which may have caused some part of their continental decline in recent years. Added to the contaminants is the destruction of nesting habitat through shoreline development. This species' population is still but a small fraction of its historical numbers described by Barrows (1912) and Wood (1951) who enumerated several colonies with more than 500 nests in Michigan. Continued monitoring of toxic contaminants in herons (Custer et al. 1991) and clean-ups of polluted sites along the Great Lakes could aid this species.

Monitoring Black-crowned Night-Heron numbers can help us follow the decline or increase in nesting colonies in Michigan, but ultimately, the survival of the species depends on conserving natural diversity of coastal marshes, and keeping both the mainland and island nesting sites free of toxic contaminants and human disturbance.



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	33	1.74%	41	2.13%
Probable	10	0.53%	8	0.42%
Confirmed	15	0.79%	25	1.30%
Total Breeding	58	3.06%	74	3.84%

Data presented by Township/Range

0 20 40 80 120 Miles

Turkey Vulture *(Cathartes aura)*

Torrey Wenger



Tom Hodgson ©

Few people admit to liking this bald-headed scavenger, but the entire state benefits from the Turkey Vulture's carrion removal services. Potentially dangerous bacteria that might pass unscathed through a mammal or insect scavenger are destroyed in the vulture's digestive tract (Kirk and Mossman 1998). Add to this its remarkable soaring abilities and incredible sense of smell and you have a wonderful – if not beautiful – bird.

The two species of Cathartid vultures, turkey and black, can be tough to find in American field guides. Originally placed with the diurnal raptors, they were grouped with the storks in 1998 but were moved back in 2006 (Banks et al. 2007). Genetic and behavioral similarities are still being studied to better understand how vultures are related to other birds. The South American checklist avoids these problems by placing New World vultures in their own order, the *Cathartiformes* (Remsen et al. 2009).

Distribution

Eastern birds are short-distance migrants wintering primarily in the southeastern U.S. (Kirk and Mossman 1998). Typical arrival dates are in March in the southern counties (Adams 1979). "Early" vultures show up with warm southerly winds – a Turkey Vulture was recorded on a December 2007 Winter Feeder Survey report (Kalamazoo Nature Center 2009). The MAS Michigan Bird Survey documents Turkey Vultures in a dozen or fewer counties during the winter months, December through February; (Wuepper 2008, Murphy 2005). Christmas Bird Count observers in Michigan have recorded Turkey Vultures sporadically since the early 1980s and regularly since the mid-1990s (National Audubon Society, Inc. 2009). These observations imply that Turkey Vultures are leaving later, wintering further north than they have historically, and returning earlier.

The bulk of vultures are not "early birds", however. The Winter Feeder Survey has recorded 186 Turkey Vultures in March (Kalamazoo Nature Center 2009). The MAS Seasonal Survey documents vultures in 60 or more counties during the spring, March through May (Reinoehl 2004, 2008). Hawk counts at Whitefish Point Bird Observatory show an increased number of vultures, but the arrival date of March 26 is on par with the 20-year average (Brennan 2009).

The Turkey Vulture's northward expansion has continued in Michigan. During MBBA I, the vulture was recorded in 53% of townships statewide; during MBBA II, this jumped to nearly 68%. The largest increase was in the UP where the number of townships with recorded Turkey Vultures tripled. However, the Michigan map needs to be interpreted with caution. MBBA protocol classified any Turkey Vulture flying over a site as possible rather than observed. Turkey Vultures nest in isolated areas, forage over miles of territory, and gather in communal roosts at night (Kirk and Mossman 1998). They certainly use two-thirds of the state's townships but it cannot be said they nest in all of those townships. Breeding was confirmed in only 32 townships, primarily in SLP. This is not surprising considering the vulture's secretive nesting habits. No vulture-specific studies were carried out during the MBBA II period so most confirmed nests were accidental discoveries.

Breeding Biology

Turkey Vultures can be considered "cavity nesters", using a wide variety of "dark recesses" from tumbled boulders to old mammal dens to thick brush (Kirk and Mossman 1998). Nests are generally spaced well apart in areas isolated from human disturbance. Two eggs are typically laid and both parents incubate; the eggs are resistant to chill and may take up to 40 days to hatch. If the nest is lost, the pair may attempt a second clutch in an alternate location (Kirk and Mossman 1998). The young are fed by regurgitation and will regurgitate as a defensive measure. The young begin spending time outside the nest cavity at 40-60 days and will fly at 60-80 days. Parental dependence is short-lived, and young quickly join the communal roosts (Kirk and Mossman 1998).

Abundance and Population Trends

The apparent population increase is real and not an artifact of sampling – the same protocol was used for both Atlas efforts. Similar increases are documented in the second Atlas of New York where the incidence of Turkey Vultures rose by two-thirds (McGowan 2008) and in the second Atlas of Ontario where the likelihood of encountering vultures more than doubled (Peck 2007). This is also supported by BBS data at state, regional, and continental levels. While Breeding Bird Surveys are not ideal for monitoring vultures – who may not begin foraging until five hours after sunrise, depending on wind conditions – they can be used for density comparisons (Kirk and Mossman 1998). Throughout Canada and the U.S., Turkey Vultures have shown statistically significant increases of 1.8% per year from 1966 through 2007; in USFWS Region 3 (the Upper Midwest), they have increased by 6.5% annually; and in Michigan, they have increased at 6.5% annually (Sauer et al. 2008).

Common explanations for the northward expansion include increased road building and therefore a steady supply of road killed carrion, a burgeoning deer herd, forest clearing, and warming trends (Kirk and Mossman 1998). The road kill theory is generally held to be the most important (Peck

Turkey Vulture *(Cathartes aura)*

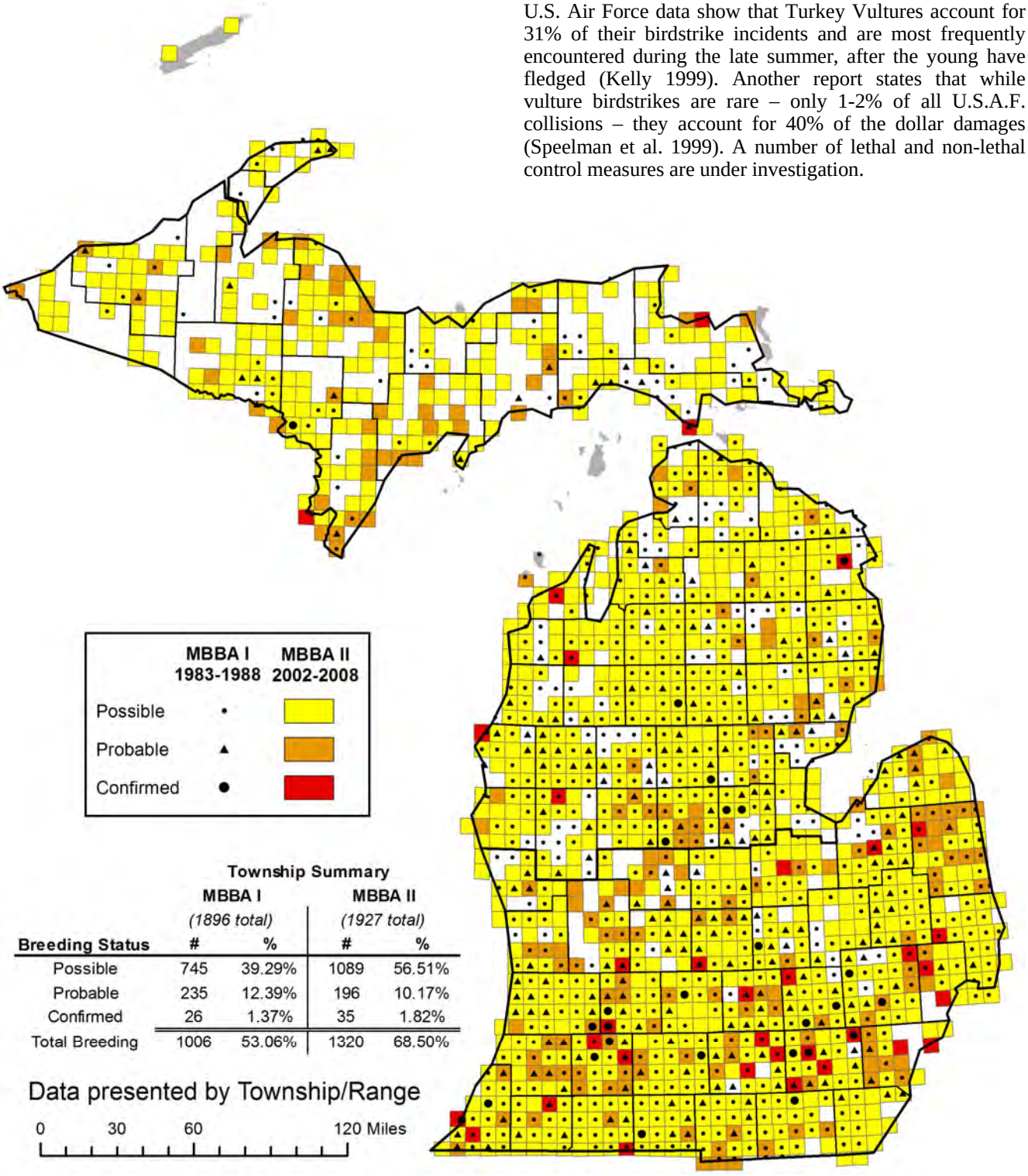
Torrey Wenger

2007) but does not explain the situation in the UP very well. More study needs to be done.

Conservation Needs

The population is not currently at risk. However, conservation issues do exist. Turkey Vultures depend on isolated areas in which to nest and roost. Deforestation and habitat fragmentation pose obvious risks to this retiring bird. Climate change is already affecting this species (Butler 2003). The Black Vulture, a more gregarious but also more aggressive cousin to the Turkey Vulture, reaches the northern edge of its range at the southern edges of Illinois, Indiana, and Ohio. Should this species expand into Michigan, it will compete for the same nesting areas and can outcompete the Turkey Vulture for food resources (Kirk and Mossman 1998).

Additionally, Turkey Vultures are a concern near airports. U.S. Air Force data show that Turkey Vultures account for 31% of their birdstrike incidents and are most frequently encountered during the late summer, after the young have fledged (Kelly 1999). Another report states that while vulture birdstrikes are rare – only 1-2% of all U.S.A.F. collisions – they account for 40% of the dollar damages (Speelman et al. 1999). A number of lethal and non-lethal control measures are under investigation.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	745	39.29%	1089	56.51%
Probable	235	12.39%	196	10.17%
Confirmed	26	1.37%	35	1.82%
Total Breeding	1006	53.06%	1320	68.50%

Data presented by Township/Range

0 30 60 120 Miles

Osprey *(Pandion haliaetus)*

Sergej Postupalsky

Status: *Special Concern (MNFI)*



Jim Ridley ©

The Osprey is a large, distinctive, fish-eating raptor which obtains its prey by plunging feet-first into the water from flight or a hover. During the breeding season it carries the fish to a perch, often with spectacular flying and vocal display high in the sky. In boreal and temperate regions Ospreys are migratory, moving to tropical and subtropical areas for the winter (Henny and Van Velzen 1972, Osterlof 1977). In North America, it breeds from central Alaska across Canada to Newfoundland, south to western Mexico, the Rocky Mountain states; east to the Great Lakes region and New England; along the Atlantic Coast south to Florida and the Bahamas; along the Gulf Coast to Louisiana and Texas; and along the Yucatan and Belize coastlines (Palmer 1988, Poole et al. 2002). Michigan Ospreys breed mainly in the northern two-thirds of the state and are currently expanding their range into the southern third.

Distribution

Prior to the 1960s, the Osprey's status in Michigan was poorly understood. Early accounts stated that the species was "generally distributed, but apparently nowhere abundant" and that it "breeds" without citing specific nest records (Gibbs 1879, Cook 1893, Barrows 1912). This was likely due to a lack of ornithological activity and record-keeping before automobiles and good highways made northern Michigan more accessible to ornithologists, most of whom lived in southern Michigan where the species had been eliminated by loss of habitat and persecution. By the 1950s, Osprey nests were reported in a dozen Michigan counties and its status was described as "a rare summer resident, principally in the northern half of the state" (Zimmerman and Van Tyne 1959).

In the early 1960s, the Osprey population was rapidly declining (Postupalsky 1977) due to much reduced reproduction attributable to the thin-eggshell syndrome caused by widespread DDE (a metabolite of DDT) contamination of aquatic food webs (Wiemeyer et al. 1975, Poole 1989). Osprey productivity in Michigan started improving in the late 1960s and by 1971 had reached estimated population maintenance levels (Postupalsky 1977). Osprey numbers then leveled off at about 80 pairs and in 1977 started slowly increasing again.

In Michigan, Ospreys nest in dead trees found in beaver ponds, man-made impoundments, or along the fringes of lakes and streams. They also nest in conifer swamps where nests are built on top of tall pines, other conifers, or on snags, occasionally up to several miles from the nearest water body. Ospreys readily accept nest platforms provided for them (Postupalsky 1978) in addition to power-transmission towers, utility-line poles, light-poles, navigational aids (Poole 1989), and telecommunication towers. Fully 90 % of the nests in the LP are now on man-made structures.

Breeding Biology

Most Ospreys arrive at their Michigan nest sites in early April. Eggs (two to four, most frequently three) are laid in late April and early May. Most chicks hatch in the first half of June, and young fledge from mid-July to early August. Ospreys start departing from Michigan in August and by October most have arrived on their tropical wintering grounds. One-year-old Ospreys remain in their wintering areas for at least one year (Henny and Van Velzen 1972, Osterlof 1977). Whereas some return as two-year olds and a few may attempt nesting (Englund and Greene 2008), most Ospreys do not start breeding until at least age three (Postupalsky 1989). Factors limiting reproductive success include weather, changing fish populations, increased weediness and water turbidity of lakes and reservoirs, and predation by Great Horned Owls and Bald Eagles.

Abundance and Population Trends

By 1992, the statewide population had tripled to 227 known pairs: 152 in the UP and 75 in the northern LP. During 1993-1998, the number of nesting pairs dropped to a low of 180 known pairs (113 in the UP and 67 in the LP). This decline was observed over most of the Osprey's Michigan breeding range and was also noted in Wisconsin (Eckstein et al. 2009). The cause of this negative trend remains unknown. Osprey reproduction in the 1990s continued at adequate levels, therefore one is left to postulate increased mortality during migration or on the wintering grounds in Central and northwestern South America, where wildlife protection and anti-pollution laws go largely unenforced, and where fish-eating birds are routinely shot at aquaculture facilities (Bechard and Reyes 2003). Some partial recovery was noted by 2000 when 200 nesting pairs were located: 124 in the UP (including Isle Royale) and 76 in the LP (Postupalsky pers. obs.).

Osprey *(Pandion haliaetus)*

Sergej Postupalsky

Status: *Special Concern (MNFI)*

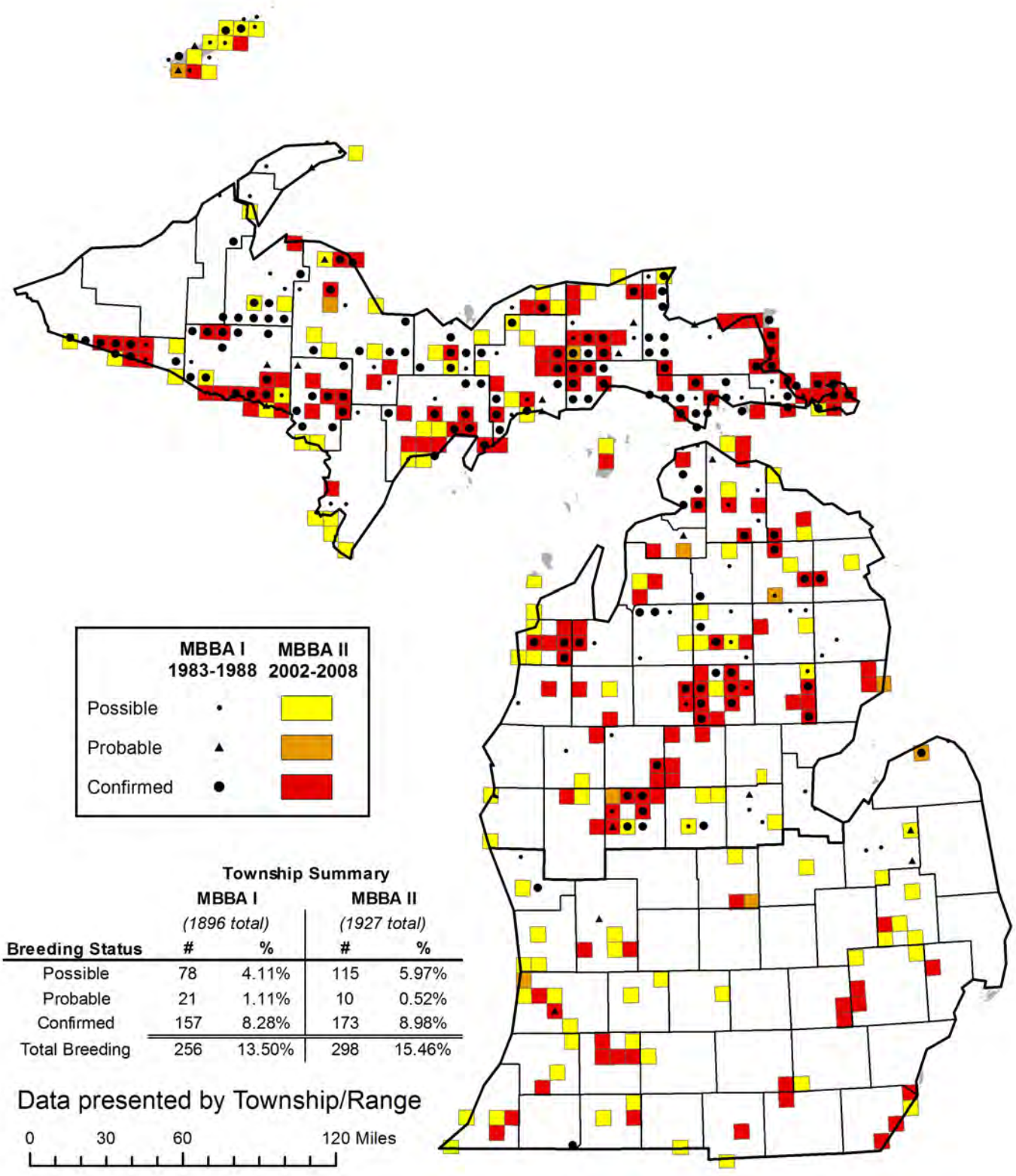
In 2008, 110 nesting pairs were identified in the LP (87 in the north and 23 in the south) representing a substantial increase from the 60 pairs reported in MBBA I (Postupalsky and Weinrich, pers. obs.). The growing population in the southern LP has become established only during the last decade, aided by an introduction program conducted by the DNR, Huron-Clinton Metroparks and the Detroit Zoo. During 1998-2007, about 50 Osprey nestlings were taken from nests in northern Michigan and hacked out at four locations in the southern LP. In 2000, the most recent year of a statewide survey, 124 nesting pairs were found in the UP, an increase from the 100 pairs reported in MBBA I. Throughout the 36-year monitoring period, nesting Ospreys were more numerous in the eastern UP than in the western part. About 50 accessible breeding sites across the UP continue to be monitored. Osprey numbers at these sites appear to be stable, except on Seney NWR where an increase has occurred in recent years. As most of the monitored nests are on platforms and other man-made structures at accessible locations, the sample may not be representative of the entire UP Osprey population. Large, more remote parts of the UP are no longer being monitored for Osprey nesting, as the DNR discontinued aerial surveys after 2000. Five to six pairs have nested on Isle Royale in recent years (Peterson and Vucetich 2006, Vucetich and Peterson 2007). The map shows Ospreys nesting in 13 of the UP's 15 counties; only Ontonagon, Houghton, and the mainland portion of Keweenaw County show no nesting. In the northern LP confirmed nesting is indicated for 21 counties. In the southern LP, nests are thinly distributed over 17 counties. This southward extension of the Osprey's breeding range is the most significant change occurring since MBBA I.

Conservation Needs

In Michigan, the Osprey was listed as threatened by the DNR until 2009 when it was removed from the state endangered species list. While its population has made an encouraging recovery in recent years, the unexplained dip in numbers during the mid-1990s is cause for concern. Well-designed nesting platforms appropriately placed near productive water bodies enable the Osprey to breed in areas lacking suitable nest supports. Power companies have erected platforms on top of isolated poles to keep Ospreys from nesting on utility towers and poles, and the U.S. Coast Guard has installed platforms on top of channel markers and range-light towers to prevent the birds' nests from obstructing the lights. Such measures permit Ospreys to persist in an increasingly human-dominated landscape; however monitoring of their effectiveness needs to continue. Because the Osprey is a top predator in aquatic ecosystems it is vulnerable to bioaccumulation of environmental pollutants (Wiemeyer et al. 1975). Therefore continued vigilance of the long-term effects of chemical pollutants is necessary.

Osprey *(Pandion haliaetus)* ***Sergej Postupalsky***

Status: *Special Concern (MNFI)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	78	4.11%	115	5.97%
Probable	21	1.11%	10	0.52%
Confirmed	157	8.28%	173	8.98%
Total Breeding	256	13.50%	298	15.46%

Bald Eagle *(Haliaeetus leucocephalus)*

Sergej Postupalsky

Status: *Special Concern (MNFI)*



Roger Eriksson ©

To see an adult Bald Eagle, whether soaring in wide circles on the breeze in the sky, its white head and tail shining in the sun, or perched atop some tall snag, is one of the most inspiring sights in nature. Owing to its size and distinctive plumage, an adult Bald Eagle is unmistakable, but the dark, mottled immature can be mistaken for a Golden Eagle. The breeding range of the Bald Eagle is limited to North America, extending from the Aleutian Islands of Alaska to Labrador and Newfoundland in the north, to Baja California, Texas and Florida in the south (AOU 1993, Buehler 2000); however, the species is thinly distributed over large areas of the interior of the continent where nests are associated mainly with the larger rivers (Stalmaster 1987, Johnsgard 1990, Buehler 2000). Most immature Bald Eagles migrate (Buehler 2000, Postupalsky 1976), but adults withdraw only from the northern parts of the breeding range and move to areas where open water and food (e.g. fish, waterfowl) are available (Buehler 2000). Some young eagles raised in Florida and other southeastern states disperse northward, including into Michigan (Broley 1947, Buehler 2000).

Distribution

Up to the late 19th Century the Bald Eagle was generally distributed over the state and was not considered rare (Gibbs 1879), especially in the uninhabited regions of the north (Cook 1893). By the early 1900s it was considered nowhere abundant, owing to relentless persecution - shooting for specimens, nest-robbing by egg collectors, and wildlife laws that classified raptors as injurious wildlife that could be freely shot. It was most commonly seen near the shores of the Great Lakes and along the larger rivers (Barrows 1912). Bald Eagles nested in the Detroit area as late as 1904 at Grosse Ile and Elba Island (Wayne County) and in 1903 at the mouth of the Clinton River in Macomb County (Wood 1951). By the early 1940s it was described as an uncommon summer resident north of Saginaw Bay and Muskegon County, and was also breeding in Monroe County (Wood 1951). Knowledge of its status in the north was still quite poor, as Wood (1951) listed only five nest records for the UP. By the 1950s it was confined as a breeding bird to the northern half of the state with a few still nesting in Allegan, St. Clair, and Monroe counties. (Zimmerman and Van Tyne 1959).

Up to the middle of the 20th century, the decline in eagle numbers was gradual due to habitat loss and persecution. An accelerated decline began in the early 1950s, resulting mainly from sharply reduced reproduction caused by breakage of thin-shelled eggs during incubation, attributable to bioaccumulation of DDE, a metabolite of the then widely used pesticide DDT, in aquatic food webs (Sprunt et al. 1973, Wiemeyer et al. 1984, Nisbet 1989). The Bald Eagle was then all but eliminated as a breeding bird from the Great Lakes shores and from agricultural and fruit growing areas of the state.

Breeding Biology

Bald Eagles breed near water bodies (e.g., seacoasts, lakes, and large rivers) where a dependable food supply and large trees for nests are available. The diet consists mainly of fish, however waterfowl, other birds, mammals up to rabbit size, turtles, and a wide variety of carrion are also taken (Stalmaster 1987, Johnsgaard 1990, Buehler 2000). Nests are typically placed in supracanopy trees that rise above the surrounding forest or trees at the edge of a stand or an opening. In Michigan a high proportion of nests are built in white pines with an open crown structure, but red pines and a variety of deciduous trees (mainly aspen, but also cottonwood, yellow birch, maple, elm, ash, oak) are also used. Live trees are preferred, but a nest may continue to be used for many years after the tree has died.

Banding has produced no evidence that adult eagles nesting south of Lake Superior are migratory (Postupalsky, unpub. data), only moving nomadically when food becomes unavailable locally. They are among our earliest breeders; eggs (2-3) are laid as early as mid-February in the south and along the major rivers, or as late as early April along Lake Superior. Eaglets hatch from late March to mid-May and most fledge between early June and late July. These dates are based on 4 decades of nest surveys and age estimates of eaglets at banding (Bortolotti 1984; Postupalsky, unpub.data). There is some evidence suggestive of earlier nesting since the 1970s (S. Postupalsky, D. Best, and W. Bowerman, unpub. data), however, it is not clear if this is a response to climate change, or to increased food availability in winter (numbers of deer killed on roads increased substantially between 1967 and 1996 though numbers have stabilized since [DNR 1987 unpub. Data, Michigan State Police unpub. data]), allowing the birds to come through the winter in good condition, conducive to earlier (and more successful) breeding (Postupalsky, unpub. data).

Abundance and Population Trends

Statewide nesting surveys began in 1961 as part of the Continental Bald Eagle Project launched by the National

Bald Eagle *(Haliaeetus leucocephalus)*

Sergej Postupalsky

Status: *Special Concern (MNFI)*

Audubon Society (Sprunt 1961, 1963; Sprunt et al. 1975) employing techniques described by Postupalsky (1974, 1983). Numbers of nesting Bald Eagles continued dropping through the 1960s and locally in the eastern UP into the early 1970s. In about 1970, reproductive success had recovered to replacement levels, and the population remained stable at 86 + 4 pairs through the decade. In 1977, the first significant improvement in reproduction was noted in the few remaining pairs near the Great Lakes shores (seven near Lake Superior west of Marquette and two on Sugar Island in the east; Postupalsky 1978). Michigan's eagle population started increasing in 1981, reoccupying sites near the shores and on the islands of the Great Lakes (Dykstra et al. 2006), and extending their breeding range into the SLP.

Michigan's Bald Eagle population has undergone a significant increase since MBBA I, demonstrated by atlas and nest surveys. Statewide, the total number of townships with confirmed nesting has grown from 192 to 334 and total townships reporting eagles increased from 299 to 547. While the number of townships with confirmed nesting in the UP has changed little since MBBA I, indicating a higher density of nesting pairs in some townships, the growth since MBBA I in the LP has been dramatic: from 53 to 171 townships and from 5 to 36 townships in the NLP and SLP respectively.

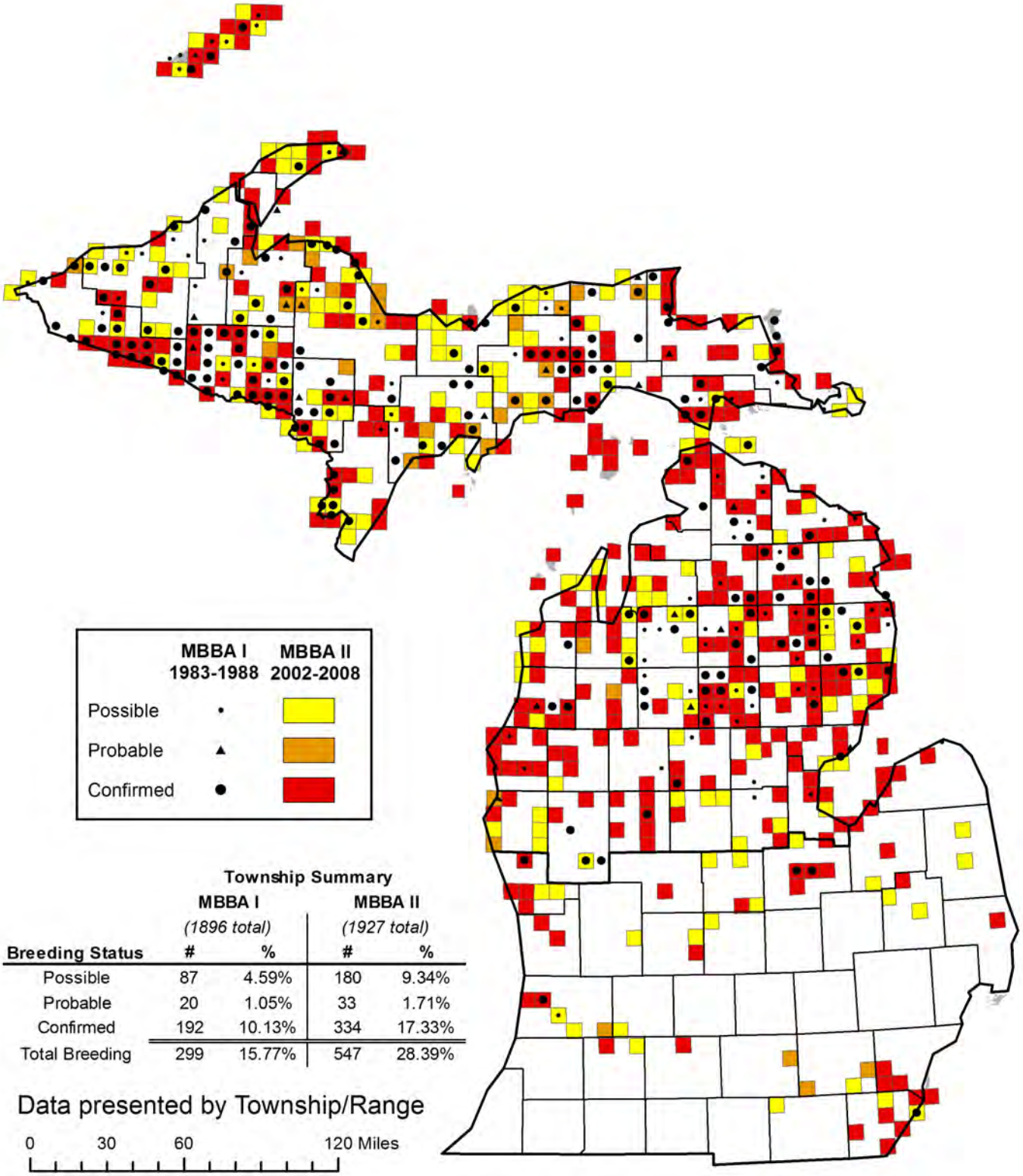
Nest surveys located at least 218 pairs in the UP in 2007-2008 (S. Postupalsky, D. Best, and W. Bowerman, unpub. data), more than doubling the 1988 total of 102 pairs (Postupalsky 1989). Owing to less intensive effort in the western UP, many pairs were missed there in recent years; therefore the 2007-2008 total is to be viewed as a minimum estimate. Ten pairs nested on Isle Royale in 2007 (Vucetich and Peterson 2008); in 1988 there were only two. As in MBBA I, Bald Eagles continue nesting in all 15 UP counties; most of the recent population growth has occurred in the eastern UP where the decline during the DDT-years had been much more severe than in the western UP. Nest surveys in 2008 located 273 nesting pairs in the NLP, a substantial increase from the 58 pairs reported in 1988. In the SLP the population has grown from two pairs in 1988 to 46 pairs in 2008. Nesting eagles are now found in all NLP counties and in 18 SLP counties. Michigan's total for 2008 stands at approximately 550 nesting pairs; the numbers of occupied nests have nearly doubled every decade since the low during the 1970s (S. Postupalsky, D. Best, and W. Bowerman unpub. data). While no significant population trends have been found by the BBS for Michigan, there is a significant 14% annual increase for USFWS Region 3 (Sauer et al. 2008).

Conservation Needs

The Bald Eagle has shown a very gratifying recovery since the DDT-era and is now breeding in most of the 48-contiguous states. First afforded protection under the Bald Eagle Protection Act of 1940, legal protection was increased under the Endangered Species Act of 1973 at both the Federal and State level. Its recovery is attributable to cessation of use of persistent biocides and polychlorinated biphenyls, nesting habitat protection, reduced persecution, and an adequate food supply (fish, waterfowl, road-kills). Use of roadkills, however, is a double-edged sword: while it provides a welcome food supply, especially in winter, some eagles are killed or injured by vehicular traffic. There is reason to believe that Bald Eagle mortality from lead poisoning is on the rise in recent years (Stuber et al. 2011). These sources of mortality might be reduced by timely removal of carcasses from the roadsides to safer locations (Watson et al. 2009). While small numbers of eagles still continue to be illegally shot, electrocuted on power lines, or die in traps set for furbearers; a healthy, reproducing population can withstand such causes of mortality as long as they remain at low frequencies. The recovery of its population over the past three decades has led to federal delisting of the Bald Eagle in 2007 and in 2009 by the State of Michigan. It continues to be protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, as well as by Michigan law. The positive population trends notwithstanding, the Bald Eagle's position at the end of aquatic and terrestrial food webs calls for continued vigilance relating to long-term effects on the biota of the multitude of chemical pollutants being released into the atmosphere and into our waterways.

Bald Eagle *(Haliaeetus leucocephalus)* ***Sergej Postupalsky***

Status: *Special Concern (MNFI)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	87	4.59%	180	9.34%
Probable	20	1.05%	33	1.71%
Confirmed	192	10.13%	334	17.33%
Total Breeding	299	15.77%	547	28.39%

Data presented by Township/Range

0 30 60 120 Miles

Northern Harrier *(Circus cyaneus)*

Gerald R. Urquhart

Status: *Special Concern (MNFI)*



Darlene Friedman ©

In grasslands and marshes, ghostly male and brownish female Northern Harriers hunt low over the fields, gliding back and forth in search of small rodents and birds. They are familiar yet special birds in Michigan, with less frequent breeding than their familiarity suggests, and great vulnerability due to their habitat requirements.

The Northern Harrier has a circumpolar distribution through two subspecies, with the North American subspecies being commonly called the Northern Harrier (formerly Marsh Hawk) and the Eurasian commonly referred to as the Hen Harrier (MacWhirter and Bildstein 1996). In North America, the breeding range of the Northern Harrier extends from Alaska and Newfoundland south to Baja California in the west, across the Great Plains, and to the Atlantic Seaboard. Harriers are highly migratory, with birds spreading from southern Canada to northern South America during winter months.

Distribution

In Michigan, the Northern Harrier is sparsely distributed throughout the state, with lower densities in the southern third of the LP. Surveys found breeding evidence in fewer townships during MBBA II (18.81%) than in MBBA I (27.22%), a 30% decrease in the number of townships with breeding evidence. Although these figures do not represent actual population estimates, they do suggest that the previously uncommon Northern Harrier should be considered a rare breeder in Michigan. From MBBA I to MBBA II, breeding evidence declined in each of the areas that Yunger (1991) identified as "high breeding concentration." The declines in each area are: 1) Gladwin-Midland county wetlands (-59%), 2) south-central UP wetlands (-39%); 3) the eastern UP wetlands (-39%); and 4) the thumb region grasslands (-12%).

Breeding Biology

Northern Harriers migrate in March and April to their breeding areas in Michigan. From early April through May, the harriers perform a spectacular aerial display to attract mates. The male or male and female together flap their way up into the sky—as high as 300 meters—and then stoop toward the ground at high velocity, curving through a U-shaped flight bottoming out near the ground, and returning skyward (Bent 1939). Unlike most raptors, Northern Harrier males are occasionally polygynous, simultaneously breeding with two to five females (Simmons et al. 1987).

Harriers feed mostly on voles and other rodents, although grassland birds (Red-winged Blackbirds, Eastern Meadowlarks, and others) make up a small portion of their diet (MacWhirter and Bildstein 1986). Birds living in wet areas also consume frogs.

Harriers nest on the ground in grassy fields or on elevated hummocks in marshes and bogs, locating their nests in the densest and tallest vegetation in the habitat. The nests are built of twigs and sticks with a cup of 20-25 cm wide and 5-10 cm deep, and outside diameter of 39-63 cm. After nest construction, females begin laying eggs at two to three day intervals for a typical clutch of four to five eggs (Macwhirter and Bildstein 1996, Bent 1939). Egg laying in Michigan occurs mostly during May (late April-early June; Craighead and Craighead 1969).

Incubation lasts 30-32 days during which females remain on the nest for all but brief absences (MacWhirter and Bildstein 1996). Male harriers provide all food to females during incubation and most food to young in the first 10-14 days after hatching (Simmons et al. 1987). During this period, females brood the young and apportion food to nestlings, with older nestlings receiving more food. As nestlings grow, females begin to hunt and remain responsible for feeding the young. Young begin flying around 30-45 days, and remain in family groups for up to four weeks after fledging (MacWhirter and Bildstein 1996).

Abundance and Population Trends

The results of MBBA II surveys support the need for concern over decreasing populations, with an overall decrease of ~30% in townships with breeding evidence since MBBA I.

A century ago, Barrows (1912) called the Northern Harrier "one of our commonest and best known birds," but there have been significant changes in both habitat availability and harrier population since. Because of its affinity for open grasslands and wetlands, it has been hit on multiple fronts by land use changes. Agricultural intensification—including reduced acreage in hayfields, shortened harvesting cycles and the increased use of pesticide—has reduced suitable habitat for Northern Harrier breeding. Wetlands have declined in Michigan since the 1830s (Dahl and Allord 1996).

Northern Harrier *(Circus cyaneus)*

Gerald R. Urquhart

Status: *Special Concern (MNFI)*

Between MBBA I and MBBA II, there were breeding evidence declines of 39%-59% in the three regions where harriers utilized extensive wetlands, with a lesser decline in the grassland region in the thumb. The declines suggest that changes in the wetland habitats may have impacted the populations in the centers of abundance. However, the Upper Peninsula regions also had further regrowth of forests logged in the early 1900s, and this may have fragmented grasslands and wetlands to the point of making them unsuitable. Gladwin and Midland Counties are home to large hayfields, and earlier first cuts of hay have negatively impacted many grassland birds (Bollinger et al. 1990, Giuliano and Daves 2002). In sum, multiple factors may be involved in the current declines in Northern Harriers in Michigan.

Northern Harriers and the state-endangered Short-eared Owl are the two major grassland raptor species in Michigan. Both species breed in large, undisturbed wet meadows and grasslands with tall and often dense vegetation (Currier 2001). The minimum habitat size required for breeding is not well established, although territory sizes averaged 260 hectares (640 acres) in Washtenaw County (Craighead and Craighead 1969). In Illinois, Herkert et al. (1999) found harriers nesting in grasslands ranging from eight to 120 hectares, but suggested proximity to adjacent grassland areas was important for pairs nesting in small fragments. Based on the breeding records for Michigan, it appears that the scattered prairie remnants of SW Michigan do not provide enough nesting habitat for Northern Harriers, which may be because of their often small size (5-20 hectares) or isolation from other prairies.

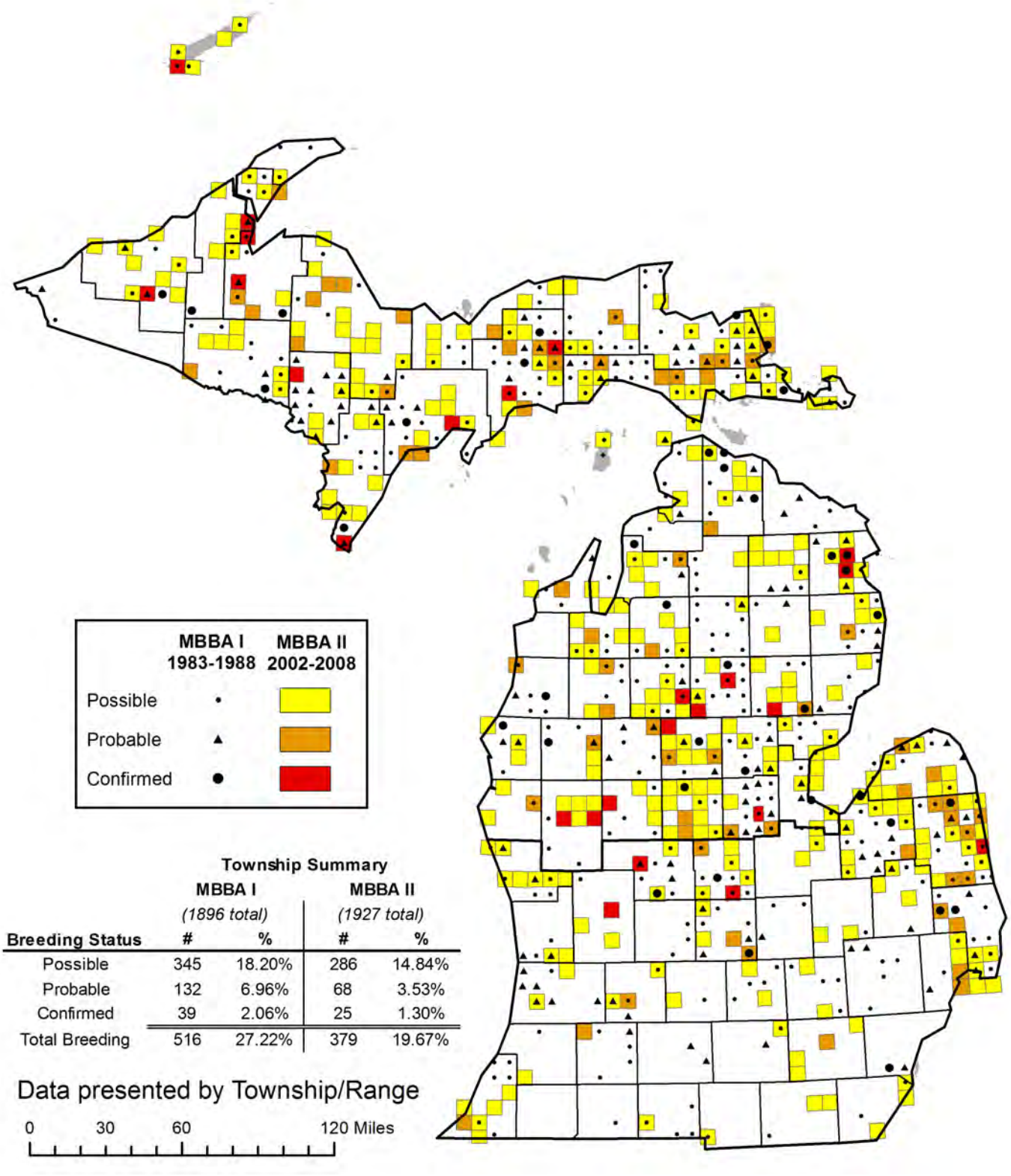
Conservation Needs

The Northern Harrier is a species of special concern in Michigan and is considered threatened or endangered in 12 north central and northeastern states (Currier 2001). The declines of Northern Harriers between MBBA I and MBBA II validate the bird's "Special Concern" status and call for further monitoring. Of particular concern are the declines in areas identified by Yunger (1991) as centers of abundance for Northern Harriers in Michigan. Populations are directly tied to the availability of suitable habitats and the loss of both wetland and grassland habitats undoubtedly contribute to this decline, yet other factors may play a role (e.g. invasive species like Purple Loosestrife and Phragmites spp.). More research is necessary to determine the probable causes of the declines and allow for the development of better management strategies. Without improved management, what was once Michigan's most common raptor (Barrows 1912) may soon be absent from many regions of the state.

Northern Harrier *(Circus cyaneus)*

Gerald R. Urquhart

Status: *Special Concern (MNFI)*



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	345	18.20%	286	14.84%
Probable	132	6.96%	68	3.53%
Confirmed	39	2.06%	25	1.30%
Total Breeding	516	27.22%	379	19.67%

Sharp-shinned Hawk *(Accipiter striatus)* ***Gerald R. Urquhart***



Elizabeth Rogers ©

The small, acrobatic Sharp-shinned Hawk is an abundant migrant but an uncommon breeder in Michigan. During migration they funnel into points that concentrate migrant songbirds and patrol like squadrons of biplanes, dropping from above to ambush prey up to the size of Blue Jays. In the breeding season, they disappear into woodlands where they use their long tails and short wings to pursue prey through even the densest of vegetation.

Sharp-shinned Hawks range from Alaska and Labrador south to Argentina, with several subspecies being endemic to Caribbean Islands. The main North American subspecies, *A. striatus* velox, breeds over most of Canada and the northern U.S., with densities becoming lower in the Southwestern U.S. and Appalachian region.

Distribution

In Michigan, the Sharp-shinned Hawk breeds in both the UP and LP, but their highly secretive nature during breeding resulted in few records to clearly define their range. The results from MBBA I and MBBA II show a substantial increase in SLP townships with breeding evidence from 6.03% in MBBA I to 11.71% in MBBA II. Breeding evidence suggests relatively stable numbers in the NLP, with 16.95% for MBBA I and 13.95% for MBBA II, and in UP townships with 21.80% in MBBA I and 21.26% in MBBA II. Because of their small size and secrecy during the nesting season, confirmed breeding was recorded in less than 1% of townships (17 of 1,925). The increase in SLP breeding may be due to maturation of forests. Ontario had a substantial increase in observations in their Carolinian forest region (similar to our SLP forests in species composition, level of fragmentation, and age of stands) from their first atlas with 7.9% of blocks occupied (Cadman et al. 1987) to 33.8% in the second atlas (Gahbauer 2007).

In Wisconsin, the highest concentration of breeding records comes from the northern third of the state (Jacobs 2006). States to the south had very few breeding records, with sparse populations in east-central Ohio (Austing 1991) and southern Indiana (Squires et al. 1998), and only a few scattered records in Illinois (Kleen 2004).

Breeding Biology

Relatively little is known of the breeding behavior of Sharp-shinned Hawks in Michigan. Although some birds overwinter sparsely in Michigan, most of the individuals that breed in Michigan probably winter in the southern U.S. and return to the breeding ground in April.

Nesting takes place in coniferous, deciduous, and mixed woodlands with most nests found in conifers (pine, spruce, tamarack and cedar) (Barrows 1912). The broad, flat nests are located from 12 to 55 feet above the ground, and are made of dead twigs and bark, measuring 35-60 cm wide and 10-14 cm deep, nearly the same dimensions as the larger Cooper's Hawk (Barrows 1912, Bent 1937).

Females lay individual eggs on alternating days with four to five eggs (range three to eight) in a clutch, and only a single clutch laid each year (Bildstein and Meyer 2000). Most estimates of incubation period range from 30-35 days, with the eggs all hatching within 48 hours, suggesting delayed onset of incubation (Palmer 1988).

Accipiters have a high degree of sexual dimorphism, with male Sharp-shinned Hawks significantly smaller (24-27 cm) than females (29-34 cm) and weighing only half as much as females in many cases (Wheeler and Clark 1995). The altricial hatchlings rapidly differentiate in size, with females gaining mass faster but more slowly developing plumage. Males develop plumage, flight skills, and fledge up to several days before females. Birds fledged between 21 and 27 days in U.S. populations, and young remained with parents for approximately 3.5 weeks after fledging (Bildstein and Meyer 2000).

Sharp-shinned Hawks are often thought of as smaller versions of Cooper's Hawks, but difference in distribution and habitat choice exist (Trexel et al. 1999). Cooper's Hawks breed throughout the United States and Canada, but Sharp-shinned Hawks are much more common in the northern U.S. and Canada. Trexel et al. (1999) found that Sharp-shinned Hawks nested more frequently in coniferous and mixed forests than Cooper's Hawks, as well as forests with larger trees.

Abundance and Population Trends

As common as Sharp-shinned Hawks are during migration, actual population numbers are difficult to determine. Few observations of nesting birds and a lack of nest surveys in Michigan make any trends in population difficult to discern (Betz 1991). Although breeding survey block numbers do not necessarily reflect population changes, there was a sizeable increase in the number of blocks with breeding evidence between MBBA I and MBBA II in the SLP, possibly tied to maturation of old fields into forests in the

Sharp-shinned Hawk *(Accipiter striatus)*

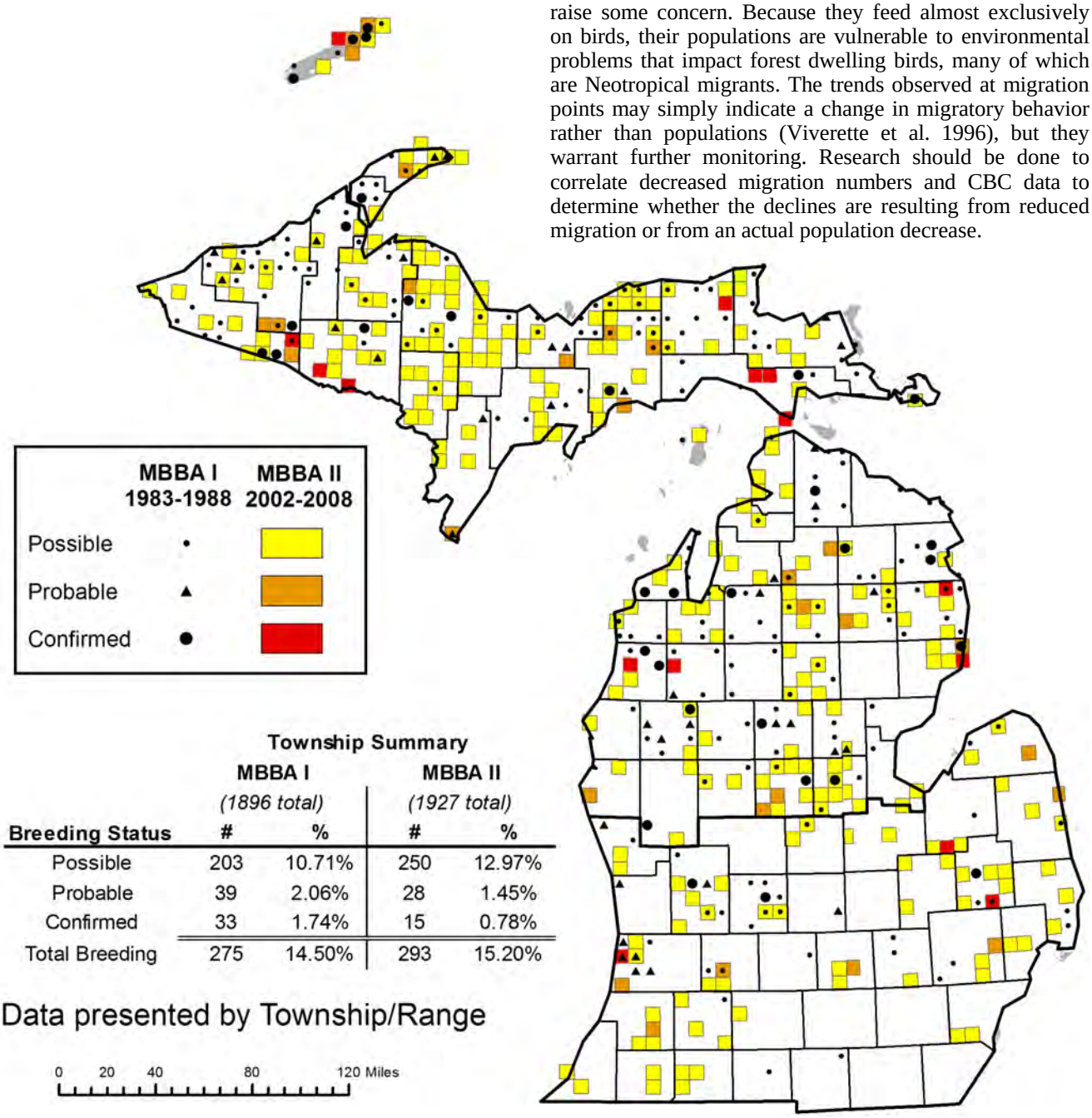
Gerald R. Urquhart

SLP. Combined historical breeding bird survey data show no significant trends for Michigan or the Midwest between 1966 and 2007 (Sauer et al. 2008).

Migration counts are one of the best indicators of population, but inter-annual variation makes it difficult to determine trends and causes (Farmer et al. 2007). Michigan's two hawk counts with the longest coverage are mostly surveying birds that breed in Ontario, but both have shown decreases in Sharp-shinned Hawks in recent years. The Southeastern Michigan Raptor Research data (Wayne County) from 1999-2008 indicate an average decrease in migrating Sharp-shinned Hawks of 9% per year during this period, although there is high annual variability (HMANA 2009a, 2009b), and Whitefish Point Bird Observatory had a declining trend from 1979-2007 (RPI 2010). Although discrete data for Michigan-breeding Sharp-shinned Hawks are unavailable, regional trends all indicate a decrease in migrant birds. During the 1980s and early 1990s, similar declines in migratory numbers occurred in the Eastern U.S. (Viverette et al. 1996), and Wood et al. (1996) suggested that these may be due to more Sharp-shinned Hawks wintering northward, but also noted that environmental contaminants may play a role in the decline.

Conservation Needs

At first glance, Sharp-shinned Hawk populations appear to be relatively healthy in North America because of their abundance in migration, but declines in migratory numbers raise some concern. Because they feed almost exclusively on birds, their populations are vulnerable to environmental problems that impact forest dwelling birds, many of which are Neotropical migrants. The trends observed at migration points may simply indicate a change in migratory behavior rather than populations (Viverette et al. 1996), but they warrant further monitoring. Research should be done to correlate decreased migration numbers and CBC data to determine whether the declines are resulting from reduced migration or from an actual population decrease.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	203	10.71%	250	12.97%
Probable	39	2.06%	28	1.45%
Confirmed	33	1.74%	15	0.78%
Total Breeding	275	14.50%	293	15.20%

Data presented by Township/Range

Cooper's Hawk *(Accipiter cooperii)*

Deaver D. Armstrong



Joan Tisdale ©

When it cruises through a backyard filled with birdfeeders, the stealthy Cooper's Hawk scatters the feeding birds and may even pick off a Mourning Dove or a Northern Cardinal. These and other medium-sized birds are a staple of this hawk's diet but guilt-ridden feeder watchers can take some comfort: a recent study shows the Cooper's Hawk is no more likely to be hunting in areas with feeders than in any other part of its winter territory (Roth et al. 2008). During the breeding season, it seems that Northern Cardinals that nest near a Cooper's Hawk nest know to sing from a more concealed perch than they would otherwise use (Duncan and Bednekoff 2006).

This familiar woodland hawk breeds in all states but Alaska and Hawaii, as far north as the southern provinces of Canada and as far south as northern Mexico (Curtis et al. 2006). In Michigan it is an uncommon breeder in the LP and a rare breeder in the UP. It is a fairly common migrant in the SLP in the fall (Chartier and Ziarno 2004). Birds regularly overwinter in the SLP but there are only occasional Cooper's Hawks on Christmas Bird Counts in the UP where the species is generally rare to casual (NAS 2009, Chartier and Ziarno 2004).

Distribution

Until the mid-1900s, the Cooper's Hawk was regularly shot for its reputation as a chicken predator (Bent 1937, Kielb 1994a, Curtis et al. 2006). Then widespread use of DDT generated a decline in reproductive success for the remaining Cooper's Hawk populations until regulation of the pesticide's use in the 1970s (Curtis et al. 2006). Consequently, a bird once called "our most abundant hawk" by Barrows (1912) was called "fairly common" by Wood (1951) and Zimmerman and Van Tyne (1959) and then, by Payne (1983), "an uncommon transient and summer resident" though he does note a probable increase in population. Between 1960 and 1983, only three counties north of the SLP reported nests, though this may be a case of underreporting (Payne 1983). Perhaps this is a reason that the Cooper's Hawk was retained as a species of special concern after being removed from state threatened status in 1983 (Betz 1991). Special concern status was removed during the sixth revision of the state's endangered species list (MDNR 2011, MNFI 2009). While MBBA I documented confirmed nesting in at least 15 counties in the NLP and UP, only nine counties in these areas had confirmed nesting in MBBA II. However, Cooper's Hawks continue to be widely distributed across the UP (3% of townships) and NLP (15% of townships), even though sparsely so. In the SLP, the Cooper's Hawk continues to be well and widely distributed with breeding activity in just over half of the townships.

Breeding Biology

The male Cooper's Hawk is the primary nest builder and he begins this in late March or as late as mid-April in the SLP (Kielb 1994b). Cooper's Hawks produce a single brood per year and may reuse nest sites from one year to the next (Bent 1937). Females are the primary caretaker of the noisy nestlings throughout June and July in Michigan, though males will bring food to the nest (Kielb 1994a, Curtis et al. 2006). The young leave the nest after a month and will stay together near the nest for up to seven weeks as parents drop whole prey nearby (Curtis et al. 2006).

While the Cooper's Hawk is a bird that nests in both mixed and deciduous forests, it is quite tolerant of human disturbance and habitat fragmentation, and nesting and wintering in suburban/urban habitats is on the rise (Curtis et al. 2006, Roth et al. 2008). Studies of Cooper's Hawks nesting in urban areas in Wisconsin and elsewhere in the Midwest suggest that Cooper's Hawks nesting in urban areas are as productive as those in non-urban areas (Stout et al. 2007).

Abundance and Population Trends

The Partners in Flight population estimate for Cooper's Hawks in Michigan is 16,000 birds, almost 3% of the world's population (PIF 2007). As far as raptor species are concerned, only Broad-winged Hawks (50,000) and American Kestrels (39,000) are more numerous while the less secretive Red-tailed Hawk ranks fourth (10,000).

The total number of townships in Michigan reporting evidence of breeding of Cooper's Hawks has increased since MBBA I. Almost all of that increase is in the SLP, with increases in the counties of Lenawee, Monroe, Washtenaw, and Wayne in Southeastern Michigan being most striking. The NLP township numbers are essentially unchanged. Though it is difficult to know why, the number of UP townships reporting evidence of breeding Cooper's Hawks is less than half of the number from MBBA I.

The BBS data reflects the overall trend shown by the township data. Michigan and each of the surrounding states of USFWS Region 3 show substantial increases in populations since 1966 (Sauer et al. 2008). The BBA trend

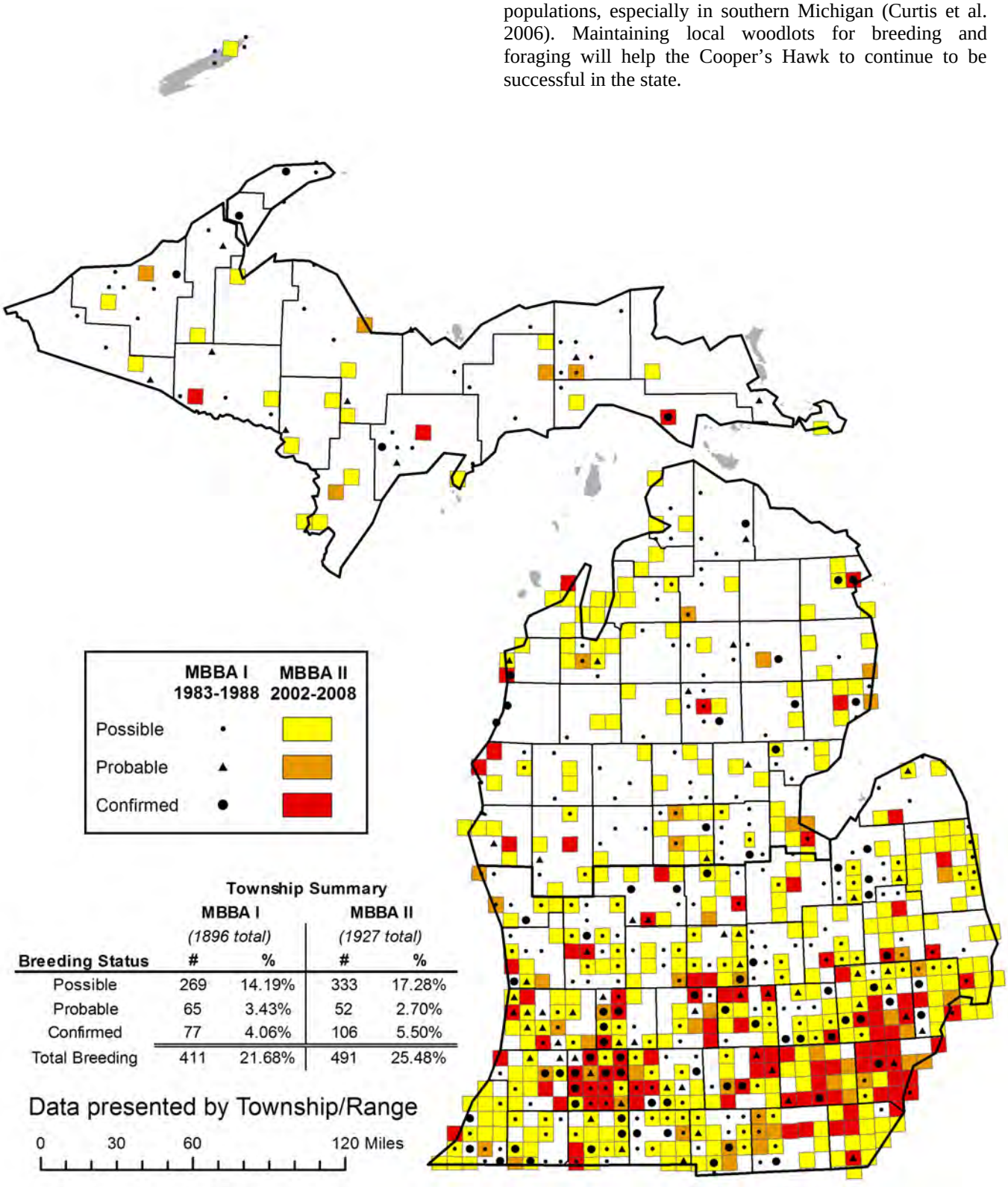
Cooper's Hawk *(Accipiter cooperii)*

Deaver D. Armstrong

map for 1966-2003 shows an area centered on the heavily farmed areas of central and western Ohio as the only area in Region 3 showing any declines (Peterjohn and Rice 1991, Sauer et al. 2008). Christmas Bird Count data for Michigan also reflect a strong increase in Cooper's Hawks, again mostly as a result of birds wintering in the SLP (NAS 2009).

Conservation Needs

This species' population seems to be stable or increasing throughout most of the state and most of USFWS Region 3. Cuthrell (2002) had concern for loss of habitat for this species; however, Cooper's Hawks have adjusted well to human-altered habitats and have strong and increasing populations, especially in southern Michigan (Curtis et al. 2006). Maintaining local woodlots for breeding and foraging will help the Cooper's Hawk to continue to be successful in the state.



Northern Goshawk *(Accipiter gentilis)*

Sergej Postupalsky

Status: *Special Concern (MNFI)*



Robert Epstein ©

Species Sponsored by: Kalman & Becky Csia.

The Northern Goshawk, the largest of the three accipiters breeding in North America, is known for fiercely defending its nest site; this behavior has left a deep (and often bloody!) impression on many a human intruder. A hardhat and protective eyewear are a must at nests of this hawk. The goshawk breeds in boreal and temperate forests of North America and Eurasia. On this continent it breeds from Alaska east across Canada to Newfoundland; in the west its breeding range extends south to central California, central Mexico and the Black Hills; in the east it extends south to the Great Lakes region, Pennsylvania, the Appalachian range at least to West Virginia and western Maryland, then east to New England and eastern Canada (AOU 1998, Palmer 1988, Johnsgard 1990, Squires and Reynolds 1997). In Michigan the goshawk nests mainly in the northern two-thirds of the state.

Distribution

Extensive timber removal in the latter part of the 19th century eliminated much of the goshawk's habitat. Early accounts indicated that the species was occasionally noted in summer and was more common in the north where it was thought to breed, but few specific records were cited (Gibbs 1879, Cook 1893, Barrows 1912). Through the early part of the 20th century the goshawk was either overlooked, or a very uncommon breeder in Michigan; its nesting was likely confined to the remaining limited patches of mature forest in the then poorly accessible northern parts of the state. By the early 1940s it was described as a local summer resident from Roscommon County northward (Van Tyne 1938, Wood 1951). During the 1960s nests were reported in several northern counties extending the known breeding range south to Mason and Clare Counties. As regenerating forests matured, the goshawk started reoccupying lost areas and expanding its breeding range southward. Similar trends were suggested for Wisconsin (Rosenfield et al. 1998) and reported in the northeastern states (Bull 1985, W. G. Ellison in Laughlin and Kibbe 1985). The goshawk's prey includes a large proportion of herbivorous mammals and birds; thus it occupies a lower trophic level than its two smaller congeners; it was therefore less affected by organochlorine pollutants, such as DDT/DDE (Snyder et al. 1973).

By 1990, the author learned of nests in 11 UP, 20 northern LP counties, and in one southern LP county (Postupalsky unpub. data); those occurring during the Atlas period were included in the MBBA I map. The confirmed breeding range at that time extended south to Ottawa, Mecosta, and Arenac Counties, and apparently disjunct nesting areas occurred in Midland, Tuscola, and (between the two Atlas periods) in Kalamazoo County (Schipper 1998). No major change in the goshawk's breeding range is evident since MBBA I. In the UP, nesting has been confirmed for Menominee and Luce Counties, leaving only Baraga and the mainland portion of Keweenaw County with no confirmed nesting. Along the southern range limit, Montcalm, Isabella, and Bay Counties are new with confirmed nesting, while no nests were reported during this atlas period for Ottawa, Kalamazoo, and Midland Counties, all of which had confirmed breeding in MBBA I. Possible range extensions into Allegan and Kent Counties in the west and into Lapeer and Sanilac Counties in the east remain unconfirmed. The southward range expansion may have come to an end as the southern limit of extensive contiguous forests was reached. In view of the lack of confirmed nesting in Ottawa, Kalamazoo, and Midland Counties with confirmed nests during MBBA I or shortly thereafter, one cannot rule out a moderate contraction of the breeding range in recent years. Breeding populations of the goshawk are limited by food, predation, and density-dependent territoriality (Squires and Kennedy 2006). A breeding-range contraction would be expected if a more thinly distributed population farther north had led to relaxed territoriality. Recent data show Muskegon, Montcalm, and Tuscola to be the only SLP counties with confirmed goshawk nesting.

Confirmed breeding was reported for significantly more UP townships in MBBA II than in MBBA I, and in fewer NLP townships. The same is true for total townships, including probable and possible nesting, having more in the UP and fewer in the NLP. The very patchy distribution of blocks with confirmed nesting throughout the goshawk's Michigan range and especially in the UP largely reflects work done on the state's three national forests. Compared with a more even distribution in MBBA I, this suggests that the species may be widely under-represented in MBBA II. More monitoring outside the national forests is sorely needed.

In the Great Lakes region goshawks inhabit large stands of upland mature mixed and northern hardwood forests with high canopy closure which are relatively free of dense understory. In such stands the hawks can maneuver among

Northern Goshawk *(Accipiter gentilis)* ***Sergej Postupalsky***

Status: *Special Concern (MNFI)*

and below the tree crowns while hunting and find large trees with suitable multiple forks to support their nests (Speiser and Bosakowski 1987, Squires and Reynolds 1997). Goshawks are also found nesting in early-successional upland deciduous stands and in recent decades also in older (50+ years) pine plantations.

Breeding Biology

In the Great Lakes region adult goshawks are mostly resident and most do not stray far from their breeding sites even in winter (Boal et al. 2003); however one Michigan study found that their home ranges become substantially enlarged during the non-breeding season (Lapinski 2000). Young birds apparently move south in the fall. At the onset of the breeding season a pair may repair an old nest or build a new one; therefore a breeding area may contain several nests, usually no more than a few hundred meters apart. Two to four eggs are laid in late March or early April, most hatch in May and young fledge between mid-June and mid-July. Productivity is influenced by prey availability, weather, and predation. Principal predators of nestlings and adults include the Great Horned Owl and the fisher (Erdman et al. 1998). In this region goshawk nests are most commonly found in deciduous trees (aspen, birch, beech, maple, black cherry, oak), even within conifer-dominated stands, and less often in conifers (white pine, red pine, jack-pine) (Boal et al. 2006, Postupalsky in Brewer et al. 1991, Postupalsky unpub. data).

Abundance and Population Trends

Estimates of population size and trends are unavailable, even for areas where the species has been extensively studied (Squires and Kennedy 2006). While neither productivity nor the dynamics of breeding range alone are reliable indicators of population trends, in combination they may allow some cautious inferences. Goshawk breeding range in Michigan was expanding from mid-century through at least the 1980s and productivity appeared adequate. Since then however, available productivity data came mainly from one limited area (Manistee National Forest [Postupalsky unpub. data]) and may not be representative of the statewide goshawk population. It is unclear if the breeding range has expanded farther, or may have actually contracted.

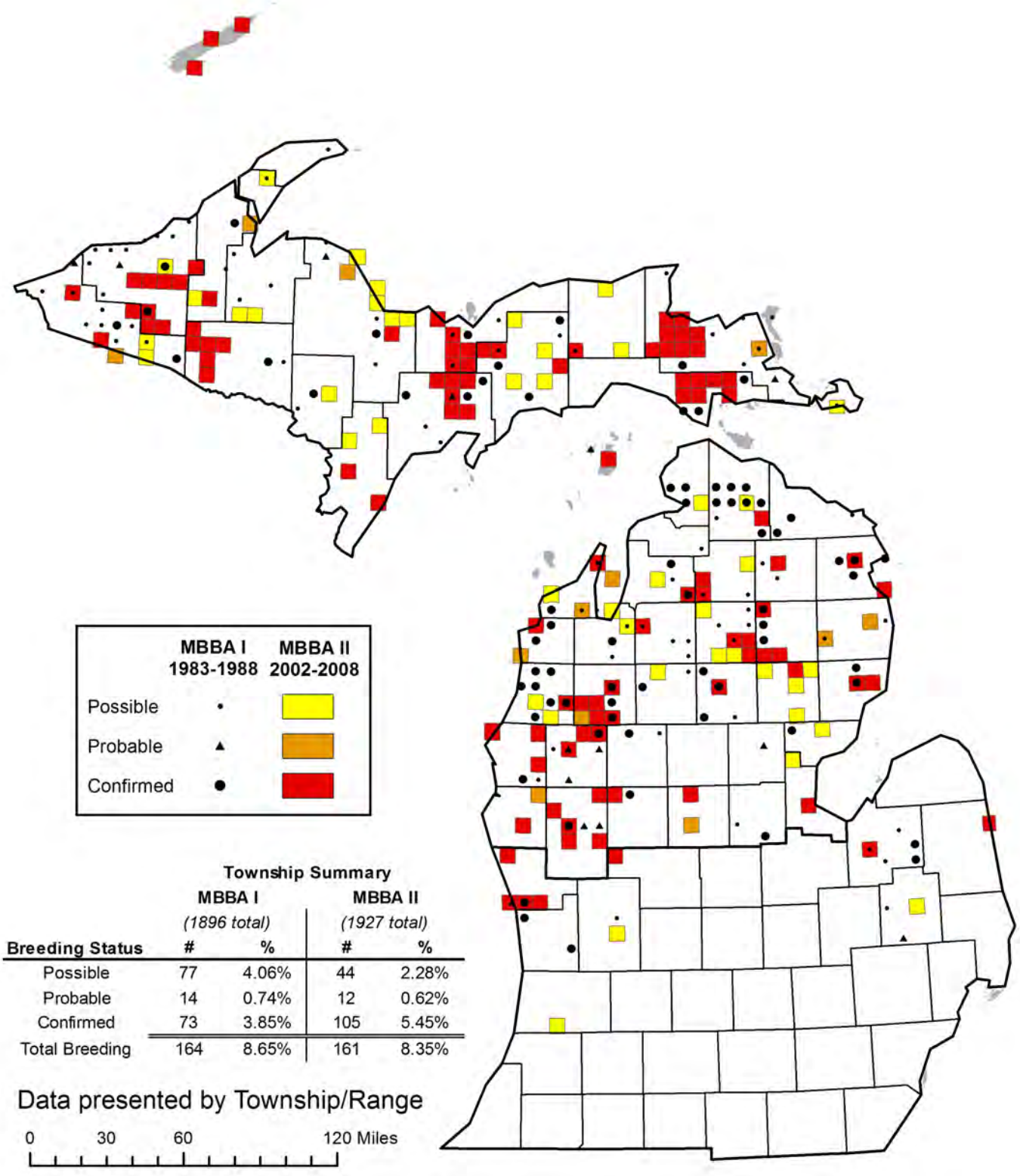
Conservation Needs

Timber harvest is an important threat to nesting goshawk populations (Reynolds 1989, Crocker-Bedford 1990). Although extensive clearcuts have eliminated many individual breeding territories (Crocker-Bedford 1990; Postupalsky, unpub. data), the effects on the goshawk population on a regional scale are poorly understood and controversial (Kennedy 1997, Squires and Kennedy 2006). The creation of large openings and fragmentation of stands suitable for nesting and foraging can affect local goshawk populations directly by eliminating suitable nest sites and reducing productivity, as well as indirectly by favoring an influx of the goshawks' competitors (Moore and Henny 1983): Red-tailed Hawks and Great Horned Owls; the latter is also a predator on goshawks. Selective harvest of large trees reduces canopy closure rendering the stand less suitable for goshawks (Bright-Smith and Mannan 1994, Beier and Drennan 1997). Many aspects of the goshawk's habitat requirements are poorly understood and may vary across the continent. More research is needed on how the species responds to various forest management regimes. Forest management that would result in shorter rotation cycles would eliminate the mature stands goshawks need for nesting and hunting (Reynolds 1989, Reynolds et al. 1992). In Michigan, aspens are the most frequently used nest trees, in pure as well as in mixed stands. By the time aspens are old enough to form a high degree of canopy closure and grow strong multiple forks to support the goshawks' bulky nests, they are also old enough for harvest (Postupalsky unpub. data).

While not currently listed as endangered or threatened by the USFWS, the Northern Goshawk is considered a Species of Greatest Conservation Need by the DNRE, Species of Special Concern by the MNFI, and a Forest-sensitive Species by the USDA Forest Service. The Forest Service has active programs to locate and monitor goshawk nests in conjunction with timber sale activity. Rules and policies for goshawks vary among the three national forests in Michigan. The policies of the Huron-Manistee typically consist of no-cut buffer zones around active nests and a peripheral zone in which cutting and other activities are allowed only outside the nesting season. Due to the time lag (up to five years) between the timber sale and the actual harvest, the hawks may build a new nest outside the protective buffer zone. Therefore monitoring of the breeding area following a timber sale is recommended.

Northern Goshawk *(Accipiter gentilis)*

Status: *Special Concern (MNFI)*



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	77	4.06%	44	2.28%
Probable	14	0.74%	12	0.62%
Confirmed	73	3.85%	105	5.45%
Total Breeding	164	8.65%	161	8.35%

Red-shouldered Hawk *(Buteo lineatus)*

Gerald R. Urquhart

Status: *State Threatened*



Mike Vanderstelt ©

The strikingly-patterned, forest-loving Red-shouldered Hawk is an uncommon raptor in Michigan. It migrates in March and by early to mid-April begins breeding in moist hardwood forests, with highest concentrations of breeding birds in the NLP. Like most forest breeding raptors, it goes relatively unnoticed during the nesting period unless its nest is threatened.

Across the United States there are four recognized subspecies, with the nominate race, *Buteo lineatus lineatus* occurring in Midwestern and Northeastern woodlands (Dykstra et al. 2008). The *lineatus* subspecies prefers moist deciduous woodlands and hunts frequently near water.

Distribution

Although the birds breed north into the Canadian Shield of Ontario, their population becomes less dense north of Michigan's LP. In Michigan, the greatest concentrations occur in the NLP where 32.7% of townships were inhabited during MBBA II and 32.49% during MBBA II. Townships with breeding evidence in SLP remained constant (12.4% and 12.27%) for MBBA I and MBBA II. A substantial increase in UP townships with breeding evidence occurred from MBBA I (5.9%) through MBBA II (13.69%). Likely factors in the UP increase are maturation of UP forest regrowth after early 20th century logging and continued recovery of the species from the effects of DDT toxicity.

The abundant riparian areas and forested wetlands of the NLP create favorable breeding areas and may explain the higher abundance in this region. The highest concentrations occur in Manistee and Cheboygan counties (Ebbers 1991). In the UP, less-preferred pine, lowland conifer, and boreal forests become more prevalent, and in the SLP, agriculture has replaced much of the suitable habitat (Cooper 1999).

In Wisconsin and Ontario, the greatest concentration of Red-shouldered Hawks occurred between 43.5º N and 46º N, similar to Michigan's NLP (Jacobs 2006, Badzinski 2007). In Ohio and Indiana, the breeding records are high in the northern and southern portions of the state and nearly absent from the central parts of the state where agriculture has removed forests. In Illinois, most breeding records are in the southern third of the state, probably due to widespread agricultural land across central and northern Illinois and paucity of sizeable woodlots (Peterjohn and Rice 1991, Webster 1998, Milosevich 2004).

Breeding Biology

Red-shouldered Hawks migrate in early spring and establish territories in March in the LP and slightly later in the UP (Dykstra et al. 2008). Nest sites are located in deciduous or mixed woodlands, often near water, with most of the nests built in deciduous trees (Palmer 1988). The nests are 45-60 cm wide with a cup diameter of ~20 cm (Bent 1937) and made of fresh and dried sticks, leaves, and bark that is often lined with green moss. Established pairs often return to the same nest year after year and refurbish it (Bent 1937). Nest site selection in Michigan has most frequently been in American beech trees (Cooper et al. 1999). However, Weber et al. (2007) found significantly lower reproductive success in pairs nesting in American beech trees (n=21) than in other tree species (n=11) in surveys of 32 nests in the NLP, and concluded that although favored, the American beech tree is not the most ideal of nest locations for Red-shouldered Hawks.

Typically three to four eggs are laid beginning on average around 5 April in Michigan's NLP (Craighead and Craighead 1956, Bent 1937). Incubation of ~33 days duration begins before the clutch is complete, resulting in asynchronous hatching that leads to uneven food consumption and aggression between nestlings (Palmer 1988, Townsend 2006). Fledging occurs at around six weeks of age (Bent 1937).

Although the birds are aggressive during territory establishment and nest-building, including frequent territorial calling, they become more secretive after eggs are laid. The birds respond aggressively to threats near the nest but otherwise are quiet and subdued during the brooding and nestling periods.

During the breeding season, Red-shouldered Hawks consume large numbers of eastern chipmunks and meadow voles, but also include in their diet *Peromyscus* mice, frogs, toads, crayfish, small birds and snakes (Craighead and Craighead 1956). The high proportion of mammals in its diet and its early arrival on the breeding grounds allows Red-shouldered Hawks to breed earlier than Broad-winged Hawks, which have a higher proportion of cold-blooded organisms in their diet. Several authors have suggested that

Red-shouldered Hawk *(Buteo lineatus)*

Gerald R. Urquhart

Status: *State Threatened*

the early breeding coincides with the emergence of eastern chipmunks from hibernation (Jacobs and Jacobs 2002). Red-shouldered Hawks are often found in forests with small wetlands, and reptiles and amphibians can be important parts of their diets, especially when mammal populations are low.

Abundance and Population Trends

Nearly a century ago, Barrows (1912) indicated that the most abundant Buteo species in Michigan was not our now-familiar Red-tailed Hawk but rather the forest-loving Red-shouldered Hawk. In 1951, Wood still referred to this species as a "common resident" in the southern third of Michigan, where today it is uncommon to rare. These accounts illustrate how dramatic changes in land cover and intensified agricultural practices during the 20th century produced a significant decline in Red-shouldered Hawks. Wood's account suggests that timing of the decrease is more tied to DDT usage in the 1950s and 1960s than forest loss that occurred in the late 1800s in the SLP and NLP and early 1900s in the UP. As forest cover began to increase and pesticides decreased in the latter part of the 20th century, the Red-shouldered Hawk began to increase in numbers, though not as significantly as the forest-hunting Cooper's Hawk. This is likely due to the Red-shouldered Hawk's preference of mature hardwood forests and the Cooper's Hawk's acceptance of late-successional forests. Kielb et al. (1992) stated that both Cooper's and Broad-winged Hawks were moving into forests previously occupied by Red-shouldered Hawks.

Nest site fidelity contributed to the vulnerability of the Red-shouldered Hawk. Bent (1937) described pairs of Red-shouldered Hawks continuing to use a nest site even as the forest around it was cut, undoubtedly leading to decreased breeding success as habitat was altered.

The combination of nest site fidelity and reliance upon mature hardwoods makes the Red-shouldered Hawk vulnerable to habitat destruction and slow to respond when forests regrow. Forest fragmentation is a great threat to Red-shouldered Hawks because it favors Red-tailed Hawks and Great Horned Owls, both of which compete with the Red-shouldered and are also known to prey upon nestlings (Bryant 1986). Although small openings are necessary for some Red-shouldered Hawk prey species (meadow voles, *Peromyscus* mice), too much opening or fragmentation will favor Red-tailed Hawks and Great Horned Owls over Red-shouldered Hawks.

Present population trends in Michigan suggest that the population is stable in the LP and growing in the UP. Because the birds rely upon mature forests, the age of regrowth will affect when birds return. The recent upswing in the UP may be due to maturation of forests there.

Conservation Needs

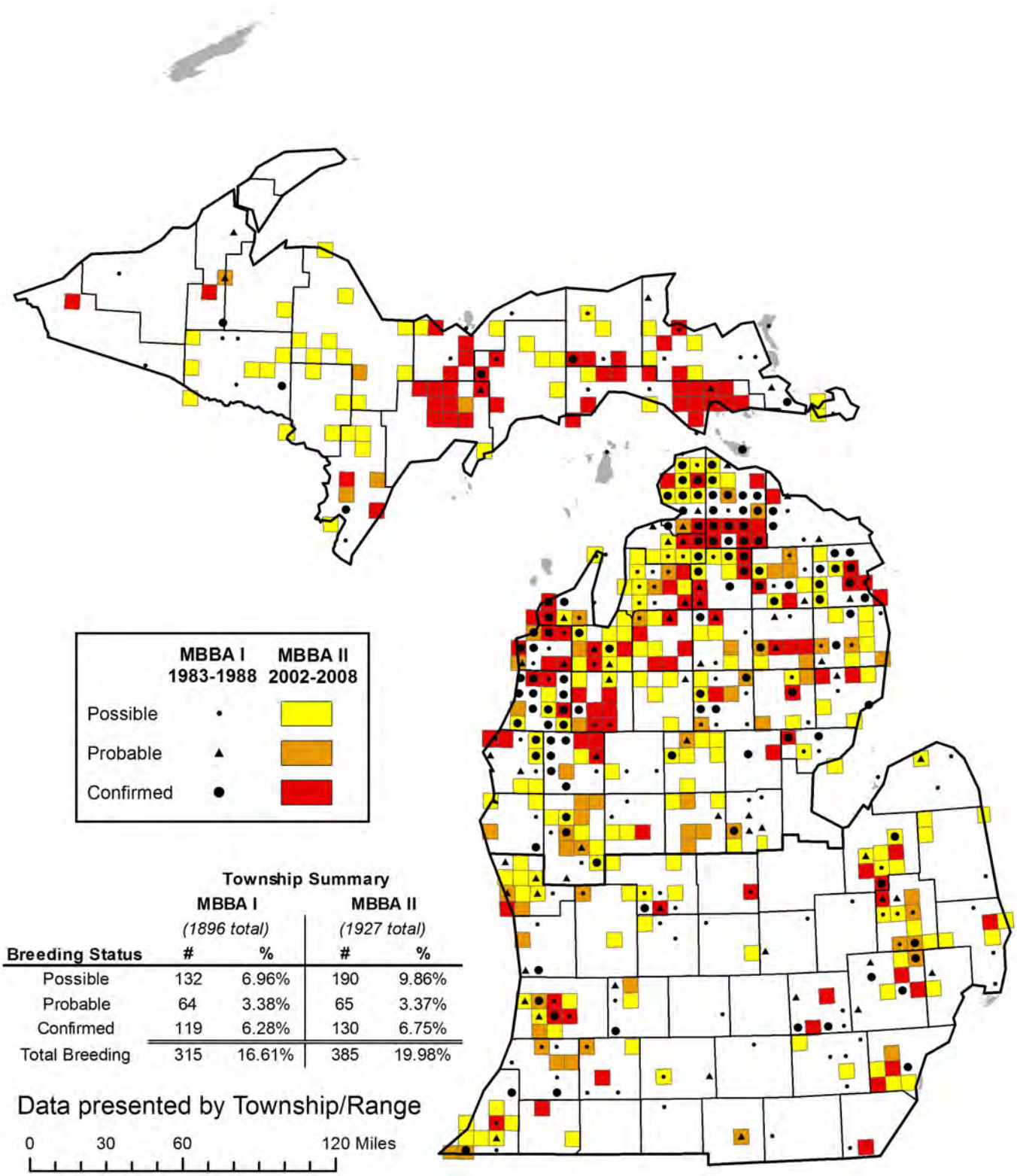
The Red-shouldered Hawk is listed as threatened in the state of Michigan by the DNR. It is ranked by Michigan Natural Features Inventory as "uncertain, ranging from vulnerable to apparently secure" (MNFI 2007.).

The increase in the UP population of Red-shouldered Hawks between MBBA I and MBBA II and the stability of the LP populations suggests that this species is faring well in Michigan as forests mature and larger areas of forest are protected. Because each nest requires a minimum of 15 ha (20 acres) of mature forest (Jacobs and Jacobs 2002), protecting a viable population of Red-shouldered Hawks requires large areas of contiguous forest. Michigan's larger tracts of forests, such as the Manistee National Forest and the Pigeon River Country State Forest, provide valuable reserves for the future of this species (Cooper et al. 1999).

Red-shouldered Hawk *(Buteo lineatus)*

Gerald R. Urquhart

Status: *State Threatened*



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	132	6.96%	190	9.86%
Probable	64	3.38%	65	3.37%
Confirmed	119	6.28%	130	6.75%
Total Breeding	315	16.61%	385	19.98%

Broad-winged Hawk *(Buteo platypterus)*

Gerald R. Urquhart



Larry Abraham ©

Michigan's smallest *Buteo* species is well known for its spectacular migrations, where it travels from eastern North America to Central and South America and back in flocks of up to 10,000 birds. On the breeding grounds in hardwood and mixed forests, its secretive nature contradicts its migratory flamboyance as the birds spend most of their time perched silently below the forest canopy.

There are six described subspecies of the Broad-winged Hawk but only the nominate is found in North America, with the other five subspecies being restricted to Caribbean islands. In North America, the Broad-winged Hawk ranges from the east coast to the eastern edge of the Great Plains and from central Canada to the Gulf Coast.

Distribution

In Michigan, the Broad-winged Hawk breeds in most counties, with the highest concentrations in the extensive forests of the UP. This hawk prefers continuous hardwood and mixed hardwood-conifer forests with openings and water nearby (Goodrich et al. 1996). In the UP, Broad-winged Hawk breeding evidence was found in 60% of townships in MBBA I and 61.67% in MBBA II. The NLP breeding declined from 35.08% of townships in MBBA I to 23.03% in MBBA II. The SLP surveys revealed very similar trends with 12.93% of townships in MBBA I and 12.55% in MBBA II, and in both surveys, there was a near absence of breeding evidence from the southeastern border counties, where forest patches rarely exceed 30 ha (40 acres).

In neighboring states and provinces, the concentrations of Broad-winged Hawks are highest in extensively forested regions and nearly absent from large agricultural and prairie regions. In Ontario, the birds are most common on the Southern Shield area where deciduous and mixed forest dominate, with observations being fewer in the coniferous forests of Northern Shield area and nearly absent from the highly fragmented southwest (Szuba 2007). Wisconsin's population is greatest in its northern counties (Rosenfield and Bielefeldt 2006). From central Wisconsin south through Illinois, breeding Broad-winged Hawks are very infrequent (Milosevich 2004). In Indiana and Ohio, the majority of the records come from southern parts of the states where forest cover is more extensive (Whitehead 1998, Peterjohn and Rice 1991).

Breeding Biology

Broad-winged Hawks arrive on their breeding grounds in Michigan in late April to early May, after other forest raptors like Red-shouldered Hawks have begun to nest. Pair formation and nest building occurs shortly after arrival, with nests built in a wide variety of tree species (Burns 1911). Although Broad-winged Hawks are known to refurbish old nests and renovate nests of other species, construction of a new nest is most common (Burns 1911, Bent 1937). Where they co-occur with Red-shouldered Hawks, the Broad-winged Hawks typically use smaller trees and lower nest heights (Dykstra et al. 2008). Nests are constructed of dead sticks with a lining of fresh sprigs and bark chips and are approximately the size of a crow nest, ranging from 30-53 cm outside diameter and 15-18 cm inside (Bent 1937).

Clutch size is typically two or three eggs, but clutches with as few as one and as many as five eggs have been observed. Incubation (28-31 days) typically begins after the first egg is laid (Crocoll and Parker 1989). Females develop a brood patch and do the majority of incubating. Asynchronous hatching leads to some sibling aggression and higher feeding rates of the oldest nestling. Only females feed the young, with the male delivering food to her or dropping it in the nest if she is absent (Matray 1974). Females tear up the food and feed it to the nestlings. Young leave the nest at five to six weeks of age and stay on territory for four to eight weeks afterward (Burns 1911, Matray 1974).

On territory, Broad-winged Hawks hunt from perches below the canopy, often near an opening or water body (Goodrich et al. 1986). This generalist predator feeds on amphibians, small mammals, insects, and juvenile birds. The high proportion of amphibians in their diet may drive the timing of migration and breeding, forcing the Broad-winged Hawk to breed later than sympatric Red-shouldered Hawks.

Abundance and Population Trends

The North American population of Broad-winged Hawks is among the highest of any raptor species (Szuba 2007). During migration, this abundance is evident as the birds flock together in massive southward and northward movements. However, little is known about the exact status of the population.

Ebbers (1991) reported that the distribution in Michigan had changed very little since the early 1900s so the present decrease in NLP birds is a deviation from historical patterns. During the period covered by Michigan's two atlases, Red-shouldered Hawk breeding increased in the UP and remained the same in both LP areas. The cause of decreased Broad-winged Hawk observations is unknown but unlikely tied to habitat loss or similar changes which would have also been observed in Red-shouldered Hawks. However,

Broad-winged Hawk *(Buteo platypterus)*

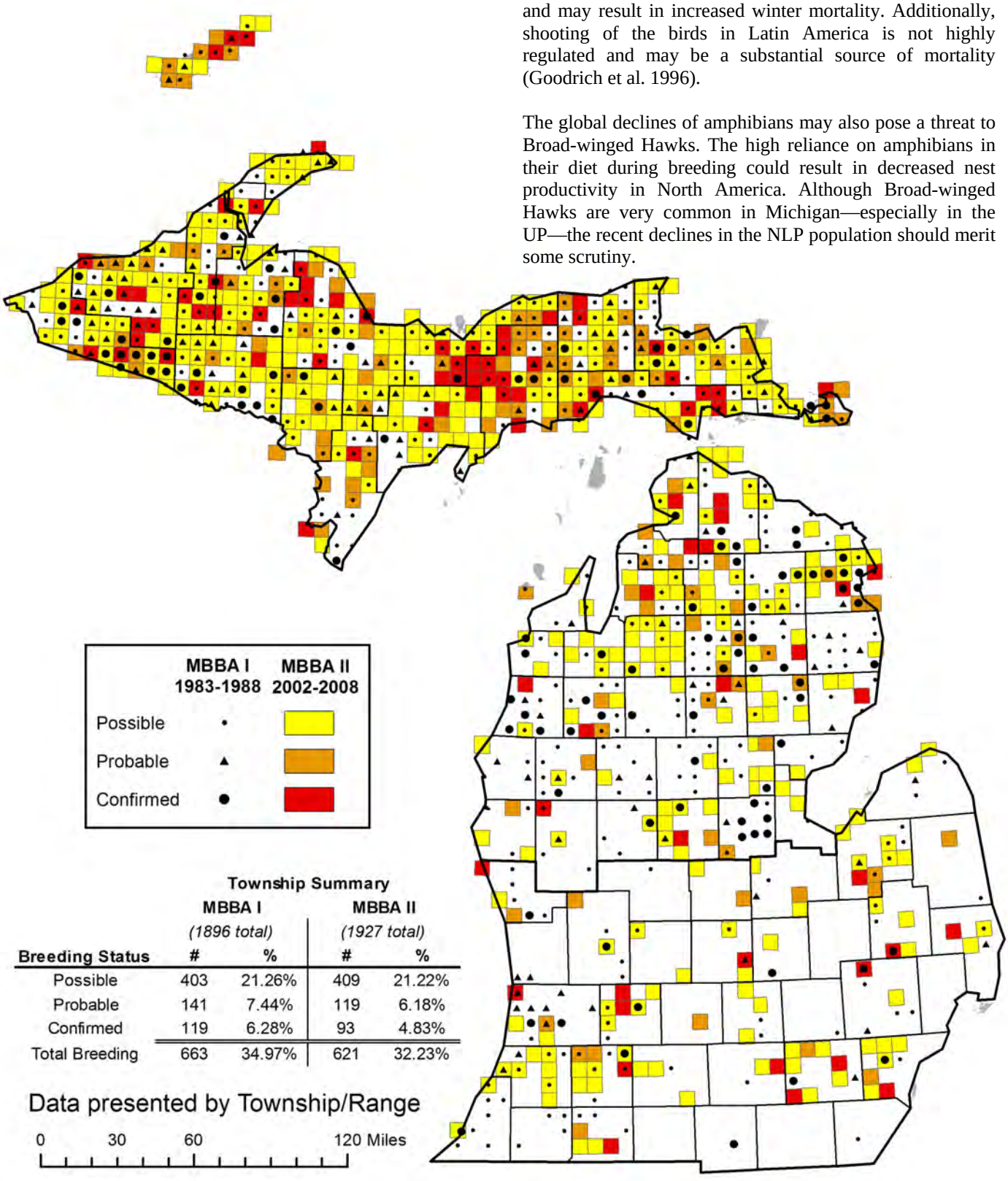
Gerald R. Urquhart

more complex responses to climate change (phenology of prey, increased thermal activity) could also explain the northward shift in distributions.

Conservation Needs

The greatest threats to Broad-winged Hawk populations occur during migration and on the wintering grounds. Deforestation at migration stops and of wintering habitats will make the already Herculean migration more difficult and may result in increased winter mortality. Additionally, shooting of the birds in Latin America is not highly regulated and may be a substantial source of mortality (Goodrich et al. 1996).

The global declines of amphibians may also pose a threat to Broad-winged Hawks. The high reliance on amphibians in their diet during breeding could result in decreased nest productivity in North America. Although Broad-winged Hawks are very common in Michigan—especially in the UP—the recent declines in the NLP population should merit some scrutiny.



Red-tailed Hawk *(Buteo jamaicensis)*

Skye Christopher G. Haas



Jerry Jourdan ©

Species sponsored by: Stanley E & Diane L Dudek.

Regal and ubiquitous, one of the most common sights in southern Michigan is that of Red-tailed Hawks perched along the interstate. With a piercing whistle, the Red-tail announces its presence as it soars high above in the sky. Food taken by Red-tailed Hawks typically includes small to medium sized mammals, but birds, reptiles and even insects will also be consumed. The species ranges across the North American continent, south from the arctic tundra to the tropics of Panama. A number of subspecies and color morphs have been described; this bird is the most variable in plumage types of all our raptor species. It is the eastern subspecies, *B. j. borealis* that can be found breeding in Michigan, however both the pale prairie "Krider's" Hawk subspecies and the dark northern "Harlan's" Hawk subspecies have been recorded at hawk-watches during migration (Binford 2006).

Distribution

The range of the Red-tailed Hawk in Michigan is likely very similar, if not the same, as in historical times based on remains found at archeological sites (Brewer 1991). However, the population of this species has certainly increased over the last 100 years. Red-tailed Hawks are partial to open country, and the extensive forests of pre-settlement Michigan likely limited their numbers while favoring woodland raptors like accipiters, Broad-winged and Red-shouldered Hawks. There was likely a major population increase in the early 20th Century after the logging boom of the late 19th Century. Barrows (1912) described the species as one of Michigan's most abundant hawk species. By the mid-20th Century, the population had declined, likely a combination of unregulated shooting and rampant pesticide use that plagued most other raptor species during the period (Preston and Beane 1993, Yunger 1991).

By MBBA I, Red-tailed Hawks had rebounded to again become one of the most populous raptors in the state. Its preferred habitat being a patchwork landscape of open country and urban areas with small woodlots for breeding covers large areas of Michigan, and the species was confirmed breeding from Monroe County to Isle Royale. The greatest densities were found in the lower third of the state, where another change has occurred since historical times. Formerly absent or very rare in Michigan during winter, they are now a common wintertime resident in the southern portion of the State (Brewer 1991). With warmer micro-habitats along roadways and urban locations that are kept snow-free, the Red-tail is able to sustain itself throughout the year.

Yet MBBA II results show another change in Red-tailed Hawk distribution. In the NLP, the number of townships where Red-tailed Hawks were found dropped by 5% while the SLP remained virtually unchanged. In the UP however, there was a 25% rise in the number of townships where Red-tails were recorded. Densities remain highest in the SLP, but this decline in distribution may merit continued monitoring. It may also mirror the differences in effort between the two atlases.

Breeding Biology

Red-tailed Hawks are both generalists and adaptive, traits that have led to their success as a species. They prefer open country for hunting, but require fencerows of tall trees or small woodlots in which to place their nests. Woodlands, particularly upland, will be used, but there is typically some component of brushy openings found in the habitat matrix for hunting (Peterson 2006).

Pair-bonding begins early in the year in late winter; however, non-migratory pairs will remain together on territory year round. Mating displays involve spectacular aerial feats, and mates will lock talons in midair. The nest is constructed by the pair, and frequently an old nest will be refurbished and reused (Preston and Beane 1993). A pair will produce one brood per year, with two to three eggs to a clutch. Incubation last 30-35 days and the young typically take 45 days to fledge (Kleen et al. 2004).

Abundance and Population Trends

Partners in Flight estimates that there are 10,000 Red-tailed Hawks in the state of Michigan - 0.4% of the world's population. This total is somewhat lower than several of the surrounding Great Lakes states. Ohio and Wisconsin each have an estimated 21,000 birds, Minnesota and Illinois have an estimated 25,000 and 32,000 birds, respectively (PIF 2007). BBA data from Wisconsin has indicated that while the species continues to increase in that state, the rate of increase has slowed in the last two decades (Sauer et al 2008). In Ontario, no change in distribution was noted between their two atlases, and the species remains abundant (Szuba 2007).

Adaptability has greatly benefited this raptor's abundance in the highly anthropogenized habitats of southern Michigan. As an edge species, the multitudes of old farm fields broken by woodlots in the LP create excellent habitat for Red-tailed Hawks. They can be found in more heavily wooded areas, though forests that have been selectively cut are preferred.

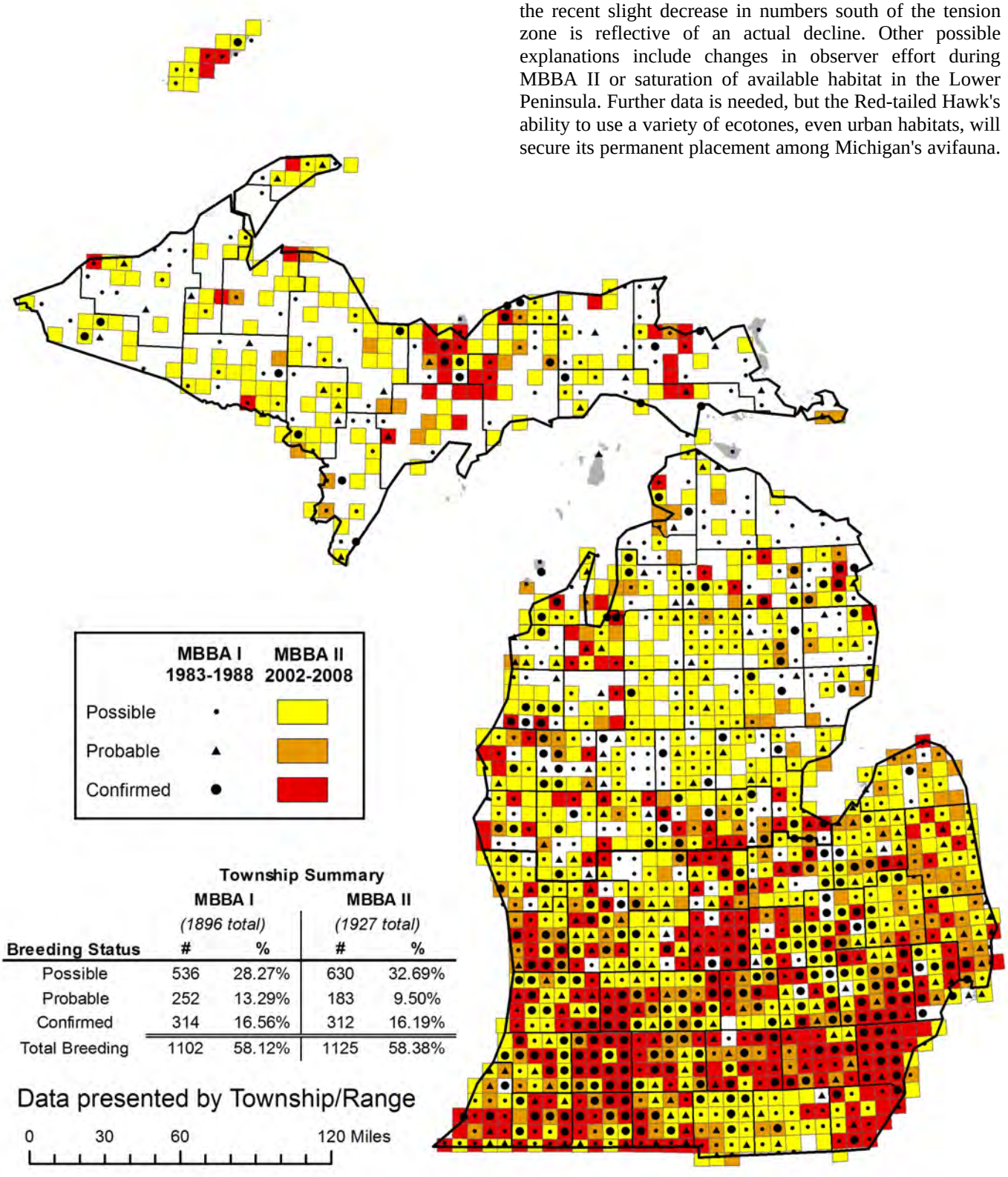
Red-tailed Hawk *(Buteo jamaicensis)*

Skye Christopher G. Haas

Conversely, they will nest in surprisingly urban habitats; in the extensive metropolitan zone of Wayne County, a vast majority of the townships had confirmed breeding!

Conservation Needs

The Red-tailed Hawk will likely continue to flourish in Michigan. It is a generalist in prey selection and does not require a rigid habitat for breeding. Even as forests mature, logging and development activities will create suitable nesting habitat. Still its numbers should be watched to see if the recent slight decrease in numbers south of the tension zone is reflective of an actual decline. Other possible explanations include changes in observer effort during MBBA II or saturation of available habitat in the Lower Peninsula. Further data is needed, but the Red-tailed Hawk's ability to use a variety of ecotones, even urban habitats, will secure its permanent placement among Michigan's avifauna.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	536	28.27%	630	32.69%
Probable	252	13.29%	183	9.50%
Confirmed	314	16.56%	312	16.19%
Total Breeding	1102	58.12%	1125	58.38%

American Kestrel *(Falco sparverius)*

Thomas Carpenter



Joan Tisdale ©

Species sponsored by: Catherine Carroll

Often conspicuous due to its proclivity to use roadside utility wires as perches, the American Kestrel occurs throughout most of North and South America. Michigan's smallest and most numerous falcon, it breeds throughout the state.

Distribution

Prior to European settlement, kestrels were probably uncommon in the heavily forested environment that characterized the state; they were likely restricted to occasional forest clearings and edges. As the forests were cut, the species proliferated, a trend that is now occurring in South America (Smallwood and Bird 2002). The modernization of agriculture during the 20th century also led to population declines, and there are probably fewer kestrels today than at the beginning of the 20th century.

Both MBBA I and MBBA II showed kestrels breeding throughout the state, being somewhat more plentiful in the more extensively deforested SLP than in the NLP or UP. In all areas of Michigan, more townships recorded kestrels during MBBA I than MBBA II. Suburban sprawl since MBBA I probably rendered some townships less suitable for kestrels; this could account for fewer townships with records in Wayne, Oakland, Macomb, Ingham, Kalamazoo and Kent Counties. West Nile Virus likely caused some mortality (Nemeth et al. 2006, Medica et al. 2007), and this may account for fewer records during MBBA II. Kestrels in the NLP and the UP are migratory. The SLP population likely consists of permanent residents and partial migrants (Smallwood and Bird 2002).

Kestrels inhabit a variety of open habitats including agricultural fields, clear cuts, marshes and bogs. They are also found in urban environments. Breeding in many areas appears to be limited by the availability of nesting cavities, as demonstrated by population increases following the erection of nest boxes (Hamerstrom et al. 1973, Toland and Elder 1987, Smallwood and Bird 2002). Kestrels utilize crevices in buildings as well as pipes associated with highway signs and grain augers for breeding in the absence of tree cavities or nest boxes. Buildings are also important roost sites during winter (Ardia 2001). Availability of perches is an important factor in determining where kestrels hunt and may also influence the number of breeding kestrels; birds will readily begin hunting in areas without perches as soon as perches are provided (Wolff et al. 1999, Sheffield et al. 2001, Kim et al. 2003).

Breeding Biology

Kestrels lay four to five eggs. Egg-laying begins in early April in the SLP and extends through most of June. If the first clutch is lost, a second one is usually laid 11-12 days later. Incubation lasts 29-30 days, and young leave the nest cavity after about 30 days. Newly fledged young can be observed from the middle of June though early August. After fledging, young kestrels remain with their parents for up to 39 days (Varland et al. 1993), where they gradually learn to hunt for themselves. These family groups are readily visible during July and August, and their presence confirms successful breeding. Sometimes family groups will merge to form social hunting groups; thus, it is not uncommon to observe as many as 20 individuals hunting in close proximity to one another during late summer. Once independent, young disperse or initiate their southward migration.

Abundance and Population Trends

Reviews of BBS data suggest that kestrels have declined since MBBA I (Sauer et al. 2008). Data from 1990-2007 for Michigan show a statistically significant decline. During the same time frame, statistically significant declines were also evident for the Great Lakes coastal plain, the Great Lakes transition and the eastern and central BBS regions combined. The decline for the central BBS region alone, however, was not significant, nor was the overall trend for Michigan for all years of the BBS (1966-2007). These data must be interpreted cautiously because the BBS is probably not a reliable way to assess raptor abundance. Counts at fall migration monitoring sites in the east also showed a significant decline during the last decade, including the Holiday Beach Migration Observatory, which is just across the Detroit River in southwest Ontario (Farmer and Smith 2009). However, counts at Hawk Ridge Bird Observatory in northeast Minnesota, which represents the western Great Lakes Region, showed only a weak, nonsignificant decline over the last decade (Farmer and Smith 2009). Based on geography, neither site likely counts significant numbers of migratory Michigan-breeding kestrels. Analyzing Christmas Bird Count data is probably the best way to detect changes in kestrel abundance. CBC data show a decline for Michigan from 1976-2007, including the last decade; however, the trend disappears when data from Ohio and Indiana are included.

Kestrel populations can exhibit considerable variation from year to year. Wet weather during the breeding season significantly reduces breeding success and subsequent survival of fledged young (Dawson and Bortolotti 2000). Severe winter weather can cause declines, particularly in the SLP where many kestrels are permanent residents. Mammalian predation of nestlings also occurs, particularly by raccoons. Kestrels are vulnerable to predation by larger raptors, and increasing Cooper's Hawk populations have been postulated as a cause for their decline (Smallwood et

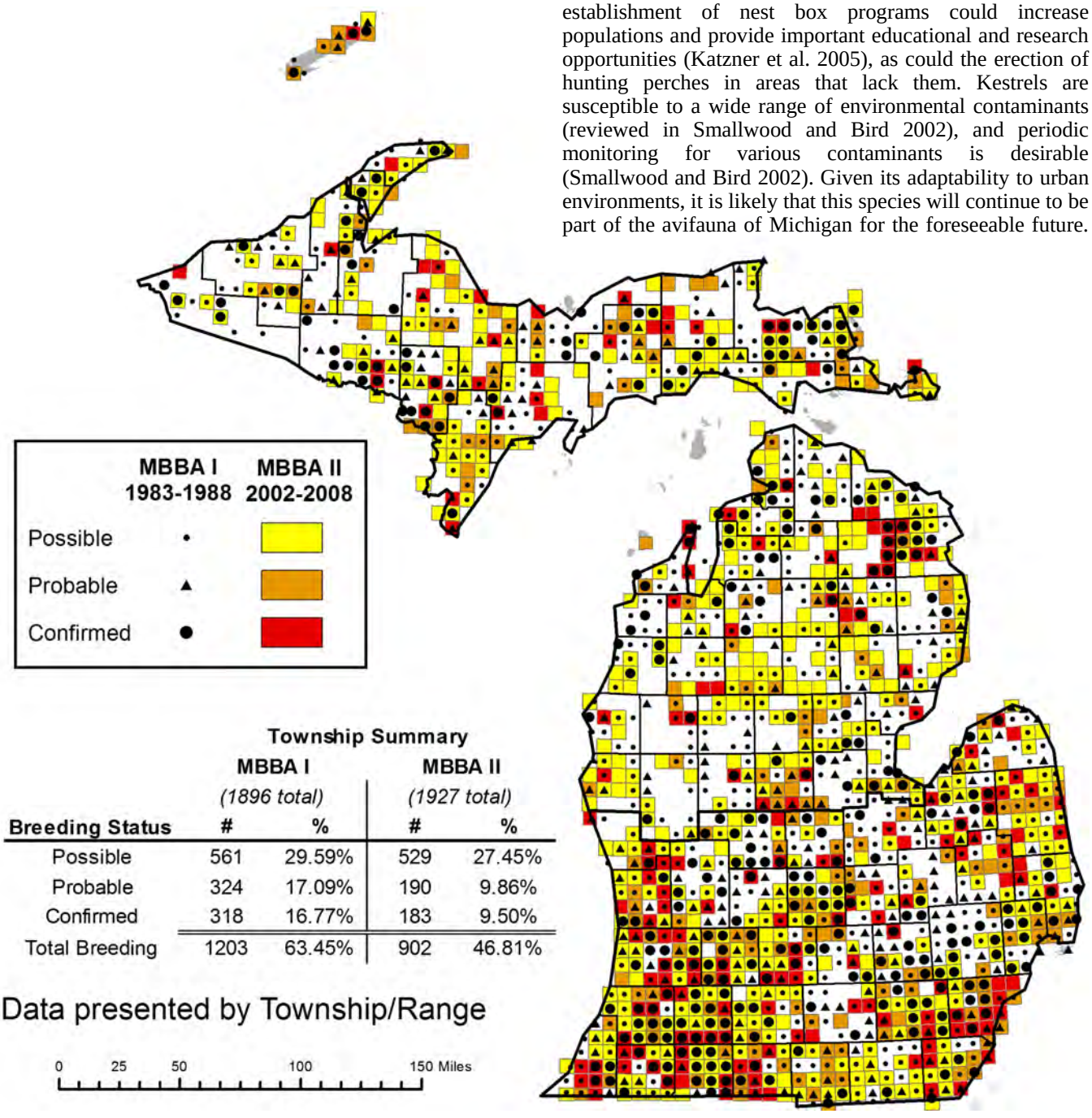
American Kestrel *(Falco sparverius)*

Thomas Carpenter

al. 2009a). Kestrels also succumb to human-related mortality such as becoming trapped in buildings, struck by vehicles and aircraft, and shot. Kestrels compete with a variety of mammals and birds for nesting cavities, particularly in areas where they are limited. The ubiquitous European Starling can cause kestrels to abandon nest cavities during the egg-laying stage (Hamerstrom et al. 1973, Wilmers 1987), and they are probably the most important competitor for cavities in agricultural areas where they use most nest boxes not inhabited by kestrels (Varland and Loughin 1993). The amount of suitable habitat at the landscape-level has also been shown to affect breeding numbers (Smallwood et al. 2009b), which suggests that habitat fragmentation in breeding, and perhaps even wintering areas may cause declines. Given all of the factors that can affect kestrel populations, it is unclear if the population decline evident by MBBA II and the BBS is cause for concern or simply the result of natural fluctuations.

Conservation Needs

The American Kestrel is not on any watchlist and no specific conservation measures are needed. The decline evident by MBBA II and the BBS suggest that continued monitoring of kestrel populations is desirable. The establishment of nest box programs could increase populations and provide important educational and research opportunities (Katzner et al. 2005), as could the erection of hunting perches in areas that lack them. Kestrels are susceptible to a wide range of environmental contaminants (reviewed in Smallwood and Bird 2002), and periodic monitoring for various contaminants is desirable (Smallwood and Bird 2002). Given its adaptability to urban environments, it is likely that this species will continue to be part of the avifauna of Michigan for the foreseeable future.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	561	29.59%	529	27.45%
Probable	324	17.09%	190	9.86%
Confirmed	318	16.77%	183	9.50%
Total Breeding	1203	63.45%	902	46.81%

Data presented by Township/Range

0 25 50 100 150 Miles

Merlin *(Falco columbarius)*

Skye Christopher G. Haas

Status: *State Threatened*



Carl Manning ©

A real success story, the Merlin has expanded its range and numbers in Michigan since MBBA I. A dynamic bird, this little predator combines pluck with skill, and is a master of aerial feats that rival even a swallow, which a Merlin is capable of catching and consuming. A welcome harbinger of spring, northern atlas workers found Merlins to be one of the first returning birds to take up territory. Launching out of a tall pine, the male performs his flutter flight, calling loudly, displaying for a nearby female. This highly entertaining show has been encountered more frequently over the past few decades as Merlins have steadily increased since the mid-20th century collapse of most Michigan raptor species.

Distribution

Historical records suggest that breeding has long occurred in the Upper Peninsula. Adults with flight-capable young were observed and some individuals collected in both the Porcupine Mountains and on Isle Royale in July and August of 1904; Merlins were also found as summer residents on Neebish Island in 1910 and likely bred there (Barrows 1912). It was not until 1955 that the first nests were found in Michigan, two in quick succession with one on 13 June at Middle Island Point, and a second on 20 July at the mouth of the Pine River in the Huron Mountain Club, both sites in Marquette County (Gysendorfer 1955, Dodge 1955).

Unfortunately it is at this time that many raptor species, including Merlins, were experiencing a region-wide decline from reproductive failures caused by organochlorine contaminants. While data from the early and mid-20th Century is too sparse to assess trends from Michigan, it is likely that the species was experiencing a low point in its population in the state (Binford 2006).

By the 1980s, populations were beginning to recover and a nest in the Keweenaw Peninsula was documented (Binford 2006). The MBBA I gave the first complete picture of the Merlin's status as a breeder in Michigan; a small population largely confined to the northern coasts, but steadily increasing by the end of the 1980s. Away from its stronghold on Isle Royale, populations were established in Keweenaw and Marquette Counties, and atlas workers had confirmed breeding in 11 townships including one in Antrim County in the LP.

Numbers continued to grow quickly in the 1990s, with Merlins expanding or reclaiming territory throughout the UP and NLP. MBBA II results show a significant increase, with birds found in 231 blocks statewide compared to 72 blocks in MBBA I; a 220% increase. Range expansion was highest in the UP with the percentage of townships reporting Merlins increasing from 9% to 26% between the two atlases, with a substantial movement into the interior of the peninsula. Absent from Dickinson and Menominee Counties in MBBA I, the MBBA II produced six and four records respectively for these counties

Merlins have also spread to a lesser extent in the LP, with birds found in 30 NLP townships compared to only five in MBBA I. Breeding was even noted along the tension zone on Lake Michigan with a confirmed breeding in Oceana County and what appeared to be a pair of young birds possibly attended by an adult in Muskegon County, though breeding could not be established by atlas criteria (J. Johnson, pers. comm.).

Merlins prefer semi-open habitat with tall conifers for nesting, and are frequently found along coasts, large lakes and boglands. Nesting habitat in the Keweenaw is mesic or wet mixed forest near large openings, usually along Great Lakes shoreline (Binford 2006). Pine-covered islands on inland lakes are preferred for nest sites in the Michigamme Highlands of Baraga and Marquette Counties. Proximity to humans does not seem to be a factor, and there has been a trend in both Michigan and region-wide for nesting in urban locations. In the City of Marquette, multiple pairs can now be found, and nests have been located at city parks, cemeteries, and on the Northern Michigan University campus (pers. obs.).

Breeding Biology

In Michigan, birds seem partial to conifers for nesting, usually red or white pines (Binford 2006). Merlins do not build nests, but re-use old corvid or raptor nests with little to no modification (Sodhi et al. 2005). Birds return to breeding territories in late March and early April, and as late as mid-April at some Lake Superior sites (Chartier and Ziarno 2004, pers. obs.). A clutch of four to five eggs are laid in early to mid-May, sometimes as late as early June. Incubation lasts about 30 days, and is done primarily by the female, with the male bringing food to his partner and occasionally offering nest relief. The young fledge from the nest about 29 days after hatching, and remain dependent on adults for one to four weeks afterwards. Fledglings generally depart from the natal area between mid-July to mid-August (Sodhi et al. 2005).

Abundance and Population Trends

The estimated population of Merlins in the U.S. and Canada is 650,000 birds (Sodhi et al. 2005). Partners in Flight (PIF)

Merlin *(Falco columbarius)*

Skye Christopher G. Haas

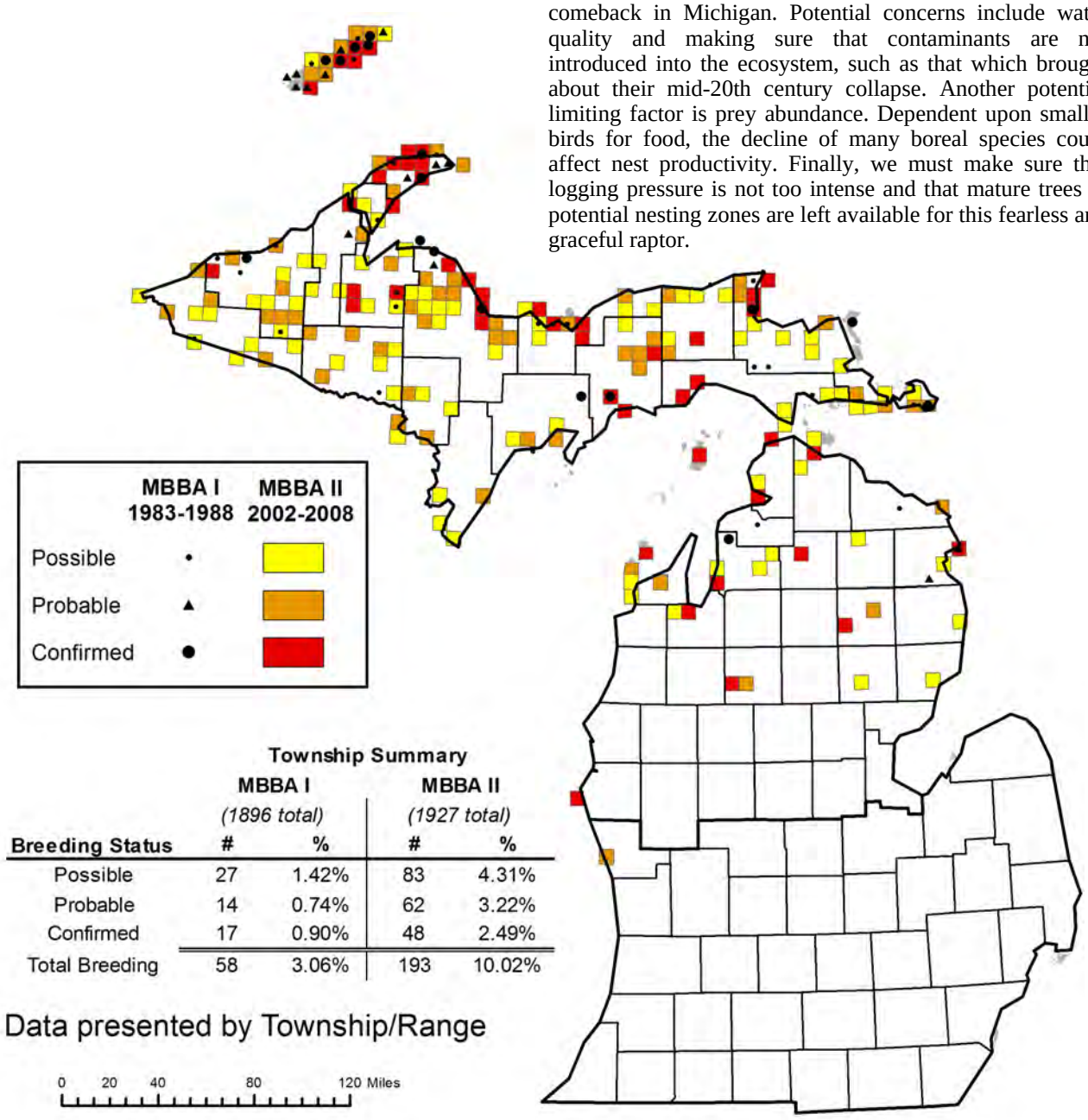
Status: *State Threatened*

has estimated there to be 300 Merlins in Michigan, likely an accurate number (PIF 2007). Overall, Merlins are increasing over the entire Great Lakes region. PIF has estimated 3,000 birds in Minnesota, and 80,000 for Ontario, where the species has increased significantly – more than double between Ontario's first and second atlases (Gahbauer 2007). In Wisconsin, population numbers are similar to Michigan. New York had an impressive increase; the species went unrecorded in their first atlas, yet was found in 131 blocks in the second (McGowan and Corwin 2008).

While Great Lakes coastlines seem to be preferable to inland sites for nesting, there is no attraction to water in particular. Rather, Merlins take advantage of the open habitats to chase and catch birds on the wing and can also be found over large inland lakes, marshes, towns, and even farmland. Binford (2006) speculated that the reason for concentrations of breeding Merlins along Lake Superior may be that it offers quality hunting opportunities. Birds that hold such territories have an abundance of prey items in the form of trans-lake migrants, with passerine migration beginning in August, just as juveniles become independent and adults are relieved from parental care. It is possible that as these territories are filled, more birds will push into the less preferred, but still suitable habitat in the interior of the peninsulas.

Conservation Needs

The Merlin has adapted to the changes that have altered the habitat within its range, and is poised to continue its comeback in Michigan. Potential concerns include water quality and making sure that contaminants are not introduced into the ecosystem, such as that which brought about their mid-20th century collapse. Another potential limiting factor is prey abundance. Dependent upon smaller birds for food, the decline of many boreal species could affect nest productivity. Finally, we must make sure that logging pressure is not too intense and that mature trees in potential nesting zones are left available for this fearless and graceful raptor.



Peregrine Falcon *(Falco peregrinus)*

Sergej Postupalsky

Status: *State Endangered*



Carl Manning ©
Species sponsored by: Bob Hess

The Peregrine Falcon is reputed to be the world's fastest flying bird; its speed and agility as it dives to strike at its flying prey has captured the admiration of falconers and naturalists alike. This falcon is widely but sparsely distributed: it is found on all continents except Antarctica. Its historical North American breeding distribution spanned the continent from the tundra to the southern Appalachians and the Mexican Plateau, and from the Aleutian Islands to Greenland (White et al. 2002). Like many raptors the Peregrine has undergone a slow decline in numbers and breeding distribution due to shooting, trapping, egg-collecting, and disturbance by human activities (Hickey 1942, Bond 1946, Cade 1960). A precipitous decline occurred after about 1950, which resulted in its total elimination as a breeding species from the United States east of the Rocky Mountains, and from eastern Canada south of the boreal forest. Elsewhere its numbers and distribution were reduced to varying degrees (Hickey 1969, Cade and Fyfe 1970, Fyfe et al. 1976). The causes of this dramatic decline are well documented: bioaccumulation in prey species of the then widely used organochlorine pesticides, such as DDT and its metabolites, which caused females to lay thin-shelled eggs which broke during incubation and led to total reproductive failures (Ratcliffe 1967, 1970, Hickey and Anderson 1968, Hickey 1969, Cade et al. 1971, 1988). Recovery and reoccupation of lost breeding range is now well underway, made possible by the ban on the use of DDT and other persistent organochlorine pesticides in the U.S. and Canada in the early 1970s, and by releases of captive-bred Peregrines by the Peregrine Fund, Inc., other organizations, and falconers and breeders in the U.S. and Canada (Cade et al. 1988, Enderson et al. 1995, White et al. 2002).

Distribution

Early reports of the Peregrine's status in Michigan are vague: "Irregular visitor" (Gibbs 1879); "Rare… breeds at Michigamme… [and] at the southern shore of Lake Superior" (Cook 1893); "Nowhere common" (Barrows 1912). Only 10 historical nesting areas have been identified for Michigan, all but one in the UP: Michigamme (eggs collected), Huron Islands, Huron Mountain Club, and Marquette (young banded), in Marquette County; Grand Island and Pictured Rocks in Alger County; Isle Royale in Keweenaw County; Garden Peninsula in Delta County; Mackinac Island in Mackinac County; and South Fox Island in Leelanau County (Wood 1951, Isaacs and Sloan 1979). The last documented successful nesting at these historical sites occurred on the Garden Peninsula in 1957 (Berger and Mueller 1969). A report of possible nesting in the Huron Mountains in the early 1970s, thought to be the last nesting of wild Peregrines east of the Mississippi River (Payne 1983), is to be viewed as extremely doubtful and likely based on sightings of migrants or on misidentification. Most commonly occupied habitats contain cliffs for nesting and open areas for foraging, in some regions distributed along rivers or shorelines of lakes and seacoasts; most sites are associated with water (White et al. 2002). The Peregrine formerly nested uncommonly in cavities of large trees in parts of the Mississippi River basin (Hickey 1969) and in some areas lacking suitable cliffs it has used abandoned nests of other species (Fischer 1977, White et al. 2002). In the Midwest, most historical eyries were on horizontal ledges or in caves on high cliffs along the upper Mississippi River, its tributaries, and on cliffs facing the Great Lakes (Berger and Mueller 1969). In Michigan, most historical nest sites were high cliffs on the shore of Lake Superior and of the Garden Peninsula in Lake Michigan; one was on a cliff located inland (Wood 1951, Dodge 1961, Isaacs and Sloan 1979). The only exception was an eyrie on a steep brush and tree-covered sand dune on South Fox Island in northern Lake Michigan (Hatt et al. 1948). Although Peregrines have historically nested on buildings and other man-made structures in cities, (e.g., New York and Montreal, as well as in Europe), no such sites had been recorded in the Midwest until recently.

Breeding Biology

While northern populations are highly migratory, most adult Peregrines breeding in the Midwest are resident. Falcons do not build nests by adding nest material; instead they form a scrape on the ledge by shaping a shallow depression in the substrate consisting of dirt, sand, decomposed fecal material, or other debris. Eggs (3-4) are laid from late March to May; first-time breeders start later in the season; timing is also influenced by latitude. Incubation (33-34 days) usually begins with the penultimate egg and is conducted by both sexes, but mainly by the female (Burnham 1983). First flights of fledglings occur about six weeks post-hatch and dependency of fledglings on adults for

Peregrine Falcon *(Falco peregrinus)* ***Sergej Postupalsky***

Status: *State Endangered*

food may continue for as long as 9-10 weeks in non-migratory populations (Sherrod 1983). Annual productivity is influenced by cold, wet, and late spring weather; local yearly variation in prey abundance; regional differences in prey availability; and predation and disease. Although not quantified for any population, predation can be significant, e.g., predation by Great Horned Owls or Golden Eagles, especially on hacked young (White at al. 2002).

Abundance and Population Trends

A survey in 1939-1940 estimated the population in the eastern U.S. at 350 pairs (Hickey 1942). By 1964 a repeat survey of the same area did not find a single nesting pair anywhere east of the Mississippi River (Berger et al. 1969). Already legally protected in most states and Canadian provinces since the 1950s and 1960s, the Peregrine was listed as Endangered under the 1969 Endangered Species Conservation Act and later under the 1973 Endangered Species Act; it is also protected by the Migratory Bird Treaty Act.

Following restrictions on the use of DDT and other organochlorines some stability and local increases were noted in the 1970s (Fyfe et al. 1976), and numbers of pairs increased rapidly during the 1980s (Cade et al. 1988). Importantly augmented by hacking releases of more than 6,000 captive produced nestlings in Canada and the coterminous U.S., continent-wide numbers approached pre-DDT levels by the 1990s. This recovery allowed the Peregrine to be federally delisted in 1999 (Mesta 1999). Legal protection continues under the federal Migratory Bird Treaty Act and by continued listing as an endangered species under the Michigan Endangered Species Act, as well as under state laws protecting wildlife.

Hacking releases of Peregrine nestlings began in Michigan in 1986 in Grand Rapids, in 1987 in Detroit and on Isle Royale, in 1988 on Ottawa National Forest in Ontonagon County, and in 1989 at the Pictured Rocks National Lakeshore in Alger County (Evers 1994). A total of 139 young falcons were released in Michigan including 108 in the UP and 31 in urban areas of the southern LP (Monfils 2007). During MBBA I there was only one possible record – from Isle Royale; the confirmed squares on the map indicate hack sites (Hess 1991). The first post-DDT nesting attempt by Peregrine Falcons occurred in 1989 in Detroit (Hess 1991); in 1990 two additional nesting attempts occurred in Ontonagon County – one at the Trap Hills, the other in Porcupine Mountains State Park (Hess 1991, Tordoff 2000). The first successful nestings in Michigan since 1957 occurred at the Trap Hills in 1991 (B. Bogaczyk, pers. comm., Tordoff 2000) and in Detroit in 1992 (Tordoff 2000).

During the MBBA II period, the number of known, apparently territorial Peregrine pairs in Michigan rose from 11 (six successful in fledging young) in 2002 to 25 (13 successful, 10 with no known nests) in 2008 (Midwest Peregrine Restoration Project 2003-2009). The largest concentration is in the southeastern LP with about a dozen pairs between Port Huron and Monroe, half of them in Detroit. Others have nested in Flint, Lansing, East Lansing, Grand Rapids, Muskegon, and in Ottawa (two pairs) and Bay Counties. Apparently territorial pairs with no evidence of nesting at several other sites are shown as probable on the map. Falcons have nested or set up territories at high rise office buildings, power plants, other industrial structures, and bridges. In the UP, apart from one pair using the International Bridge at Sault Ste. Marie, Peregrines seem to prefer natural cliffs. During this atlas period they have nested successfully at four different sites: Pictured Rocks, Grand Island, and Au Train Island in Alger County, and in Porcupine Mountain Wilderness State Park in Ontonagon County. No nesting has been reported at the Trap Hills in recent years (B. Bogaczyk, pers. comm.). There have been no reports of Peregrines from historical sites in Marquette and Delta Counties. Although these falcons are occasionally seen on Isle Royale, no nesting has been reported there.

Michigan's recovery goal for the Peregrine was eight nesting pairs in the UP and two in the LP by the year 2000 (Evers 1994, Monfils 2007). While the LP goal has been exceeded, the number of nesting pairs in the UP still falls short, this even though many more falcons were released in that part of the state and falcons typically return to the habitat type in which they were raised (Holroyd and Banash 1990).

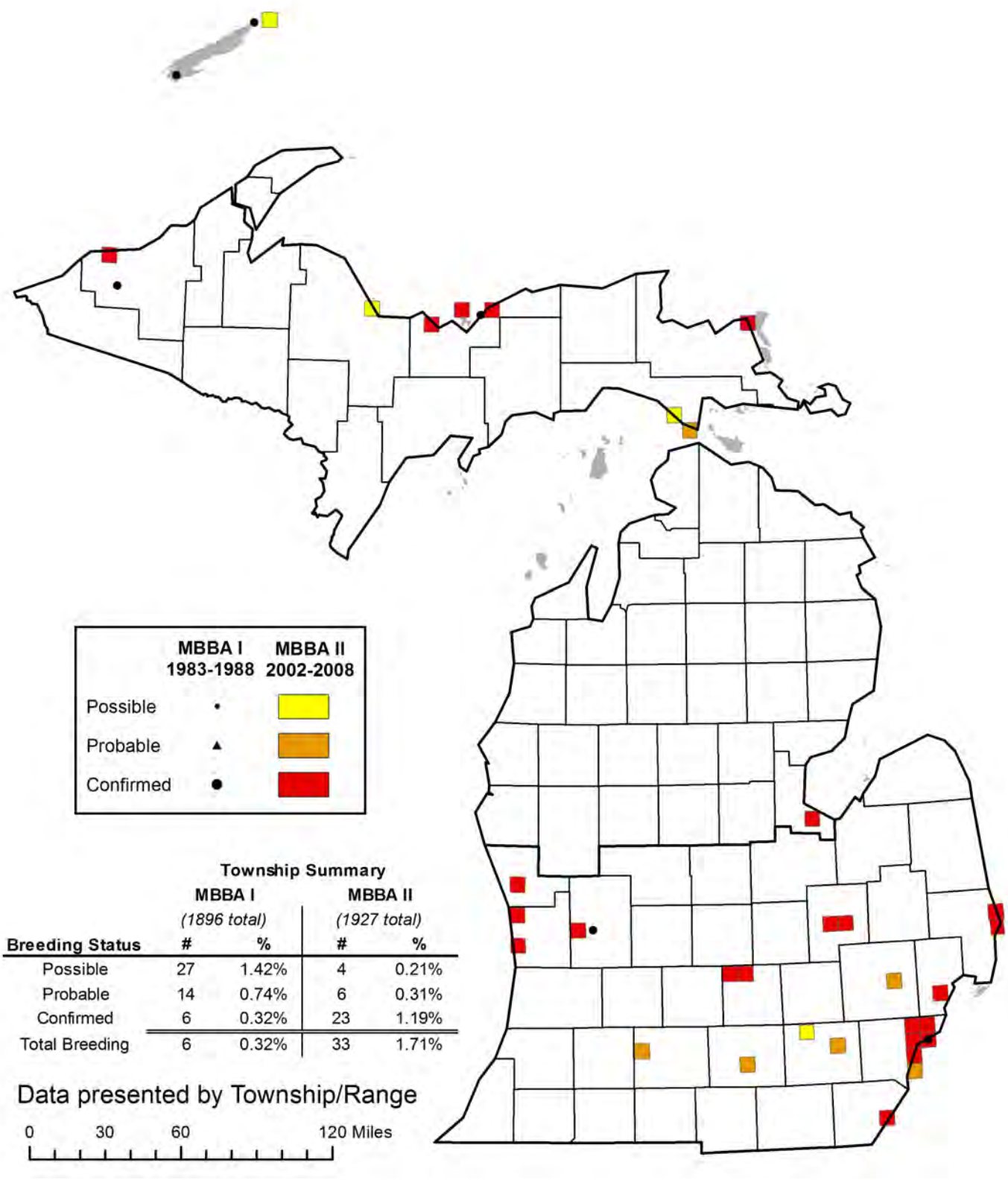
Conservation Needs

Management needs in Michigan include:

1. Habitat protection: safeguarding of eyries from alteration or destruction and from excessive human disturbance, and protection of riparian habitats that produce an adequate prey base.
2. Habitat improvements: modification of nest sites on cliffs, buildings, towers, and bridges to increase safety from predators, inclement weather, accidents. Prompt provision of nest boxes with gravel or pea stone (or suitable substitute) on suitable buildings, towers, bridges, smokestacks, or natural cliffs whenever Peregrines appear in an area, to encourage them to stay and breed.
3. Monitoring population trends and productivity.
4. Continued vigilance relating to the wide range of synthetic substances being released into the environment, which potentially could have lethal or sub-lethal effects on this and other sensitive species high on the food web.

Peregrine Falcon *(Falco peregrinus)*

Status: *State Endangered*



Yellow Rail *(Coturnicops noveboracensis)* ***Dave Olson***

Status: *State Threatened*



Phil Hansbro ©

In Michigan, the Yellow Rail begins its distinctive territorial call "*tick tick…tick tick tick*" in the sedge marshes in late April. Each spring at the Seney National Wildlife Refuge (Seney NWR), the phones ring off the hook as birders from far away places such as Australia, Germany, and England anticipate the spring arrival and plan trips in hopes of adding this elusive marsh bird to their life list. The bird is highly secretive, preferring to run under the vegetation rather than fly when disturbed. This nighttime specter could easily be within centimeters of the observer's feet yet the observer would never know.

Distribution

The Yellow Rail winters along the coast from North Carolina west to the coasts of Texas and into Mexico and parts of central California (Bookhout 1995). The breeding range for the Yellow Rail is primarily central and southern Canada, from the Northwest Territories to New Brunswick. In the U.S., its breeding range includes northern North Dakota, the Great Lakes region, and extreme northeast Maine. There is also a disjunct breeding population that occurs in the Klamath River Basin in Oregon (Bookhout 1995).

The Yellow Rail has been recorded in Schoolcraft, Luce, and Chippewa Counties of the UP and in the Houghton Lake marshes (Roscommon County) in the NLP (MNFI 2001). Since the 1980s, the Yellow Rail has been monitored in the sedge marshes at Seney NWR (Schoolcraft County). When MBBA I was conducted between 1983 and 1988, only probable breeding records were recorded at Seney NWR and elsewhere in Schoolcraft County and possible breeding records in Roscommon County. Since that time, there has been a change from probable to confirmed breeding at locations in the Upper Peninsula. Most recently in 2006 at Seney NWR, a female was flushed from a nest as fire lines were being established north of the J-G spillway in preparation for a prescribed burn in late summer (Austin unpublished data). The nest contained seven eggs. Also, Michigan's Upper Peninsula is bordered by Wisconsin and Ontario and both the Wisconsin Breeding Bird Atlas (Cutright et al. 2006) and the Ontario Breeding Bird Atlas (Cadman et al. 2007) had confirmed breeding.

Breeding Biology

The Yellow Rail may arrive in Michigan as early as late April from its wintering grounds on the Texas Coast. Some of those birds that arrive in Michigan will undoubtedly continue north to establish breeding territories in Canada. In Michigan, nest building and egg laying begins in late May to early June (Stenzel 1983). Incubation lasts about 18 days after the last egg is laid (Elliot and Morrison 1979). All eggs hatch within 24 hours and brooding of the young ceases within three weeks (Stalheim 1974).

Abundance and Population Trends

Because information continues to trickle in regarding the locations of Yellow Rails, there is really no known abundance number. Due to the bird's secretive nocturnal habits, trend data is poor at best. Until accurate and reasonably sound survey estimates are developed trying to estimate population trends would be futile.

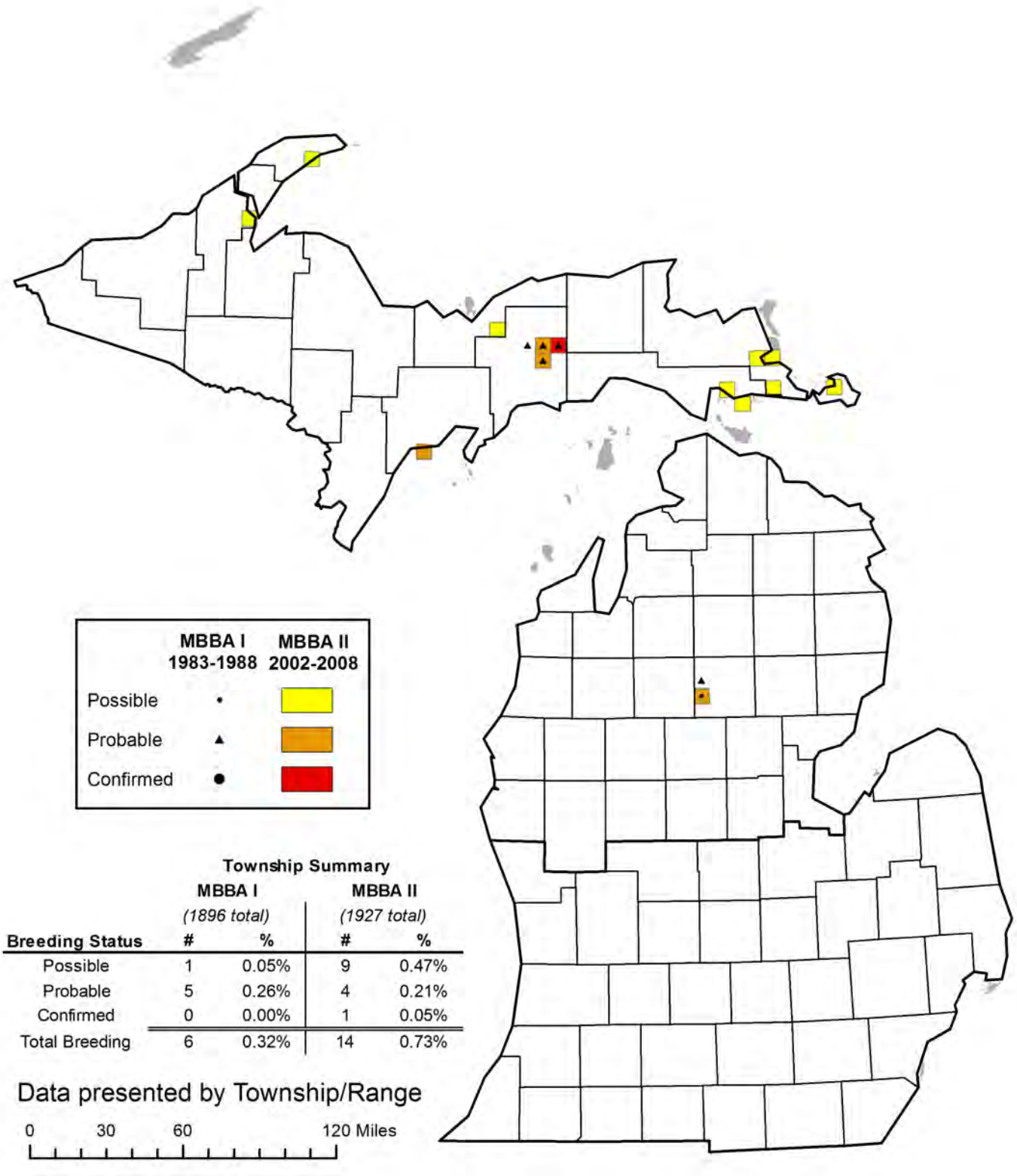
Seney NWR continues to be a focal point for Yellow Rail activities and research in the Upper Peninsula. Current research underway at Seney centers on developing tools to assist resource managers in calculating abundance estimates and identify breeding habitat of Yellow Rails (Austin 2007).

Conservation Needs

There are many aspects of this bird's biology and life history strategy that still need to be examined, including information on adult and juvenile survival rates, along with estimates of lifetime reproductive success. Tied to life history information is the need to understand management's role in providing habitat during all stages of the bird's life cycle. Current research at Seney NWR has been updating the role fire plays on the breeding habitat of rails (Austin 2007). Also, research conducted on the rails in Texas has provided more information on the bird's wintering habitat (Grace et al. 2005). One effort that would greatly increase knowledge of rails in Michigan would be conducting a cooperative Great Lakes survey. The survey could be designed similarly to the National Marshbird Monitoring Program (Conway et al. 2008) but employ monitoring methods specifically for Yellow Rails. A regional coordinated effort would assist in determining the spatial distribution of the Yellow Rail.

Yellow Rail *(Coturnicops noveboracensis)*

Status: *State Threatened*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	1	0.05%	9	0.47%
Probable	5	0.26%	4	0.21%
Confirmed	0	0.00%	1	0.05%
Total Breeding	6	0.32%	14	0.73%

King Rail *(Rallus elegans)*

Caleb G. Putnam

Status: *State Endangered; Casual (MBRC)*



Doug Jackson ©

The largest of North American rails, the King Rail is one of Michigan's most enigmatic breeding birds. Its extremely sparse distribution in the Lower Peninsula and the close similarity of its vocalizations to those of the familiar Virginia Rail conspire to make it one of the most difficult species to detect in our state. Correspondingly, as in the past, it continues to be encountered very infrequently in Michigan and surrounding states and is subsequently recognized as state endangered. The King Rail breeds from the eastern Great Plains to the Atlantic coast, as far north as North Dakota and Ontario and south to the Gulf of Mexico. In the fall it retreats to a primarily coastal winter distribution stretching from the mid-Atlantic to the Gulf of Mexico and Cuba. An additional resident population exists in Mexico. Winter records from the northern extremity of its range, including Michigan, are very rare.

Distribution

The King Rail has experienced precipitous declines in Michigan and throughout the northern reaches of its range since the early 20th century. Barrows (1912) described the species as "a common nester at St. Clair Flats," "fairly abundant in … Ingham County," and as "far from rare … from Monroe Co. to Saginaw Bay," while Wood (1951) described it as "uncommon." Today the species is strictly casual in Michigan, with only 12 reports accepted by the Michigan Bird Records Committee from 1998 to 2008 (MBRC 2009).

Detections during MBBA II were forthcoming in just eight blocks, with only a single confirmation of breeding. King Rails were detected at slightly greater levels (13 blocks) during MBBA I, perhaps indicating a continuation of gradual historical declines during recent decades. Indeed, systematic surveying of 82 wetlands within three kilometers of the Great Lakes shore during the mid-2000s, which included the use of prerecorded playback, yielded not a single observation of this species (M. Sanders, pers. comm.). Similar targeted surveying as late as 1986 had yielded as many as 26 individuals (Rabe 1986). The species is clearly down to perilously low levels in Michigan. As in MBBA I, the species was detected primarily on or near the Great Lakes shorelines, with inland records much less frequent.

Like the Virginia Rail, the King Rail is found in a variety of emergent wetland habitats including monotypic cattail, cattail-sedge-shrub, sedge-grass, wet meadow (M. Sanders, pers. comm.), bulrush, and cattail-Phragmites mix, such as at Pointe Mouillee State Game Area (Evers 1984, Rabe 1986, pers. obs.). Water depths of less than six inches and wetlands larger than 50 acres were preferred in Ohio (Trautman 1940). Whether a similar area dependency is operative in Michigan has not been quantified but does seem likely since most detections are at or near the larger coastal wetlands along Saginaw Bay and western Lake Erie.

Breeding Biology

Because of the paucity of observations, the breeding biology of this species is poorly understood. Rabe (2001) and McPeek (1994) indicate a spring arrival of mid to late April, with active nests being observed from May to July, and downy young as late as August (Chartier 1999). The species typically vacates Michigan by the end of October (MBRC 2009).

Abundance and Population Trends

Michigan may currently host as few as five to ten pairs of King Rails (McPeek 1991), a conclusion supported by MBBA II data. Available estimates for surrounding states and provinces were slightly higher, with 10-25 pairs suggested for Ohio (Peterjohn and Rice 1991) and 20-52 pairs for Ontario (Woodliffe 2007). Breeding Bird Survey data, notoriously weak for detecting crepuscular, secretive species such as the King Rail, suggested a rangewide annual decline of 7.9% between 1980 and 2002 (Poole et al. 2005).

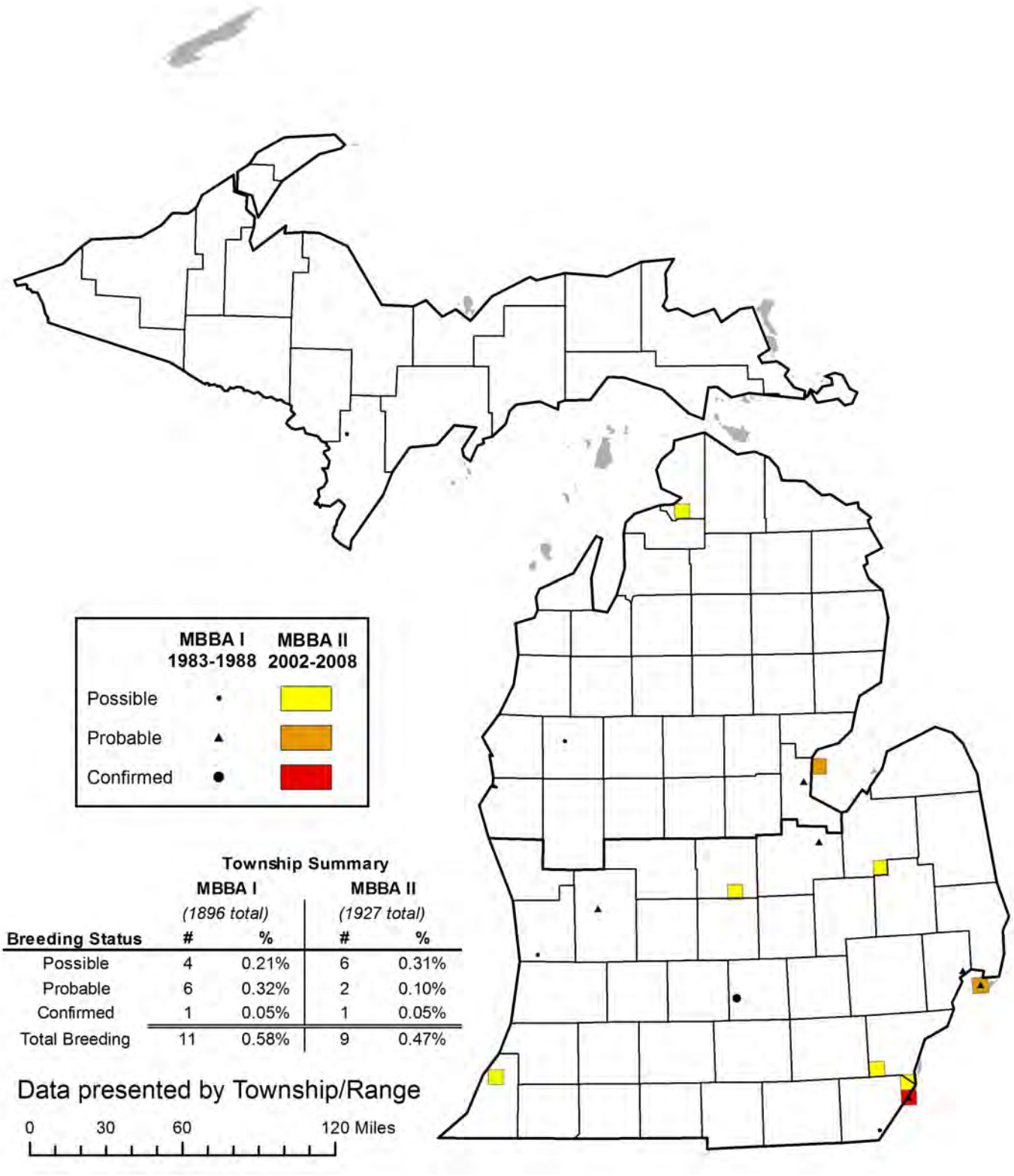
Conservation Needs

The King Rail population in Michigan is very low and possibly still declining. There is an urgent need for new information on all aspects of its biology in Michigan. Priorities include clarification of migration phenology, best survey periods, and best surveying methodology. Publication of audio recordings elucidating how to definitively separate this species from the very similar Virginia Rail would be extremely useful. Such information could guide additional targeted surveys.

The continued protection and restoration of wetlands is a prerequisite to this species' future in Michigan. Elucidation of additional causes of its decline would be helpful, as habitat loss alone (such as mentioned by Rabe 2001) may not be the only limiting factor. Potential threats identified by the Michigan Wildlife Action Plan (Eagle et al. 2005) include pollution and disease. It is unclear whether the apparent abundance of suitable habitat which goes unused by this species is actually inhospitable to it, though it seems conceivable that an area dependency could be responsible.

King Rail *(Rallus elegans)*

Status: *State Endangered; Casual (MBRC)*



Virginia Rail *(Rallus limicola)*

Caleb G. Putnam



Jim Ridley ©

The finicky Virginia Rail can be notoriously difficult to detect within its marshy confines. Even during apparently perfect conditions, it is often completely silent; yet on select calm evenings in late April and May the persistent observer is rewarded with a cacophony of its powerful *"kiddick-kiddick"* calls emanating from the invisible depths. This distinctive, orange-billed relative of cranes is a fairly common, although local, breeder throughout the middle latitudes of North America, with scattered non-migratory populations in Central and South America. Birds from the migratory, nominate population winter coastally to British Columbia and New England, along the Gulf Coast, and across much of northern Mexico. In Michigan, the Virginia Rail is found statewide as a breeder, being at its highest abundance in the south and thinning considerably in the northern LP and UP. This species very rarely winters in Michigan, though it is more numerous during this season in western portions of its breeding range (Conway 1995, pers. obs.).

Distribution

Similar to reports from Ontario (Tozer 2007) and New York (Medler 2008), Michigan has experienced no perceptible change in the distribution of the Virginia Rail since MBBA I or indeed since the early 1900s. Barrows' (1912) century-old description, for example, pertains equally well to modern times as to his own: "…found over the entire state [and] much more abundant in the southern half of the state than farther north." Statewide, this species was detected at virtually identical levels between the two atlas periods, being found in 3.66% (MBBA I) and 3.49% (MBBA II) of all blocks. There was a slight decrease in its detection in the southern LP (6.10% during MBBA I, 5.13% during MBBA II). Whether this may indicate a continuation of earlier habitat losses within this region (Rabe 1991, McPeek 1994), lower regional atlasing effort (9% fewer hours compared to MBBAI), or some other explanation is unknown.

The Virginia Rail is a generalist, being found in an array of habitats possessing emergent vegetation, wet substrate, and high invertebrate abundance. Shallow water is preferred, but deeper areas are used if sufficient floating vegetation is available to walk on (Conway 1995). It occurs in higher densities in cattail and bulrush marshes compared to sedge/grass marshes (Ribic 1999), which may explain why this species is less abundant in the northern reaches of the state. It is also found in wet meadows, river and lake edges, and even flooded ditches, exemplifying its profound flexibility to utilize habitats of all spatial scales. Wetlands just a fraction of an acre in extent are used regularly. A preference for sites possessing a roughly equal ratio of open water to emergent cover is reported (Conway 1995, Conway and Eddleman 1994).

Breeding Biology

The Virginia Rail arrives in the southern LP starting in early to mid-March (Chartier and Ziarno 2004, eBird 2010) and reaches the UP by mid to late April. There is a suggestion of later spring arrival in historical times, such as published dates of 18 April (Walkinshaw 1937) for the southern LP and "early May" (Zimmerman 1977) for the UP. Whether this is due to differences in survey effort or an actual change in migration phenology is not known, though the latter seems likely. Nesting begins in late April or May, with incubation lasting approximately 19 days (Conway 1995). The species typically vacates Michigan by October with small numbers lingering in the southern LP until December.

Abundance and Population Trends

Because traditional sampling methods such as the Breeding Bird Survey do a poor job of detecting species with localized distributions and nocturnal/crepuscular habits, few data on the Virginia Rail's abundance in Michigan are available. Breeding Bird Survey data suggest a 10.5% statistically insignificant annual decline between 1966 and 2007 for the state (Sauer et al. 2008). No population estimates are currently available.

Reports for surrounding states and provinces are mixed. The Marsh Monitoring Program reported a significant decline in this species over the entire Great Lakes basin from 1995-2003 (Crewe et al. 2005) and a significant decrease in the Lake Erie basin in particular. A significant increase in detection in Ontario, however, may have been due to increased observer effort during its second atlassing period rather than actual increases in population (Tozer 2007). Indeed, observer effort likely exerts a very strong effect on detection of this species, necessitating a standardized sampling effort in order to allow for population level inferences. Population estimates and trend data are lacking for Indiana, New York, Ohio, Wisconsin, and Ontario.

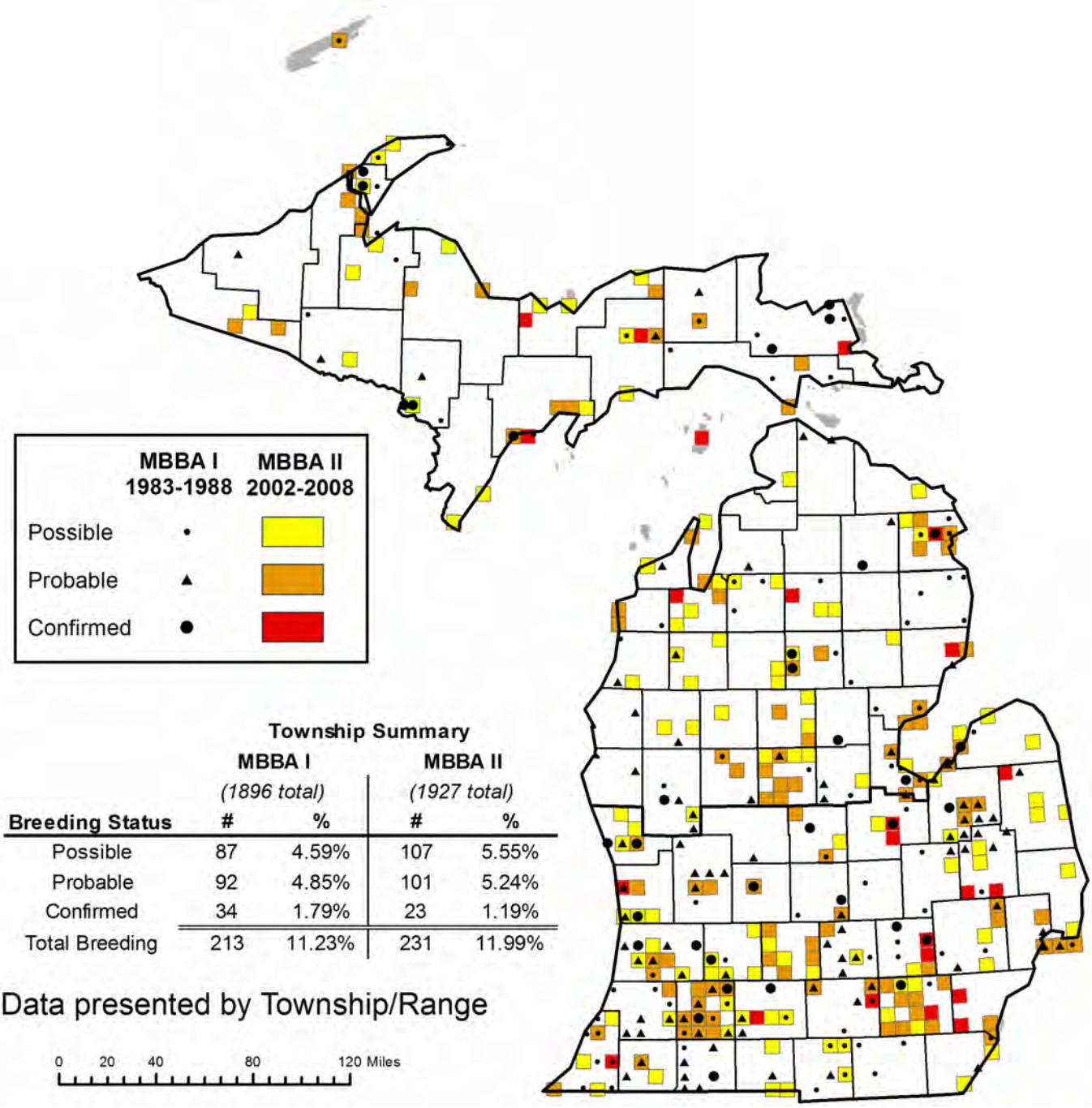
Virginia Rail *(Rallus limicola)*

Caleb G. Putnam

Conservation Needs

The protection and restoration of wetland habitats statewide is vital to the continued survival of this species. Continued funding of the Farm Bill and its provisions (e.g. Wetlands Reserve Program) should be promoted. Recent attempts to eliminate the Wetlands Program of the Michigan Department of Environmental Quality constitute a serious potential threat to Michigan's wetlands. The MDNR Landowner Incentive Program (LIP) provides one means of obtaining resources for marsh restoration on privately-owned land.

Systematic wetland surveys are necessary to obtain a clearer picture of the Virginia Rail's population status and trends in Michigan. Such surveys (e.g. the Michigan Natural Features Inventory Marshland Monitoring Program) should aim for intense coverage between early April and May in the southern LP (early May to early June in the UP/NLP), and should incorporate broadcasting of prerecorded calls to increase the detection of this and other secretive species (e.g. Conway and Gibbs 2005).



Sora *(Porzana carolina)*

Doug Powless



Darlene Friedman ©

The Sora is a stubby-tailed rail with a short, coot-like bill. This is a small bird, the length of a cardinal, smaller than a Killdeer. A migratory bird, the Sora arrives in Michigan as early as late March, mostly from mid-April to early May, and departs beginning in mid to late September (Walkinshaw 1940, Wood 1951, Adams 1979). Although more common in Michigan than other rails (Rabe 1991), finding the Sora and confirming proof of breeding is still a challenge due to the Sora's small size, cryptic coloration, marshy habitats, hidden nests, early nesting, single brood, and quick abandonment of the breeding territory after the young are independent (Walkinshaw 1940, Berger 1951, Johnson and Dinsmore 1985, Melvin and Gibbs 1996). Luckily, the Sora's loud descending whinny and *"kerr-whee"*, or *"sor-a"*, calls can give its location away. However, Soras often call most frequently before dawn or after dusk and require special effort to adequately survey them. Despite these challenges, atlas participants found the Sora across all regions of the state. Nesting ranges across the northern U.S. and southern Canada from Long Island to the Yukon, and from New Mexico to Washington, D.C. (Melvin and Gibbs 1996).

Distribution

Michigan bird lists of the early 1800s do not include the Sora until Kneeland's Keweenaw list (Kneeland 1859). From then on, the Sora was recognized as a widespread summer resident (Miles 1861, Wood 1951, Rabe 1991). Today, the Sora resides in marshes and sedge meadows throughout every corner of Michigan from the marshes of Lake Erie to the wetlands of Isle Royale. It occurs in every county of Wisconsin (Temple et al. 1997) and in most Ontario breeding bird atlas blocks along Lakes Huron and St. Clair (Tozer 2007). Records of Sora become sparse in northern Ontario, although a number nest along northern Lake Superior at sites north of the Keweenaw Peninsula and Isle Royale (Tozer 2007). In Illinois it is found primarily in wetlands around Chicago (Kleen et al. 2004). It is likely that distribution has become more localized in the 20th Century due to wetland loss and degradation (Wires et al. 2010).

The raw number of townships and blocks where Sora was found in Michigan varied little between MBBA I and MBBA II, despite an increase in coverage of 1.6%. Sora was found in roughly 5% of the atlas blocks and 15% of the townships during both atlases. However, the locations of sightings varied widely with an overlap of only about 35% of townships where Sora was detected in both atlas periods (27% overlap in the UP; 25% in the NLP; 46% in the SLP). During MBBA II, participants found the Sora in three new counties (Delta in the UP, and Ogemaw and Missaukee in the NLP), but did not relocate the Sora in at least nine counties where it was found during MBBA I. For example, atlasers found the Sora in wetlands in Oscoda, Alcona, and Gladwin counties only during MBBA I and in nearby Ogemaw county only during MBBA II. Also, although not found during MBBA I from much of Michigan's Thumb area, the central UP, or in many areas in southeastern counties, participants of MBBA II were able to locate Soras in many of those townships. These large differences in the locations of Sora sightings between atlases probably reflect the difficulties of surveying rails and not a shift in distribution. Surprisingly, Sora was found during MBBA I in just one location on Drummond Island and nearby areas even though it occurs in adjacent areas of Ontario (Tozer 2007) and was reported nesting on Drummond Island by Wood (1951).

Very few Soras stay in Michigan during the winter, however they have been found here during seven Christmas Bird Counts since 1900, six of those during the past 35 years (NAS 2009). The Sora migrates far south of Michigan to the Gulf of Mexico and northern South America (Melvin and Gibbs 1996, Clements and Shany 2001). Migration begins in late September, with some staying in Michigan through October (Adams 1979). Timing of fall migration might coincide with the onset of autumn frost (Walkinshaw 1940).

Breeding Biology

The Sora nesting cycle begins by late April in the southern U.S. and by May in the north; usually only one brood of 8-12 is reared (Baicich and Harrison 2005). Nesting is in May and June in Michigan and Wisconsin (Rabe 1991, Ribic 2006) but can extend into July in the north (e.g., at Douglas Lake and Charlevoix; Wood 1951, Pettingill 1974). A Sora's basket shaped nest is usually well concealed over shallow water with plants pulled over the top (Walkinshaw 1940, Berger 1951, Ehrlich et al. 1988, Baicich and Harrison 2005). Nests are difficult to locate, so the best survey times are when the birds are most vocal. New national protocols suggest survey windows of 1 May-15 June in the LP and 15 May-30 June in the UP (Conway 2009) with taped call playback methods used to increase detection probabilities (Conway and Gibbs 2005, Conway 2009). After the young are fledged and able to care for themselves, the adults leave the breeding territory (Johnson and Dinsmore 1985, Ehrlich et al. 1988).

Sora *(Porzana carolina)* ***Doug Powless***

Abundance and Population Trends

The Sora is one of the most common rails in the U.S. and is legally hunted in many states (Melvin and Gibbs 1996). Based upon surveys of hunters, the USFWS estimates only 100 rails, which includes both Sora and Virginia Rails, were harvested in Michigan during the 2007-2008 season, but as many as 19,600 Soras were taken in 2008 across the U.S. (Raftovich et al. 2009). Surveys however, primarily of waterfowl hunters *(Anatidae)* may give crude estimates for Sora and other waterbird harvest (Eddleman 1988, Wires 2010, Raftovich 2009). Ingestion of lead shot leftover from waterfowl hunting has been another source of mortality (Melvin and Gibbs 1996). Population sizes and trends for rails are not well understood (Bart 2005, Conway and Gibbs 2005, Conway and Timmermans 2005, Conway et al. 2008, Conway 2009; NABCI 2009). An exception is the dataset of the Marsh Monitoring Program in the Great Lakes region, which shows a statistically significant decline of Soras in the region of 5.3% during the first ten years of the survey (Crewe et al. 2006) and 4.9% from 1995-2007 (Archer and Jones 2009). The Sora was found in the same percentage of atlas blocks and townships as in MBBA I, and shows no significant trend over BBS routes in Michigan, but a statistically significant decline of 6.9% per year along BBS routes in USFWS region 3 from 1983 to 2007 (Sauer et al. 2008).

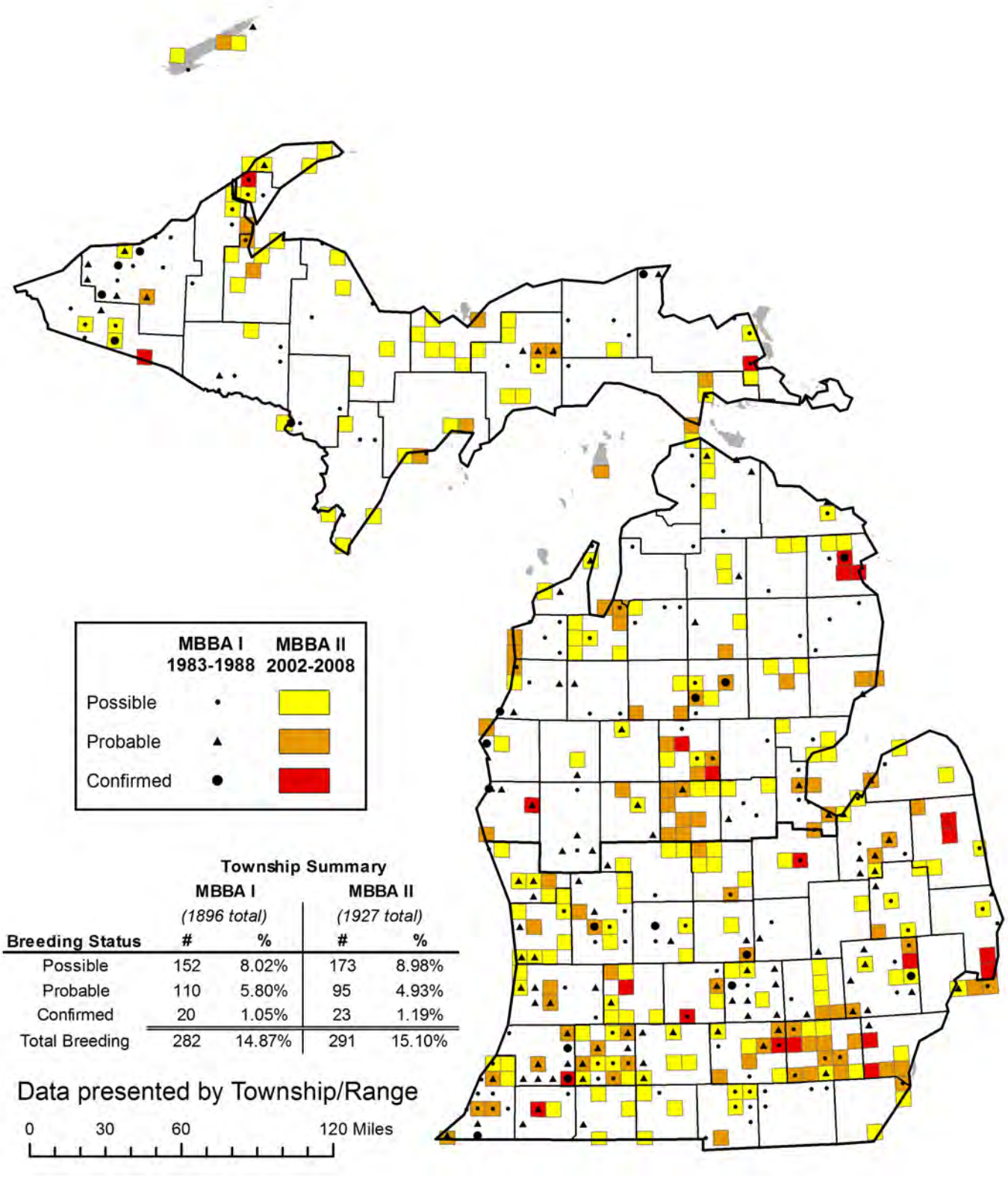
Conservation Needs

The Sora is a species of high concern on the North American Waterbird Conservation Plan, primarily because of inadequate population estimates across most of its range (Wires 2010). New federal survey protocols for marsh birds that coordinate population monitoring effort are under way that will enable managers to better understand population changes of marsh birds such as the Sora (Monfils 2010, Conway and Timmermans 2005, Conway 2009). Since 2009, the Michigan Natural Features Inventory has been coordinating a Michigan Bird Conservation Initiative program to survey marshland birds. Continuation of coordinated, annual censusing and monitoring of Sora populations (and other secretive marsh birds) in protected marsh lands, such as those within state game areas, would provide adequate estimates of population size and population trends needed for conservation of this rare and declining marshbird in Michigan.

Wetland management can be different for rails than for ducks; in particular, rails need shallower water with plenty of emergent sedges and grasses for foraging (Eddleman et al. 1988). Protection of sedge dominated wetlands provides nesting and feeding habitat (Walkinshaw 1940, Martin et al. 1951, Melvin and Gibbs 1996). The return of beaver populations could naturally create sedge meadows favorable to rails. The Sora is fond of eating wild rice in late summer and autumn (Walkinshaw 1940, Martin et al. 1951, Melvin and Gibbs 1996), so restoration of wild rice beds would likely benefit this species.

Due to climate change, several wetland birds are predicted to possibly become extirpated as summer residents from the LP and parts of the UP (e.g., Alder Flycatcher) or from the entire state (e.g., Sedge Wren and Swamp Sparrow) (Price 2000). Although predictions could not be made for rails, Price's modeling results suggest that marsh birds in general will decline in Michigan. In addition, changes in the dates of first frost in autumn might affect the timing of Sora migration with unknown ramifications.

Sora *(Porzana carolina)* ***Doug Powless***



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	152	8.02%	173	8.98%
Probable	110	5.80%	95	4.93%
Confirmed	20	1.05%	23	1.19%
Total Breeding	282	14.87%	291	15.10%

Data presented by Township/Range

0 30 60 120 Miles

Common Gallinule *(Gallinula galeata)*

Michael Sanders

Status: *State Threatened*



© Tom Hodgson

The Common Gallinule was known as the Common Moorhen *Gallinula choloropus* before 2011 when it was distinguished from among the European subspecies of *G. chloropus*, and considered a separate species, *G. galeata* (Chesser et al. 2011). The name Common Gallinule is a return to the historic name used prior to 1983. It is a chicken-like member of the rail family (Rallidae), and has also been referred to as Florida Gallinule and Black Gallinule. This quiet, skittish, yet graceful relative of the American Coot prefers permanent marshes with dense, emergent vegetation (Kleen et al. 2004). Its secretive nature and use of dense vegetation make it an infrequently observed species. This species has a wide distribution but is not abundant anywhere in its range. The breeding range extends from Central America north through much of the eastern U.S. and into southern Ontario (Higgins 1991). Common Gallinules winter throughout the southeastern and southwestern states with a very large concentration in Florida (Bannor and Kiviat 2002).

Distribution

Historical literature indicates the Common Gallinule as common in Michigan. This species could be found in "suitable habitat throughout the entire lower peninsula, but more abundant in the southern half" in the late 1800s (Barrows 1912). Wood (1951) reported it as a common summer resident, extending north to Grand Rapids and Saginaw and up to the Indian River area in Cheboygan County. Payne (1983) considered this a common summer resident south of the Saginaw Bay area, and especially plentiful in the St. Clair Flats and the Lake Erie marshes. However, this species has declined in Michigan in recent years, probably due to human disturbance and habitat degradation (Brewer et al. 2005). Bannor and Kiviat (2002) noted increases in Common Gallinule sightings on Christmas Bird Counts in the southern United States from 1959-1988, so the decline in Michigan populations might be a recent phenomenon (Brewer et al. 2005). Sanders et al. (2007) reported Common Gallinule from only seven percent (8/108) of the survey sites visited during a four-year wetland bird survey of Michigan's coastal wetlands.

There was little change in the overall breeding distribution of the Common Gallinule since MBBA I. Common Gallinules were mostly reported south of the Tension Zone in the LP and completely absent from the UP, where fewer areas of suitable habitat exist (Sanders et al. 2007). A notable change was the lack of reports along Lake Michigan in the SLP.

Overall occurrences dropped by about 62% (56 compared to 149) despite increased block coverage during MBBA II. A downward trend is also evident in Common Gallinule occurrences by township; about 6% reported this species in MBBA I while only 2.5% had records during MBBA II. Breeding confirmations were down by 71% and all confirmed breeding was in the SLP. Coastal strongholds continue at the Lake Erie marshes, St. Clair Flats, and at areas along Saginaw Bay.

Breeding Biology

Common Gallinule return to Michigan from mid-March to late April (MNFI 2007). Common Gallinule are more aquatic than true rails and prefer deep water marshes with depths up to 1 meter (Keller and Castrale 1998). Floating mats of vegetation and muskrat dens are prominent features in the breeding territory (Timmermans 2007). A Common Gallinule nest is a bulky platform of dead vegetation usually within six meters (20 feet) of open water in well-concealed spots among cattails (Peterjohn and Rice 1991). Egg laying typically occurs in May and June and they will renest if the first nest is destroyed (Bartelt 2006). The precocial chicks begin to feed on their own within one week of hatching (Bannor and Kiviat 2002). Fall migration begins in early September with most birds departing Michigan by mid-November (MNFI 2007).

Abundance & Population Trends

Analysis of Breeding Bird Survey (BBS) data from 1966 to 2007 does not reveal any statistically significant population trends for this species throughout North America. The data show double digit downward trends in Michigan and other Great Lake states but the sample sizes are too small to offer any validity (Sauer et al. 2008). BBS data for Canada indicate a statistically significant decline during the same time period (Sauer et al. 2008). Marsh Monitoring Program results from 1995 to 2003 showed a significant decline in the Great Lakes Basin (Medler 2005).

It is evident that Common Gallinules are declining in Michigan and the Great Lakes region. This could be explained by habitat degradation or loss, human disturbance, or simply a retraction by a species at the northern extent of its range. The Common Gallinule is a threatened species in Michigan and Illinois and one of special concern in Wisconsin.

Common Gallinule *(Gallinula galeata)*

Michael Sanders

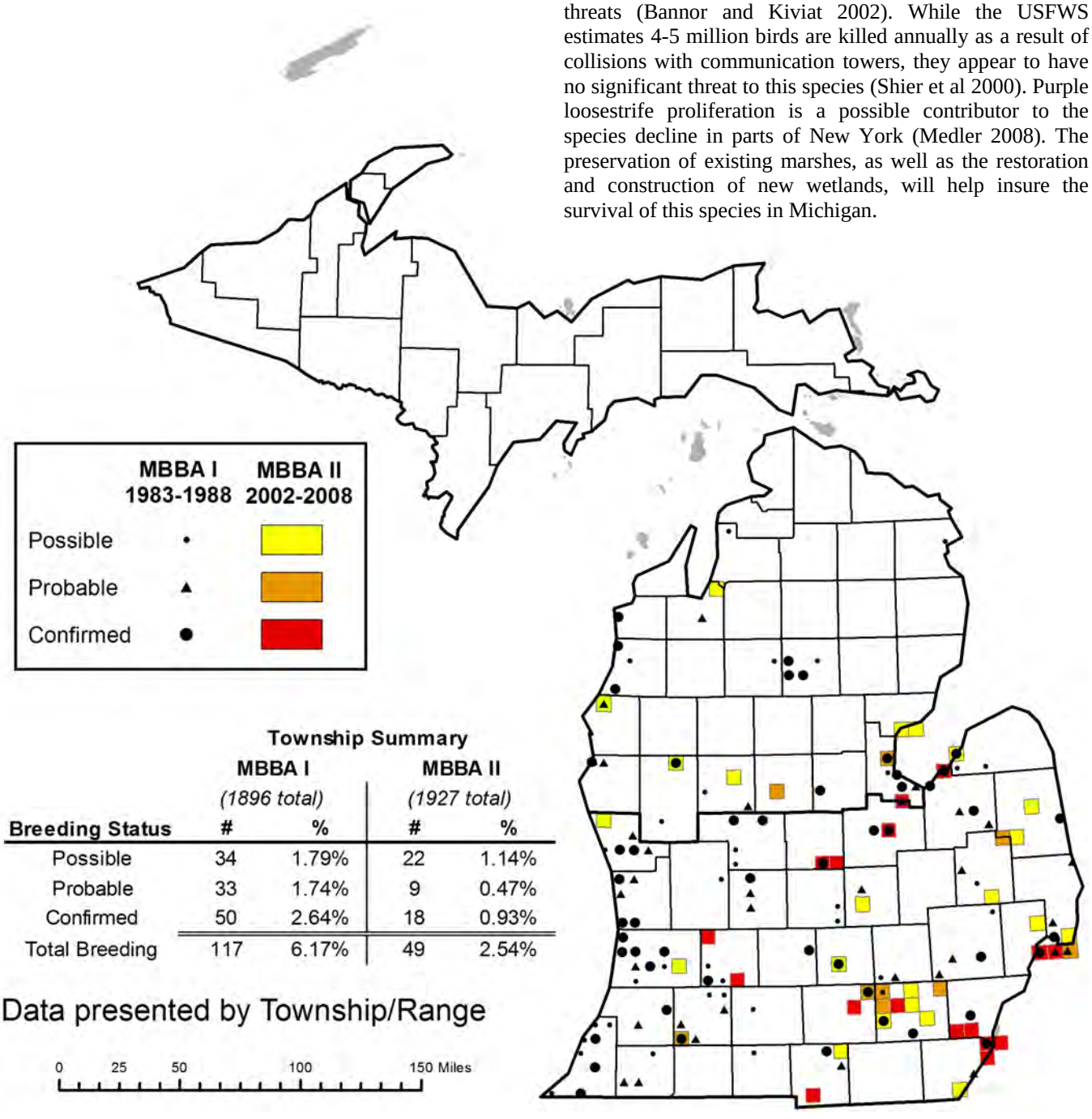
Status: *State Threatened*

Conservation Needs

Common Gallinule populations depend on the protection and proper management of marshland habitat. Fortunately, many large marshes are in public ownership and managed for waterfowl, which also provides good habitat for Common Gallinule. Habitat conditions with a 50:50 ratio of open water and emergent vegetation (hemi-marsh) should be encouraged. Management strategies involving dramatic water level fluctuations during the nesting season may flood nests and/or increase predation (Peterjohn and Rice 1991, MNFI 2007).

Common Gallinule is a game species in Michigan and Indiana, though very few are taken each year in either state (Keller and Castrale 1998, B. Avers, pers. comm.). The U.S. Fish and Wildlife Service (USFWS) Hunter Information Program reported no harvest during the 2007 and 2008 hunting seasons (Raftovich et al. 2009). Given the limited hunting pressure on gallinules (B. Avers, pers. comm.) and restrictive regulations on take, annual hunting mortality is not a significant source of mortality.

This species is tolerant of urban and agricultural habitats, but pollution and wetland destruction constitute potential threats (Bannor and Kiviat 2002). While the USFWS estimates 4-5 million birds are killed annually as a result of collisions with communication towers, they appear to have no significant threat to this species (Shier et al 2000). Purple loosestrife proliferation is a possible contributor to the species decline in parts of New York (Medler 2008). The preservation of existing marshes, as well as the restoration and construction of new wetlands, will help insure the survival of this species in Michigan.



American Coot *(Fulica americana)*

Michael Sanders



Allen Chartier ©

Formerly known as the Mud Hen or Crow Duck (Barrows 1912), the American Coot is the "most abundant and widely distributed species of rail in North America." (Brisbin and Mowbray 2002). American Coots can be distinguished from Common Gallinule by their milk-white bill and by white tips along their secondary feathers. Breeding occurs across Canada from British Columbia to Quebec; and southward throughout the western and central U.S. and into Central America (Cornell Lab of Ornithology 2010). Large breeding concentrations occur in the Prairie Pothole Region of Canada and the U.S. (Brisbin and Mowbray 2002). Michigan lies at the eastern end of the breeding range. The winter range extends from western and south central U.S. into southern Central America (Cornell Lab of Ornithology 2010). Some hardy individuals overwinter in southern Michigan, where they often turn up on Christmas Bird Counts, although many suffer late winter mortality as a result of starvation and exposure (Brisbin and Mowbray 2002). A common migrant in the state, American Coots are most frequently seen in Michigan in large flocks during spring and fall.

Distribution

Historically, the American Coot was a more common component of Michigan's fauna. Early observers suggested that the species nested in "great numbers" on the St. Clair Flats (Wood 1951) and in "all suitable places" from these Flats northward to Lake Superior (Barrows 1912). Although Pettingill (1974) noted it as "common" in the NLP in the 1970s, it probably refers to the coot's abundance during migration (Bielby 1991). Roughly half of Michigan's pre-settlement wetlands have disappeared, including most of the state's coastal lowlands (Cwikiel 1998); additionally, several prime coot breeding areas along the Great Lakes were eliminated due to high water levels in the mid-1980s (Adams 1991). The current nesting scarcity of the species is echoed in neighboring states. American Coots were reported in only 5% of survey blocks in Indiana (Keller and Castrale 1998) and Wisconsin (Bartelt 2006), and in only 2% of blocks in Ohio (Peterjohn and Rice 1991).

The overall distribution pattern for American Coots in Michigan changed little between atlas periods; the species continues to be most abundant in the SLP where suitable habitat is more available, although declines occurred in most counties along the Lake Michigan shoreline. The wide distribution of inland observations in the SLP attests to the importance of interior wetlands to the conservation of the species. Overall block occurrences dropped by 43% (100 from 174) and township-level observations dropped by 36% (83 from 130). Breeding confirmations fell sharply by 68% statewide (18 from 56); there was only one confirmed nesting in the NLP and none in the UP.

Breeding Biology

The American Coot has been described as a "bird with an attitude" owing to the fierceness with which it will often challenge almost anything or anyone that enters its territory (Bartelt 2006). Arriving in Michigan by late March, coots inhabit deep-water marshes with abundant emergent vegetation such as cattails and bulrushes (Bartelt 2006). Nests are large floating platforms comprised predominantly of cattails and reeds; pairs also construct extra platforms which act as brooding areas utilized by young for resting (Baicich and Harrison 1997). Precocial young feed themselves by one month and are independent by two months (Baicich and Harrison 1997).

Abundance and Population Trends

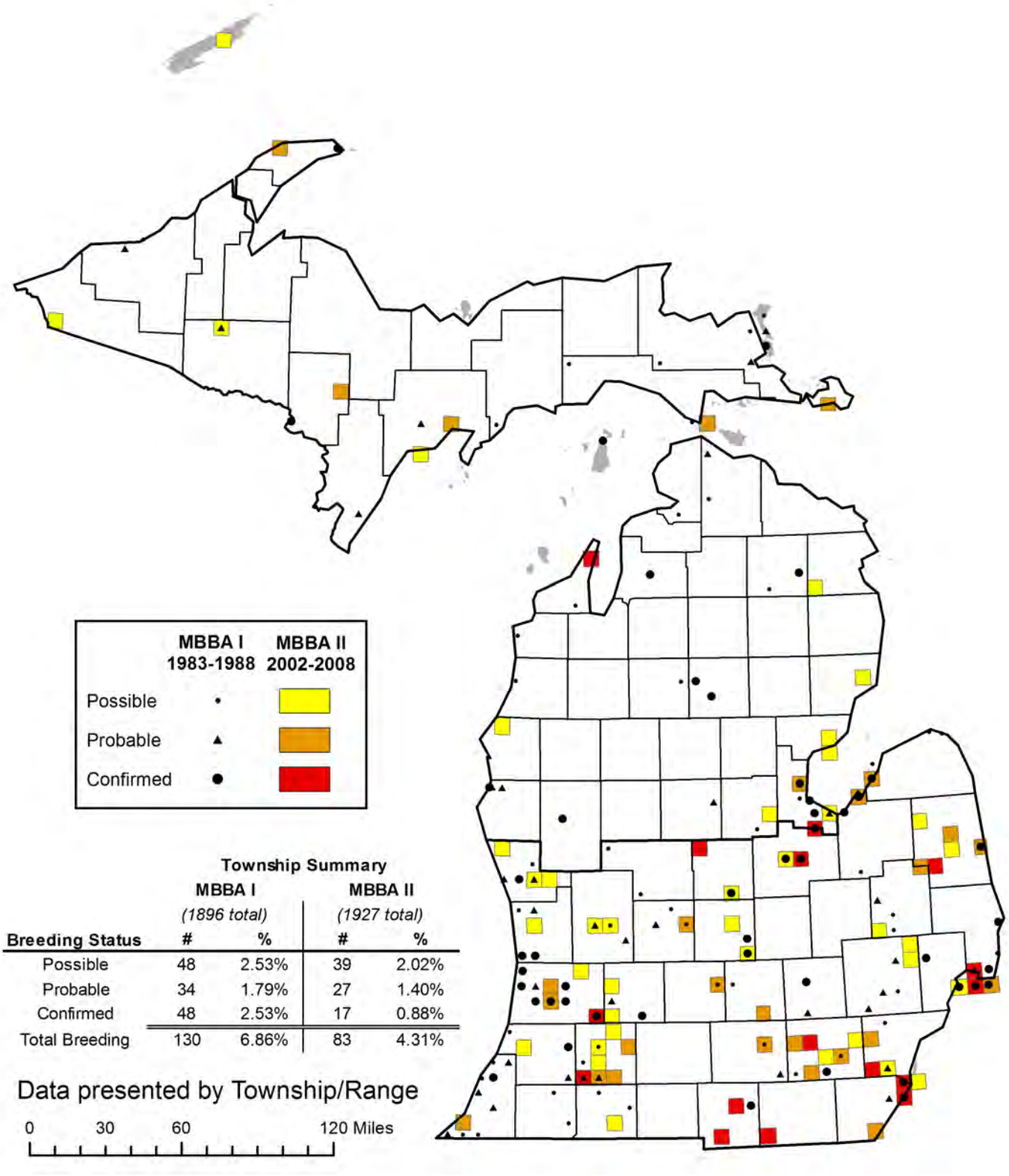
Mirroring MBBA II findings, North American BBS data from 1966-2007 indicate a statistically significant annual decline of 6.0% for the American Coot in the Upper Midwest (Sauer et al. 2008). While large-scale surveys do not adequately census secretive marsh birds like American Coots, BBS data are useful for suggesting general trends and patterns (Monfils 2003, Kleen et al. 2004). It is clear that American Coots are declining across the Great Lakes region, with habitat loss as the likeliest primary factor in their decline.

Conservation Needs

American Coots are closely linked to marshes with emergent vegetation, and their numbers will decline if such habitat is destroyed or degraded (Bartlett 2006). The species is sensitive to seasonal precipitation cycles; drought can reduce reproductive success and abundance (Medler 2006). Management efforts should concentrate on establishing wetlands with an appropriate mosaic of open water and emergent vegetation that can result in maximum breeding densities; deep flooding, mowing, and burning can reduce vegetation and create open areas unsuitable for nesting (Brisbin and Mowbray 2002).

American Coots are a game species in Michigan and other Great Lake states, but are probably harvested little throughout the region (Brisbin and Mowbray 2002). American Coots are susceptible to tower kills, which may pose an increased threat as the number of communication towers and wind turbines increase across the landscape (Shire et al. 2000). Common Gallinule and Redhead commonly parasitize the nests of this species, although the overall effects are probably nonsignificant (Brisbin et al 2002).

American Coot *(Fulica americana)* ***Michael Sanders***



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	48	2.53%	39	2.02%
Probable	34	1.79%	27	1.40%
Confirmed	48	2.53%	17	0.88%
Total Breeding	130	6.86%	83	4.31%

Data presented by Township/Range

0 30 60 120 Miles

Sandhill Crane *(Grus canadensis)*

Ronald Hoffman



Al Menk ©

Species sponsored by:
Petoskey Regional Audubon Society
And also by: Matthew D. Sabourin Family.

Few species captivate our interest more than Sandhill Cranes. Michigan's tallest nesting bird commands our attention with their long life, mate fidelity, loud penetrating vocalizations, and dramatic dancing. Their range extends from northeastern Siberia and northern Canada south to Mexico and Cuba. Of the six subspecies, two are listed in the federal Endangered Species Act, while populations of the other subspecies are stable or increasing. The eastern population of the Greater Sandhill Crane, the largest of the subspecies, breeds in the Great Lakes region and migrates to southeastern states.

Distribution

Prior to the 1880s, Sandhill Cranes were believed to be common throughout the state, but 25 years later they were expected to become extirpated (Barrows 1912). During 1930-54, they were known to occur in only five UP and seven SLP counties (Walkinshaw and Wing 1955). By MBBA I cranes were breeding in 18 NLP and 26 SLP counties and all but Gogebic County in the UP. MBBA II found that their breeding range currently extends to every Michigan county. Based on the number of cranes per block during MBBA II, about 54 % the cranes in Michigan were found in the SLP, 31% in the UP and 15% in NLP. The percentage of blocks with nesting cranes in the UP increased from 12.7% to 24.9%, from 2.5% to 10.6% in the NLP, and from 9.3% to 25.4% in the SLP, becoming more widespread, with observation rates two to three times that reported in MBBA I.

A similar pattern of range expansion has occurred in the upper Great Lakes region. They have spread to almost anywhere there is suitable wetland habitat in Ontario (Cadman et al. 2007) and Wisconsin (Cutright et al. 2006). The southern Michigan population has expanded into northeast Indiana (Castrale et al. 1998) and northwest Ohio, but the greatest increase in Ohio has occurred in the northeast part of the state (ODNR 2006).

Sandhill Cranes depend on wetlands with a diversity of wetland types, composition and diversity of aquatic vegetation, seasonally stable water levels, and little human disturbance (Tacha et al. 1992). Marshes are preferred, but bogs are commonly used north of the climatic tension zone. Range expansion has been most dramatic in areas of the SLP where emergent marshes are common and fulfill crane habitat requirements. Bogs with species poor vegetation (Kost et al. 2007) support fewer cranes. Walkinshaw (1973) found the average LP nesting territory was 53 ha (132 acres) compared to 85 ha (210 acres) in the UP. Because vegetation zones along the Great Lakes shorelines can be destroyed over a short period of time by persistent winds, storms and water level cycles (Kost et al. 2007), few cranes nest in those wetlands.

In addition to wetlands, cranes use uplands for loafing and foraging for a variety of plants and animals. Open grasslands and agricultural fields, common in the SLP, are favored, while in less agricultural areas of northern Michigan, cranes are more apt to use upland openings, forest edge and park-like forest stands (Tacha et al. 1992).

Breeding Biology

Sandhill Cranes are a classic example of a species that relies on low mortality to compensate for low productivity. They do not breed until four to seven years old, are perennially monogamous, lay two-egg clutches, usually have no more than one successful nest per year, rarely raise more than one young annually, provide extended care of the young by both parents, and live up to 20+ years (Tacha et al. 1992).

Cranes are one of the first migratory birds returning to Michigan in the spring, although some have stayed in Michigan during mild winters. In recent years the average arrival date in SLP has been 20 February, a full month earlier than historic records from 1857-83 (Hoffman 2004). Nesting begins in late March in the SLP and extends into June if earlier attempts fail. The average date for laying the first egg is 15 April in the SLP and 18 May in the UP (Walkinshaw 1973). Incubation lasts about 30 days, and the young are able to fly in 67-75 days (Tacha et al.1992).

Abundance and Population Trends

It is difficult to accurately estimate the number of cranes in Michigan. Hoffman (2010) reported that 24,453 cranes were found during a 2009 fall survey in Michigan. However, some of those cranes came from Ontario while most of the cranes in the UP were not included because they had migrated to Wisconsin or Indiana before the census date.

The Sandhill Crane population has increased at a remarkable rate in Michigan and the surrounding region. Cranes counted on the Breeding Bird Survey routes for 1966-2007 increased 13.9% per year in Michigan, 30.3 % in Ontario, and 7.8 % in Wisconsin (Sauer et al. 2008).

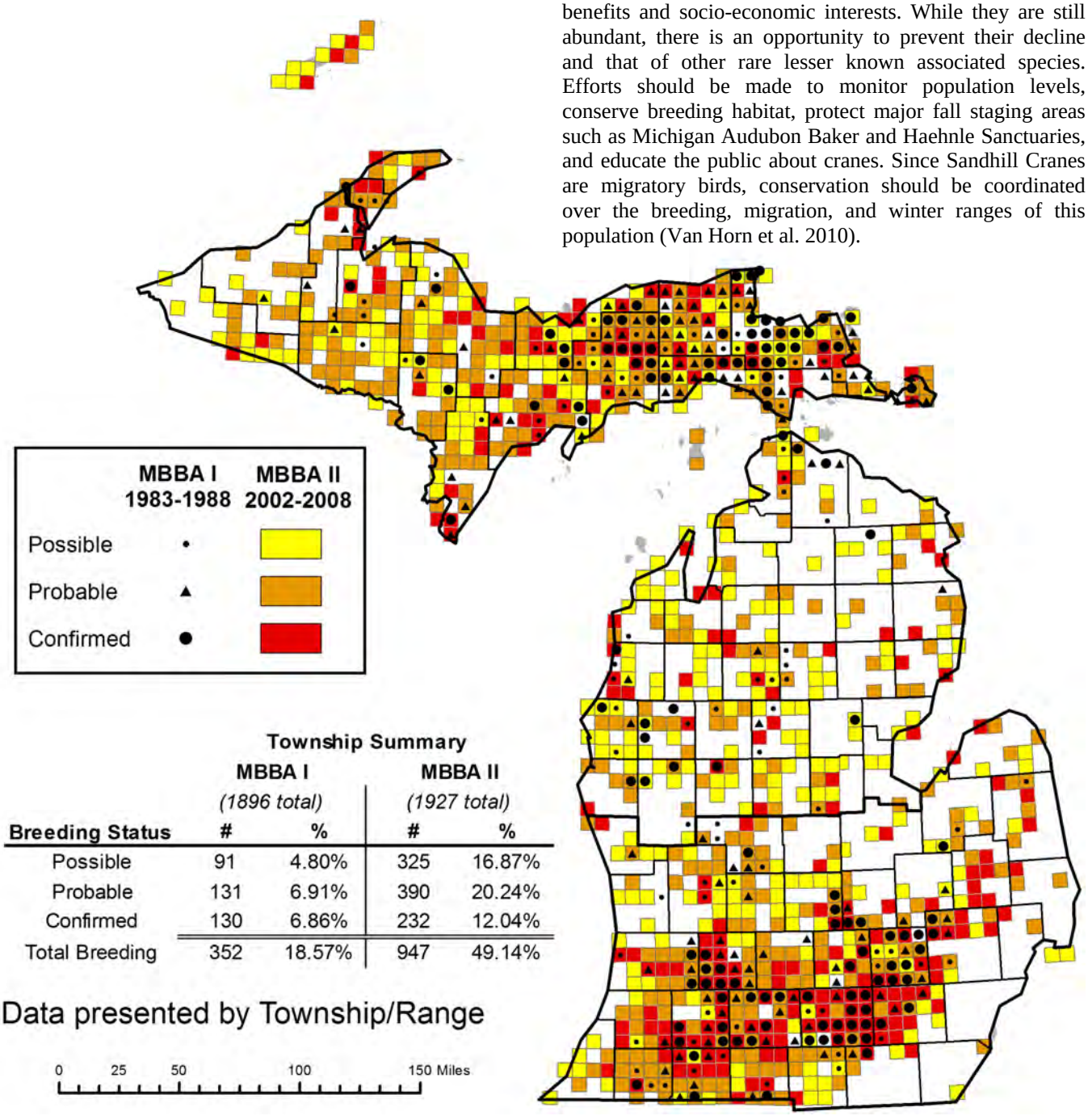
Sandhill Crane *(Grus canadensis)*

Ronald Hoffman

Conservation Needs

Sandhill Cranes are an "umbrella" species, i.e., a species whose conservation can provide protection for a wide variety of species and ecosystems. A committee of the Atlantic and Mississippi Flyway Councils has recognized three main socio-economic interests in crane management: wildlife viewing, agricultural conflicts, and hunting (Van Horn et al. 2010). Concentration of cranes at major staging areas annually attracts thousands of people to view this symbol of conservation success. Crop depredation of newly planted corn can be significant in certain areas and will worsen if the crane population continues to increase and more farmland is lost to rural development. One promising solution is anthraquinone, a non-toxic chemical that deters cranes from damaging newly planted corn (Lacy 2007). With the growth of the eastern population, the Atlantic and Mississippi Flyway Councils have endorsed limited hunting of cranes in some states to help control conflicts (Van Horn et al. 2010).

Future conservation efforts should address ecological benefits and socio-economic interests. While they are still abundant, there is an opportunity to prevent their decline and that of other rare lesser known associated species. Efforts should be made to monitor population levels, conserve breeding habitat, protect major fall staging areas such as Michigan Audubon Baker and Haehnle Sanctuaries, and educate the public about cranes. Since Sandhill Cranes are migratory birds, conservation should be coordinated over the breeding, migration, and winter ranges of this population (Van Horn et al. 2010).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	91	4.80%	325	16.87%
Probable	131	6.91%	390	20.24%
Confirmed	130	6.86%	232	12.04%
Total Breeding	352	18.57%	947	49.14%

Data presented by Township/Range

0 25 50 100 150 Miles

Piping Plover *(Charadrius melodus)*

Francesca Cuthbert

Status: *Federal & State Endangered*



Chris Neri ©

Species sponsored by: Sally & Kenyon Stebbins.

A visitor to Michigan's coastline will first discover the Piping Plover by its distinctive call, "*peep-lo*" as it scurries along the waterline or flies off over the dunes. This species is found only in North America, and breeds in three distinct geographic areas: the Great Lakes, the Atlantic Coast and the Northern Great Plains. Plovers from all three populations winter, and often intermix, on coastlines along the southern Atlantic Ocean and Gulf of Mexico, rarely reaching the Caribbean and Northern Mexico. Great Lakes birds are found in highest densities in South Carolina, on barrier islands off coastal Georgia and in northwest Florida; winter sightings, however, have been reported from as far south as the Bahamas and west to Padre Island, TX. As of summer 2008, 86% of the breeding pairs in the Great Lakes population nested in Michigan. The rest were in Wisconsin and Canada. Although breeding plovers once were found on Great Lakes shorelines throughout the state, nesting is primarily restricted to the NLP and UP.

Distribution

The distribution of Piping Plovers in Michigan is associated with Great Lakes shoreline habitat that is characterized by wide beaches composed of sand and cobble. These sites represent some of the most spectacular examples of the coastal dune ecosystem in the region. Plover breeding distribution in Michigan has changed significantly over the past 100 years (Cuthbert and Roche 2008). For example, Cottrille (1957) reported probable breeding in 20 counties in the SLP, NLP and UP (1903-1956). By Lambert and Radcliff's (1981) survey, this number decreased by approximately 50% to 11 counties. When MBBA I was conducted in the 1980s, near the time the Great Lakes population was placed on the federal Endangered Species List, plovers were found nesting in only six counties (Alger, Luce, Chippewa, Charlevoix, Emmet and Leelanau). No nesting was documented on Lake Huron or in the SLP. In response to management and protection, the distribution has changed again to reflect an increasing population and occupation of new or historic sites. Cuthbert and Roche (2008) reported plovers nested in nine counties in Michigan in 2007. Since MBBA I, Piping Plovers have expanded to nest in Benzie, Delta, Iosco, Mason, Mackinac and Schoolcraft counties but birds have not nested in Charlevoix, Chippewa and Luce counties in recent years. The general distribution pattern since MBBA I has been a return to periodic nesting on Lake Huron, limited observations in the SLP and an expansion west of the Mackinac Bridge to Escanaba on the northern Lake Michigan shoreline in the UP. Michigan plovers have also extended their range to Wisconsin and Canada. Adults banded as chicks in Michigan recolonized the Apostle Islands National Lakeshore in Lake Superior, Wisconsin in 1998 and sites on Canada's Bruce Peninsula in 2007 and 2008.

Breeding Biology

Piping Plovers return to Michigan in mid- April to early May. Most clutches are complete and pairs are incubating eggs by the end of May or early June. Incubation is about 28 days with peak hatch occurring in mid-June. Birds will renest if a breeding attempt fails. Migration patterns are variable. Nesting females depart as early as mid-July leaving the male to care for their offspring; males typically leave by early August and juveniles initiate migration as late as early September.

Abundance and Population Trends

Abundance and population trends of the Piping Plover have been well documented since the late 1970s; prior to this time, no statewide estimate was available (Cuthbert and Roche 2008). Russell (1983) speculated that as many as 200 pairs may have nested in Michigan before 1940. Cottrille (1957) provided the first summary of Piping Plover nesting records for Michigan but it was not until 1979 (Lambert and Ratcliff 1981) that the first statewide breeding survey was conducted. They estimated 24 nests and 31 plover pairs. By the mid-1980s, the population had declined to approximately 12-17 pairs and was federally listed as endangered (USFWS 1985). In response to protection and management, mandated by its federal status, the population increased to 57 pairs and 63 nests in Michigan in 2007. These records demonstrate a 58% increase in breeding pairs over a period of approximately 25 years (Cuthbert and Roche 2008); the population size at listing was likely due to a slow decline in numbers influenced by scientific collecting of plovers for museums as well as residential development and recreational use of the Michigan coastline. Currently, most (60%) of Michigan's plovers nest in the NLP and approximately 30% are found on land belonging to Sleeping Bear Dunes National Lakeshore.

Conservation Needs

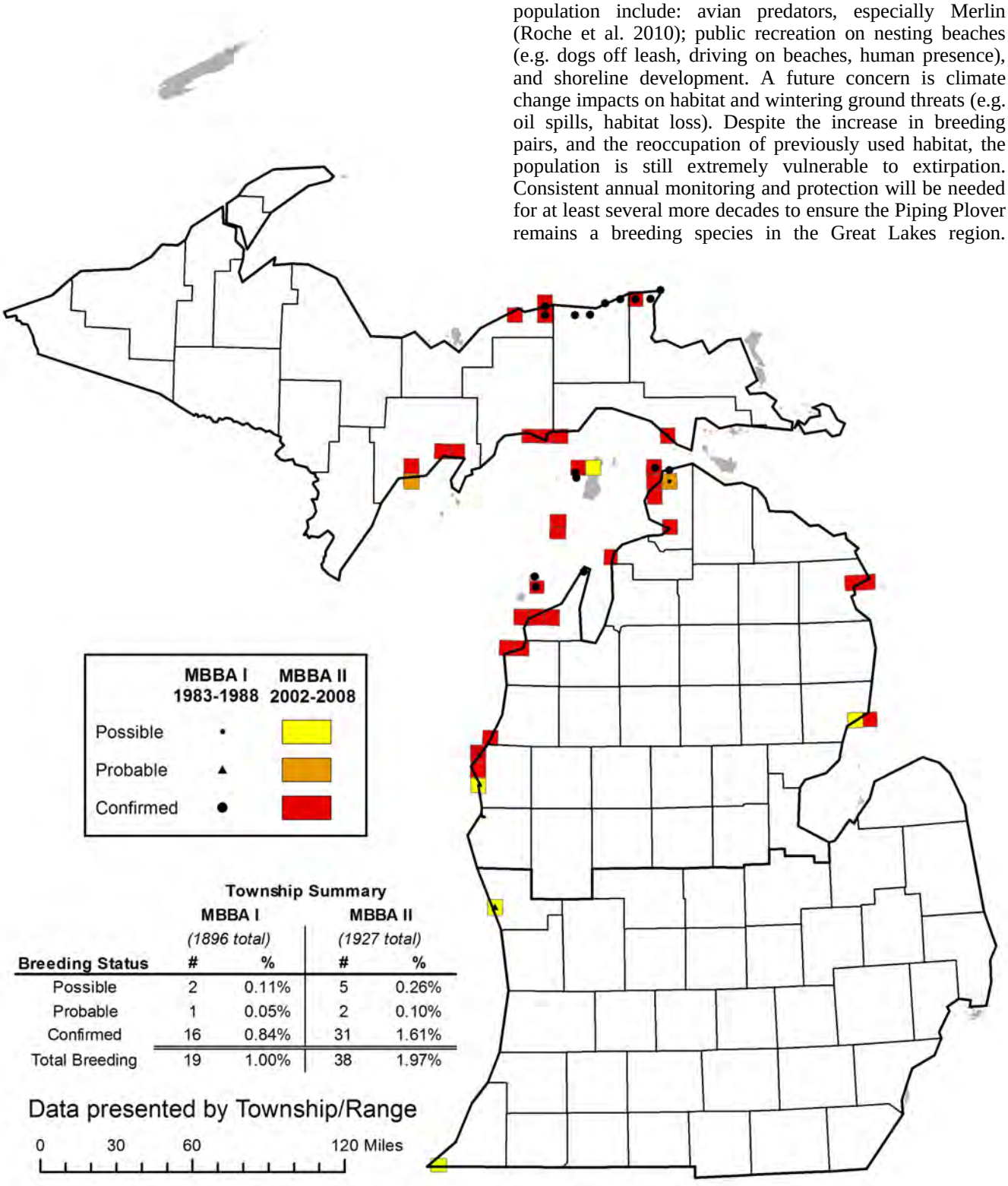
The most recent recovery plan for the Great Lakes population was completed in 2003 (USFWS 2003). Important conservation actions include: designation of Critical Habitat, public outreach, stakeholder involvement and volunteer plover monitors. At the time of listing, approximately 17 pairs of Piping Plovers nested in the Great Lakes region; all were located in Michigan. A goal of 150 pairs (100 in Michigan; 50 elsewhere in the region) must be

Piping Plover *(Charadrius melodus)*

Francesca Cuthbert

Status: *Federal & State Endangered*

met for delisting (USFWS 2003). Significant effort has gone into the recovery of this population and the breeding numbers have slowly increased due to several strategies followed since listing: monitoring, beach closure and predator exclosures. Monitors collect data on nest success and continue to ensure protection of each site until chicks have fledged. In 1992, a program was started at the University of Michigan Biological Station to captive-rear and release chicks raised from abandoned eggs (Roche and Cuthbert 2008). This effort continues. Additionally, an intensive banding effort was initiated in 1993 to track individual survival and movements. Current threats to the population include: avian predators, especially Merlin (Roche et al. 2010); public recreation on nesting beaches (e.g. dogs off leash, driving on beaches, human presence), and shoreline development. A future concern is climate change impacts on habitat and wintering ground threats (e.g. oil spills, habitat loss). Despite the increase in breeding pairs, and the reoccupation of previously used habitat, the population is still extremely vulnerable to extirpation. Consistent annual monitoring and protection will be needed for at least several more decades to ensure the Piping Plover remains a breeding species in the Great Lakes region.



Killdeer *(Charadrius vociferus)*

Nancy Seefelt



Allen Chartier ©

K*illdeer! Killdeer! Killdeer!* Not many birds can announce their presence quite like the Killdeer, the most familiar and widespread of the North American plovers. Killdeer breed from Newfoundland to east-central Alaska, south across North America from coast to coast, throughout Central America, the eastern Caribbean, and down to South America, including Peru and Chile (Jackson and Jackson 2000). They also winter across this large range, but are typically absent from Michigan, the Appalachian Mountains region, and much of Canada, with the exception of British Columbia, during the colder months (Jackson and Jackson 2000).

Distribution

During the summer months, Killdeer can be found in every Michigan county. Historical records indicate that these birds were common throughout the state around the turn of the last century (Cook 1893, Barrows 1912). Between the 1960s and the 1980s, Killdeer numbers actually increased substantially along BBS routes (Adams et al. 1988), and the species account published in the MBBA I echoes this trend (Chu 1991). During the MBBA I period, breeding Killdeer were confirmed in every county in Michigan; birds were observed in over 3,700 blocks, with 37% of the blocks reporting confirmed breeding (Chu 1991). In this same account, it was predicted that Killdeer numbers should continue to increase in Michigan. Unfortunately, this has not been the case.

Even though Killdeer are still rather common in Michigan, MBBA II data reports a decline in occurrences. Although Killdeer were present in all Michigan counties during the breeding season, several counties did not report confirmed breeding for this species, including Ontonagon, Iron, and Dickinson Counties in the UP, and Presque Isle, Montmorency, Roscommon, Lake, and Osceola Counties in the NLP. There has been a dramatic decrease in occurrence of Killdeer sightings by township; about 81% indicated Killdeer presence in MBBA I while only about 67% recorded these birds during the MBBA II period. This trend is evident in the block data, as well; only about 35% of the blocks reported Killdeer for the MBBA II, while over 52% documented Killdeer for the MBBA I. Sadly, these declines were noted even though a larger number of townships and blocks were surveyed for the MBBA II. The decline is less evident in the SLP. As Killdeer often nest in open areas associated with human activities (Jackson and Jackson 2000), this area of the state probably provides prime habitat for breeding birds.

Breeding Biology

The breeding biology of this species has been well documented and the antics of this species are well known by many. Killdeer may return to Michigan as early as late February (Chu 1991). A Killdeer nest is a simple scrape, often lined with light-colored stones, shells, rocks and other materials, in an area with little to no vegetation (Jackson and Jackson 2000). Killdeer often nest in residential and agricultural settings, including gravel driveways, road shoulders and parking lots, as well as sparse lawns, railroad right-of-ways, and even flat, graveled rooftops (Wass 1974, Jackson and Jackson 2000). Killdeer perform several types of distraction displays if a predator approaches the nest or chicks; the most famous being the “broken wing” display; this display is beautifully described in Jackson and Jackson (2000). After hatching, young typically fledge within a month and may remain with the parents for an extended period of time (Jackson and Jackson 2000). Although most Killdeer leave Michigan in September and October, some do remain in the state until late December (Chu 1991).

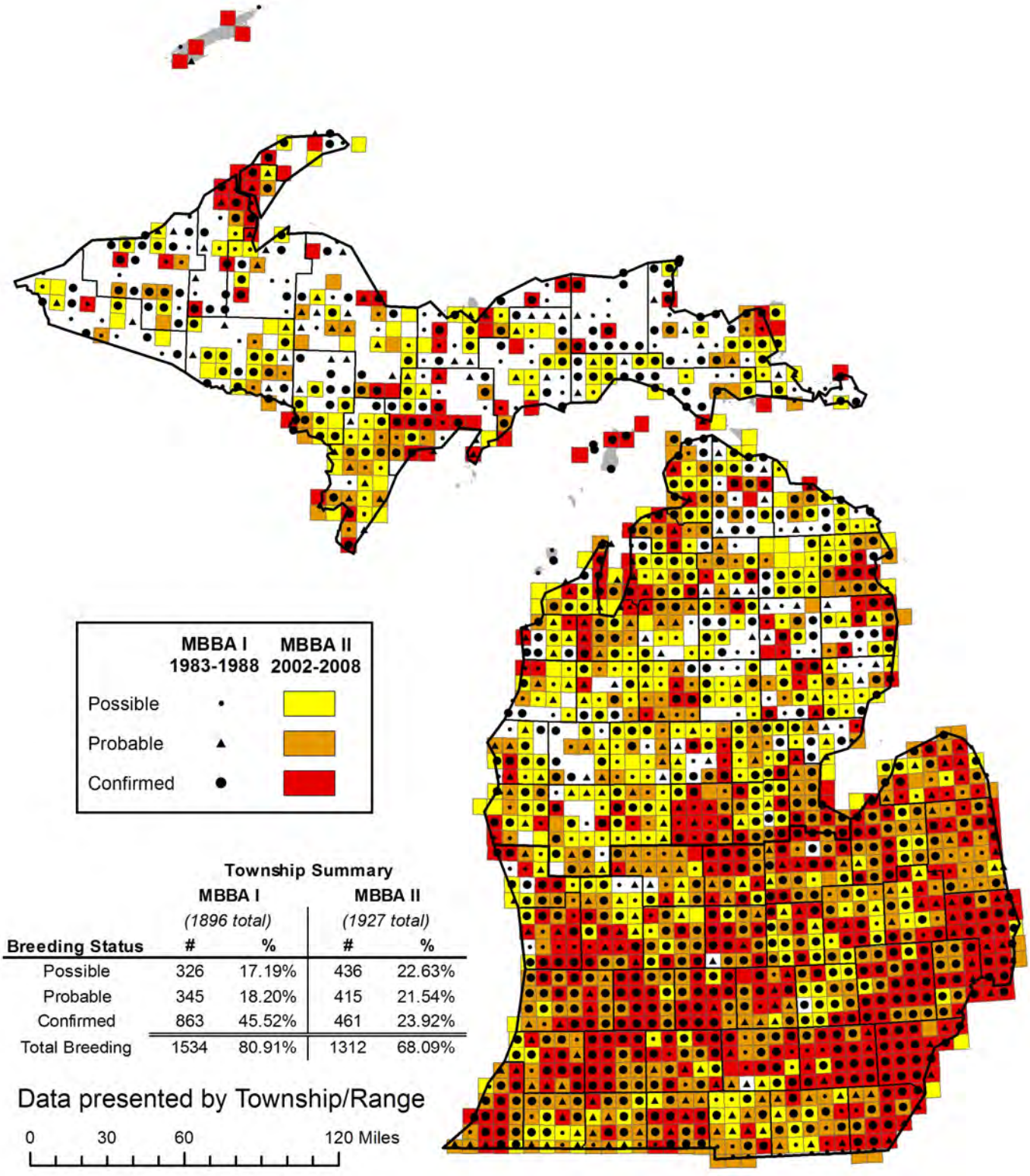
Abundance & Population Trends

Although Killdeer are considered a common species, the true size of the population is not known and there are no regional population estimates available. However in 2001, the Western Hemisphere estimate for Killdeer was 2 million birds (Brown et al. 2001). Confidence in the accuracy of this estimate is relatively low, but it is considered to be in the right order of magnitude of true population size for Killdeer. Unfortunately, across the Great Lakes Region, Killdeer populations have had an estimated annual decline of 3.1% between 1966 and 2007 (Sauer et al. 2008). In Michigan alone, the breeding Killdeer population has shown an annual decline of 0.9% over the same time period (Sauer et al. 2008). Because this decline is mirrored across much of their range, the Killdeer is considered to be a species of moderate concern in the U.S. Shorebird Conservation Plan (Brown et al. 2001).

Conservation Needs

During the MBBA I period, Killdeer populations showed latitudinal variation between the SLP, NLP and UP; it was hypothesized that this was the result of greater human disturbance in the south. In addition, this species is well-adapted to breed in close proximity to human activities. It was predicted that increased human activity in the north

would allow for expansion of Killdeer populations northward (Chu 1991). However, even though human development has increased over the last several decades in the north country of Michigan, Killdeer populations have actually retracted within Michigan and elsewhere. Why Killdeer are continuing to decline is not well understood and how to reverse this trend is still a matter of conjecture.



Black-necked Stilt *(Himantopus mexicanus)*

Allen T. Chartier

Status: *Casual (MBRC)*



Jerry Jourdan ©

This elegant, large, black and white shorebird with its long, thin, delicate bill and long, bright red legs is a very rare sight in Michigan. If their flamboyant appearance doesn't catch your eye, their very visible anti-predator displays and loud, somewhat nasal *"yap yap yap yip yap"* calls will certainly get your attention. The Black-necked Stilt breeds at widely scattered locales in the western U.S. including the Great Basin locally north to Washington and Montana, coastal California and the central valley, the southern Great Plains from Texas and New Mexico locally north to Colorado and Kansas, south Texas east through the Gulf States to the Florida Peninsula and along the Atlantic Coast locally north to Delaware, and south into Central and South America the Caribbean Islands and Hawaii (Robinson et al. 1999). The Hawaiian subspecies is sometimes considered a separate species, the Hawaiian Stilt (*H. m. knudseni*) (AOU 1983). The U.S. population generally winters in the southernmost portions of the continent and in Mexico to Central America (Robinson et al. 1999).

Distribution

In Wisconsin, the Black-necked Stilt is currently considered a casual migrant that breeds rarely, though more regularly in the past decade (Mueller and Kowalchuk 2009). Domagalski (1999) cites a spring record from April 1847 in Racine County and a fall departure date of 11 October 1991 in Milwaukee County. The first confirmed nesting record in the state was at Horicon Marsh, Dodge County in summer 1999, consisting of three adults and later five young observed in the area (Tessen 1999, Soulen 1999, Cutright et al. 2006). Second and third confirmed successful nesting records were documented in 2004 in Jefferson County and Horicon Marsh (Frank 2005), and the species summered again at Horicon Marsh in 2007 (Frank 2007, Soulen 2007) and in 2008 with two adults and two young observed (Frank 2009, Hoffman 2009).

Bohlen (1978) described the status of the Black-necked Stilt in Illinois as a very rare fall migrant or vagrant, and listed only three records between 1959 and 1969. The first evidence of nesting in Illinois was in Jackson County in the summer of 1993 (Fink 1994). The first confirmed nesting was a nest with four eggs found on 11 June 1994 in Jackson County, which was destroyed by agricultural practices, another nest with two eggs in Mason County on 27 June to 1 July 1994 was destroyed by high water (McKee and Fink 1995). The first successful nest in the state was in southwestern Jackson County in summer 1995 (Bohlen 1996). More recent nestings were documented in southwestern Jackson County in 1998 and 1999 (Monroe 2000), at East Cape Girardeau in Alexander County and Santa Fe Bottoms in Clinton County in 2002 (Kleen 2003), and at Lime Kiln Slough, Pulaski County in 2005 (Kleen 2006).

Keller et al. (1979) listed the status of Black-necked Stilt in Indiana as hypothetical. The first confirmed record in the state was in 1989, with fewer than a dozen records prior to 2000, but with a total of 23 records in 2002, 2003, and 2004 (Brock 2006). Breeding was not recorded during the Indiana Breeding Bird Atlas (Castrale et al. 1998). The state's first confirmed, but unsuccessful breeding came in the form of a nest with two eggs in Sullivan County in 2002. This was followed by a pair, and subsequently two juveniles in Greene County in 2004, and a nest with three eggs, resulting in three fledglings observed in Gibson County in the summer and fall of 2005 (Brock 2006). Ohio has had 17 records of Black-necked Stilt since 1980, and the behavior of birds in 2004 and 2008 suggested breeding; a pair was present in suitable habitat from 24 June – 3 August 2008 but no young were seen (Harlan 2008). In Ontario, as with all other states and provinces in the region, the Black-necked Stilt was considered a rare vagrant before surprising observers by breeding at a single locale in Halimand County, southwest of Hamilton, in 2004. A nest was found with three eggs, plus another egg found later nearby, but was lost to predators (Coady and Peck 2007).

Only seven records, most of multiple individuals, have been accepted in Michigan, where it is considered casual in status (MBRC 2009). Michigan's first record was two individuals recorded at the Shiawassee NWR, Saginaw County on 6-13 June 1980, followed by one individual photographed near Oscoda, Iosco County on 13 June 1988 (Belyea 1980, Granlund 1989, Chu 1992, McPeek and Adams 1994). The biggest surprise in the summer of 2003 came when the state's third Black-necked Stilt record came in the form of two nesting pairs found at Pointe Mouillee SGA, Monroe County. A pair was found on 11 May 2003 and by early June a second pair had turned up and both were on nests. These nests were far out in an impoundment, perhaps a quarter mile away, so could not be closely examined, but each pair hatched four young, and seven of these eight

Black-necked Stilt *(Himantopus mexicanus)* ***Allen T. Chartier***

Status: *Casual (MBRC)*

young survived to fledging, being observed until 30 August 2003 (Reinoehl 2003; Byrne 2004a, 2004b; Chartier 2004). The following year, two individuals were again present at Pointe Mouillee but only in spring, from 18 April to 30 May 2004 (Reinoehl 2004, Chu 2005). A single bird on a single day, 14 April 2006, was in Hillsdale County (Reinoehl 2006, Putnam 2007). Raising hopes for a Berrien County nesting was a pair present at a roadside pond in Sodus Township from 6 May to 6 June 2007, but no nest, eggs, or fledglings were ever found (Reinhoehl 2007, Dombroski 2008, Putnam 2008). In 2008, a pair was again found at Pointe Mouillee on 13 June, with four young observed on 20 July and only the male and three young through 30 August (Dombroski 2009, MBRC 2009).

Breeding Biology

The Black-necked Stilt breeds on high ground with sparse emergent vegetation on the edges of salt ponds, sewage ponds, or shallow inland wetlands. Breeding is sometimes semicolonial, sometimes as single pairs, and infrequently in larger aggregations. Their nests consist largely of loose vegetation, mud, pebbles, and shells scraped into a platform on a high spot in a wetland, sometimes completely in the open, sometimes on the edge of denser emergent vegetation (Robinson et al. 1999).

Typically four eggs are laid, with little variation. Both sexes incubate the eggs, which can begin immediately after the first egg is laid, or later depending on ambient air temperatures. The incubation period also varies depending on local temperatures, with eggs hatching after about 21-27 days. The young are precocial and downy, and stay in the nest no longer than 24 hours after the last is hatched. The young follow their parents closely, learning how to feed but never being fed by them, and are capable of sustained flight at the age of about 27-31 days (Robinson et al. 1999).

Abundance and Population Trends

The Black-necked Stilt appears to show little fidelity to breeding sites, is extremely mobile from year to year, and breeding sites are often very widely spaced, making population estimates difficult. Breeding Bird Survey (BBS) data have not shown any clear population trends (Robinson et al. 1999), probably due to factors in the survey design which are not optimized for surveying waterbirds.

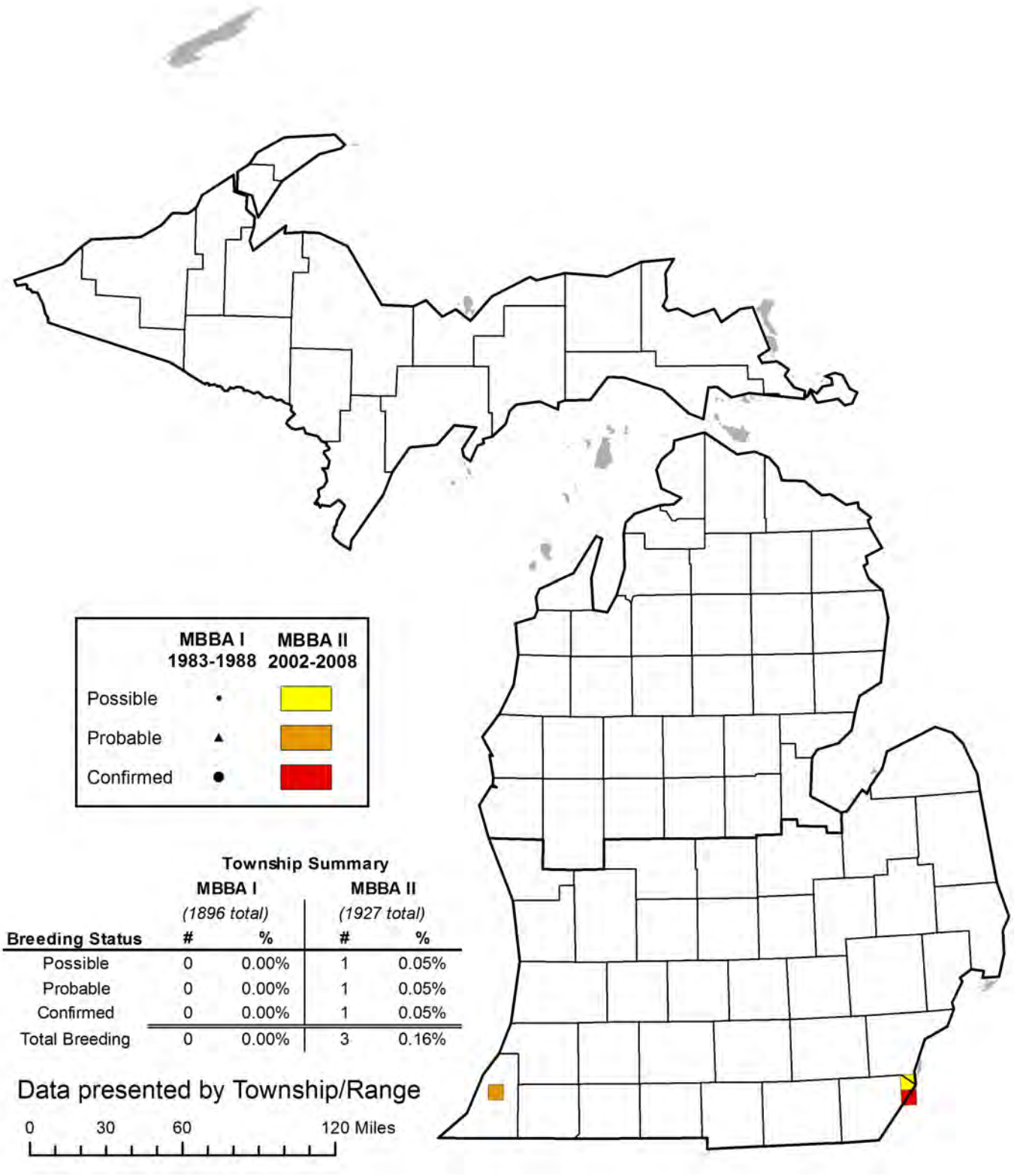
The Black-necked Stilt has expanded its range northward into our region with increasing numbers of records beginning in the 1980s. Typically, after only a few records, it has established small, intermittent breeding populations. Increases in records in the Upper Midwest are more recent and may be correlated with prolonged drought conditions in the western U.S., especially in 2002 and 2004 (Coady and Peck 2007).

Conservation Needs

As with many waterbird species, the Black-necked Stilt is vulnerable to loss of wetland habitats, which it requires for breeding, as well as a wide range of contaminants in those habitats. Given its irregular occurrence, the Black-necked Stilt has no conservation status in Michigan. With its recent range expansion trends, it is very likely that the species will nest in the state again in the near future.

Black-necked Stilt *(Himantopus mexicanus)*

Status: *Casual (MBRC)*



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	0	0.00%	1	0.05%
Probable	0	0.00%	1	0.05%
Confirmed	0	0.00%	1	0.05%
Total Breeding	0	0.00%	3	0.16%

Spotted Sandpiper *(Actitis macularius)* ***Nancy Seefelt***



Darlene Friedman ©

If you see a medium-sized sandpiper teetering back and forth as it runs along the shoreline, it is the Spotted Sandpiper or "spotty". Flying low over water using shallow, rapid, stiff wing beats interspersed with short glides is also characteristic of this species (Oring et al. 1997). The Spotted Sandpiper has the largest breeding range of all North American sandpipers. The range stretches from Newfoundland and Labrador in the east to the tree-line of northwest Alaska, and then south to Virginia in the east and to California in the west. Occasionally, some birds will breed in the northern portions of the Gulf States (Oring et al. 1997). Although some Spotted Sandpipers remain in northern areas (especially coastal zones) in the winter, most are migratory and winter in the southern U.S., Caribbean, Central America and South America as far south as Argentina (Oring et al. 1997).

Distribution

Spotted Sandpipers have been described in historical accounts as common summer residents throughout Michigan (Cook 1893, Barrows 1912). Data from the MBBA I verify the widespread occurrence of this species throughout Michigan, from Isle Royale to southern counties with the greatest concentration of birds in the UP and SLP. Spotted Sandpipers were least common in the NLP during MBBA I (Chu 1991). This same general pattern is evident in the MBBA II data; however, Spotted Sandpiper numbers appear to be declining in Michigan. By block or township, the number of confirmed breeding pairs has dropped in all three regions, with the steepest decline in the NLP. Statewide, less than 11% of the blocks reported Spotted Sandpipers in MBBA II, compared to almost 14% in MBBA I. In terms of townships, about 30% documented this species during the MBBA II period, compared to over 38% in MBBA I. This decline is evident even though more blocks and townships were surveyed for MBBA II. Currently, the greatest concentration of confirmed breeding occurrences appears to be in the southeastern LP, particularly Wayne County. In addition, the Beaver Archipelago and other islands of Lake Michigan, as well as Isle Royale in Lake Superior, appear to provide important breeding habitat for this species

Breeding Biology

Spotted Sandpipers are very unusual compared to other sandpiper species. First, they tend to migrate singly or in small groups, as opposed to the large flocks characteristic of many sandpipers (Oring et al. 1997). In Michigan, they may return as early as late March, with most returning in late April (Chu 1991). Spotted Sandpipers may show either monogamy (i.e. one female mates with one male) or polyandry (i.e. one female mates with several males) on the breeding grounds; female Spotted Sandpipers tend to be larger, more aggressive, and return earlier to the breeding grounds compared to their male counterparts (Oring et al. 1997). The breeding density of Spotted Sandpipers is often affected by mating strategy. Females will sometimes have as many as four male partners at one time, each male tending one of her nests within her territory (Oring et al. 1997). Historically in Michigan, such activity and high nest density has been best documented in Wayne County (Miller and Miller 1948).

Spotted Sandpiper nests are typically located in areas of dense vegetation between the shoreline and where trees begin to grow. Their nests are scrapes lined with mostly dead grasses (Oring et al. 1991). Males often provide more parental care of eggs and young, especially in polyandrous breeding. Young can typically fly less than three weeks after hatching (Oring et al. 1991). In Michigan, Spotted Sandpiper migration southward begins as early as late July, with most birds exiting the state by the end of October (Chu 1991).

Abundance and Population Trends

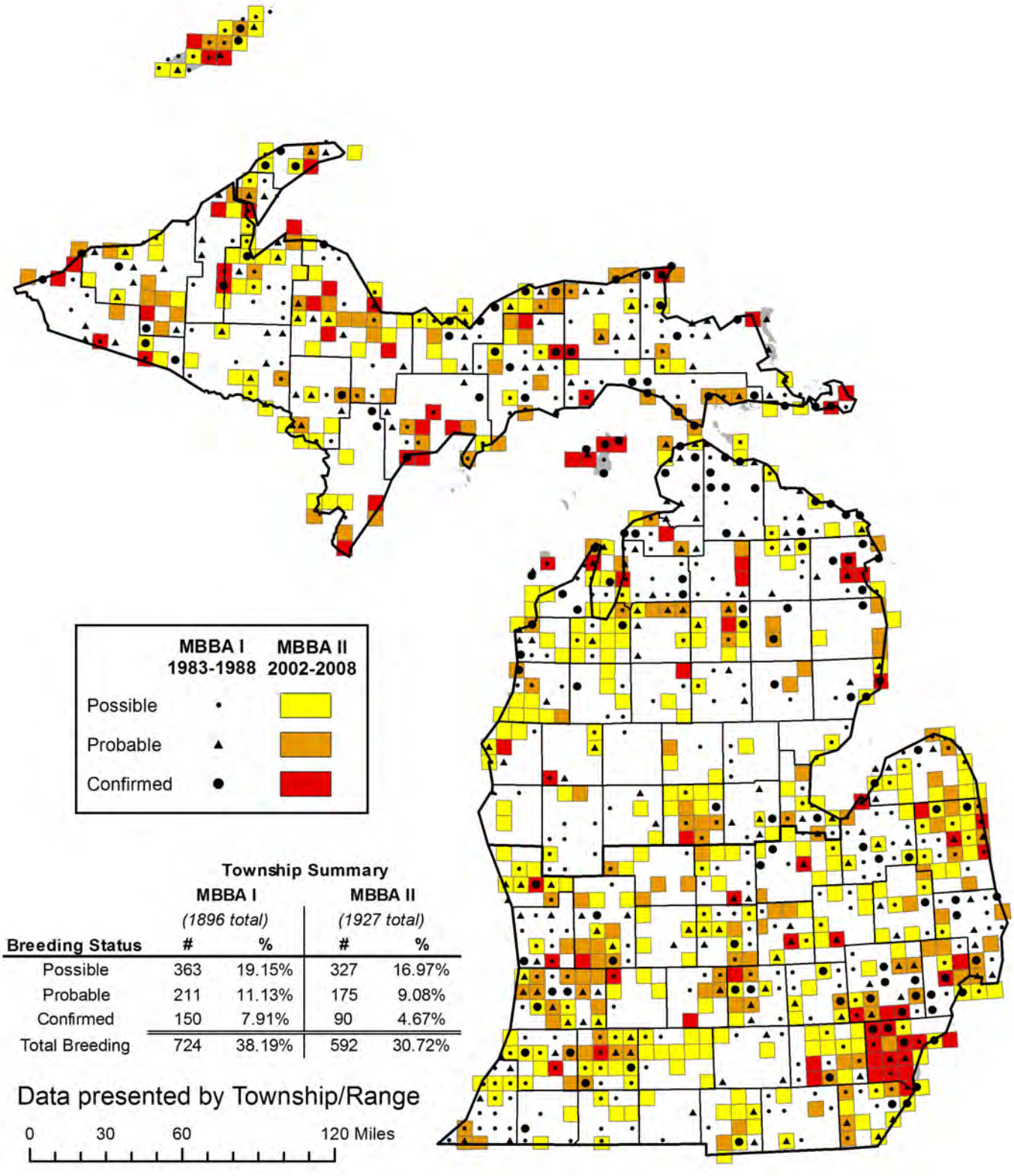
Spotted Sandpipers are considered a common species throughout their range, although they are sometimes more rare on a local scale in some areas (Oring et al. 1997). This species is considered to be a habitat generalist, especially when compared to other shorebirds. Little is known regarding the population size of Spotted Sandpipers in this region; however in 2001, the Western Hemisphere estimate for this species was 150,000 birds (Brown et al. 2001). Confidence in the accuracy of this estimate is relatively low, but it is considered to be in the right order of magnitude of true population size for Spotted Sandpipers. The overall population status remains unknown. Unfortunately, in Michigan, Spotted Sandpiper populations have had an estimated annual decline of 2.7% between 1966 and 2007 (Sauer et al. 2008). In the Great Lakes region, the Spotted Sandpiper has had an estimated annual decline of 3.9% (Sauer et al. 2008). The cause of these declines remains unknown. Population declines are not evident in all areas of this bird's range (this species is actually increasing elsewhere); the Spotted Sandpiper is not considered to be a species of concern in the U.S. Shorebird Conservation Plan (Brown et al. 2001).

Spotted Sandpiper *(Actitis macularius)*

Nancy Seefelt

Conservation Needs

Spotted Sandpipers, like most shorebirds and waterbirds, are at risk from pesticides and habitat loss, whether the latter is caused by human development, changes in lake levels or succession (Oring et al. 1997). Although Michigan's Spotted Sandpiper populations are not currently considered at risk, the decline in the number of occurrences between MBBA I and MBBA II is somewhat alarming. When a common, adaptable species declines, it may be a sign that something is ecologically amiss. Monitoring of this species, as well as others, may be warranted. The decline in Spotted Sandpipers across the state is truly puzzling.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	363	19.15%	327	16.97%
Probable	211	11.13%	175	9.08%
Confirmed	150	7.91%	90	4.67%
Total Breeding	724	38.19%	592	30.72%

Data presented by Township/Range

0 30 60 120 Miles

Upland Sandpiper *(Bartramia longicauda)*

R. Gregory Corace III, Ph.D.



Darlene Friedman ©

Though historically Michigan was a state dominated by forest ecosystems, the native avifaunal community of Michigan has nonetheless long been comprised of species more dependent on open land (Barrows 1912). Of these, the Upland Sandpiper is one of the lesser known and perhaps the most perplexing. Taxonomically classified as a shorebird, the Upland Sandpiper is rarely if ever found along water bodies, but instead is considered an obligate species of terrestrial grassland (or other openland) ecosystems (Houston and Bowen 2001). The Upland Sandpiper is also characterized by its relatively large size, penchant for conspicuously perching on posts and dead trees, and its entrancing "wolf whistle," emitted during aerial courtship displays. Although this species breeds as far east as Maine, it is found at much lower densities in states east of the Mississippi River compared to those Great Plains states that comprise the core breeding range in the U.S. (Houston and Bowen 2001).

Before European settlement, the native openland ecosystems inhabited by Upland Sandpiper in Michigan likely included the native prairies of the southwestern portions of the LP and the dynamic, xeric, fire-dependent jack pine and oak barrens in the northern LP and the UP. However, Barrows (1912) also documented breeding in open wetlands. Now, remnant barrens, recently harvested pine stands, and anthropogenic habitats, such as old fields and low-intensity managed hayfields and pastures, are the predominant breeding habitats in the state (Corace et al. 2005, Corace 2007). Birders searching in openland-dominated landscape of the UP and the northern LP from mid-May to late May have a very good chance of observing birds, especially in recently harvested jack pine within state and federal Kirtland's Warbler Management Areas. Searches are most successful in larger (often >202 ha or 500 ac) habitat patches.

Distribution

In his seminal work, Barrows (1912) indicated that the Upland Sandpiper was found throughout much of Michigan, but had experienced drastic declines in population and some range restriction. Wood (1951) stated that this species was still relatively uncommon throughout the state, but locally common in Crawford Co., a county historically dominated by fire-dependent jack pine ecosystems.

MBBA II data support the contention of Eastman (1991) that the range of Upland Sandpiper is shifting northward in the state. A total of 24 Michigan counties (28.92%) had no breeding evidence for Upland Sandpiper during MBBA II, with the majority of these counties being in the southern LP. Comparatively, during MBBA I, only 13 counties (15.66%) lacked any breeding evidence. Again, most of these counties were in the southern LP, particularly the tier of counties comprising the southern boundary of the state. Not surprisingly, the openland in these counties is dominated by intensively-managed row crops (Corace 2007). MBBA II data also suggest—albeit with some level of caution due to sampling effort— a population decline of Upland Sandpiper in Michigan. Block summaries indicate a statewide decline in the percentage of Atlas blocks reporting birds in MBBA II compared to MBBA I of 50%, with 69% in the SLP, 49% in the NLP, and 29% in the UP. This pattern of decline was also mirrored by the pattern of decline in township summaries: statewide, a decline of 43% in occupied township blocks occurred, with declines of 60%, 39%, and 35% in the SLP, NLP, and UP, respectively. The decline is more striking if the confirmed breeding data are used. For example, there were 26 blocks confirming breeding in the UP for MBBA I, but only 8 in MBBA II. For the NLP, there were 52 in MBBA I and only 9 in MBBA II. The change is not as pronounced in the SLP, but still noteworthy (13 to 5).

Breeding Biology

The phenology of Upland Sandpipers in Michigan is not well known, but Eastman (1991) states that the first birds tend to arrive in the southern LP in mid-April. Anecdotal evidence and on-going research suggests birds arrive in the UP in early May (G. Corace, pers. obs.). Prior to nesting, Upland Sandpipers can be quite conspicuous, but then become much more secretive (Eastman 1991, G. Corace pers. obs.). Socially monogamous, Upland Sandpipers breed semi-colonially (Casey 2006, B. K. Sandercock, pers. comm.). Almost invariably laying 4-egg clutches in shallow scrapes on the ground (Houston and Bowen 2001, B. K. Sandercock, pers. comm.) females do little of the parental care of the precocial young, leaving most work to the males (Casey 2006, B. K. Sandercock, pers. comm.). Young seem to be independent of parental care by 30 days. Food consists of both seeds and terrestrial invertebrates (Houston and Bowen 2001). Most birds start leaving Michigan for their wintering grounds in South America in late July and early August.

Abundance and Population Trends

No quantitative data exist for tracking the abundance or population trend of this species in Michigan. Because it exists at relatively low density in the state, the U.S.

Geological Survey's Breeding Bird Survey is probably poorly suited to monitor this species. Other than the Atlas data and the associated work of Gibson and Enander (2007), few studies of Upland Sandpiper have been conducted in Michigan. However, the multi-species studies by Corace et al. (2005) and Corace (2007) did document occupancy, density, and breeding success (e.g., percent pair success, number of young fledged) for northern Michigan landscapes representative of the major habitat types used in the state, especially historic pine barrens of the UP. Working in the Baraga Plains (Baraga Co.), the Sands Plains (Marquette Co.), the Danaher Plains (Luce Co.), and the Raco Plains (Chippewa Co.), Upland Sandpiper densities ranged from one breeding pair for every 106 to 550 hectares (262 to 1,359 acres). These data suggest that in Michigan the Upland Sandpiper can be considered an area-sensitive species (i.e., habitat patch size influences occupancy and density) (Ribic et al. 2009). On average across these four landscapes, 95% of the breeding pairs successfully fledged young, with between four and 14 young fledged per landscape (Corace 2007). Broad-scale, multi-species surveys on a consistent basis would better help track relative abundance changes and range shifts within Michigan.

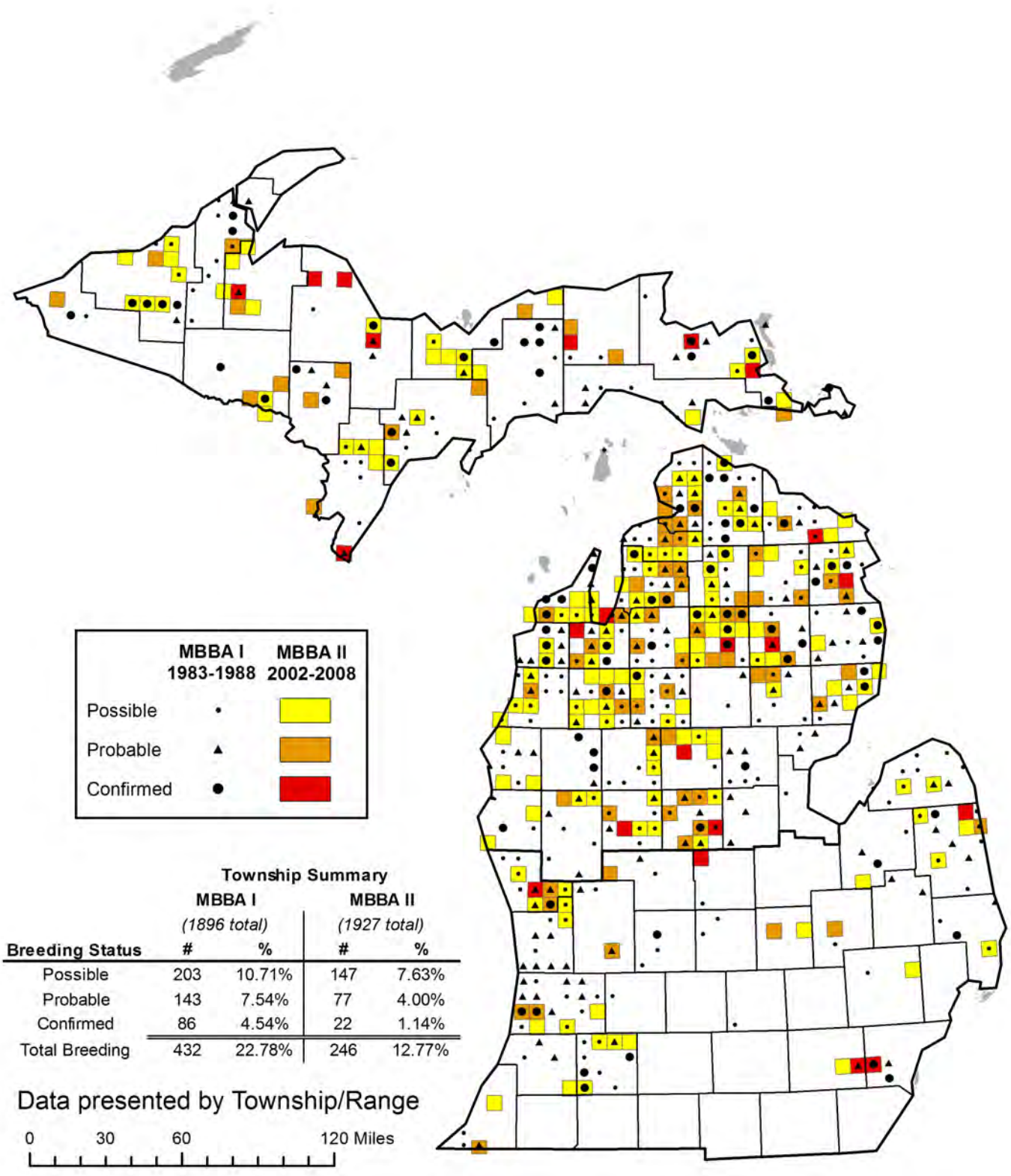
Conservation Needs

The Upland Sandpiper was once considered a delicacy by early European pioneers hunting on North American breeding grounds (Houston 1999). Presently, however, this species is not legally hunted in North America, and most conservation efforts focus on conserving and restoring openland ecosystems and the disturbance regimes that maintain them, such as fire, grazing, and low-intensity agricultural practices. Across much of its core range in the Great Plains, the conversion of native prairie to intensively managed agriculture has led to declines in Upland Sandpiper populations (Dechant et al. 1999, Vickery et al. 2008).

In Michigan, little conservation-related research has focused on this species or the large, dynamic openland complexes it inhabits. More research conducted at multiple spatial scales is necessary to quantify habitat associations for this species. Because the Upland Sandpiper breeds in disturbance-dependent ecosystems, conservation and restoration of the disturbance agents that maintain these ecosystems is critical (Askins 2000). For instance, in ecoregions such as the eastern UP, the conservation of low-intensity managed hayland and pasture may bode well not only for this species, but other openland species of conservation priority (Corace et al. 2009a). However, the amount of openland in many ecoregions of the state has declined due to fire suppression, natural secondary succession, the reduction in low-intensity farming, and the concomitant conversion to other land uses. For instance, in the far eastern UP counties of Chippewa and Mackinac, the amount of openland decreased from 8,499 ha to 4,856 ha (21,002 ac to 12,000 ac) between 1980 and 1993, a decrease of 43% in 13 years (Maples and Soulliere 1996).

In the northern LP and the UP, the greatest opportunity for Upland Sandpiper conservation on public lands rests with management of xeric pinelands, including jack pine ecosystems. In particular, the large clearcuts associated with state and federal management of Kirtland's Warbler habitat provide an appropriate habitat type and patches of the necessary size for Upland Sandpiper. Managed with ecological principles as a guide and either involving prescribed fire or emulating patterns resulting from wildfire, these clearcuts can provide conditions that mimic the now rare jack pine barrens (Corace et al. 2009b). However, to provide habitat for Upland Sandpiper and other openland-dependent species, land managers should consider delaying the replanting of these areas for Kirtland's Warbler, thereby allowing the openland conditions to persist for a longer period of time. Such management would not only benefit Upland Sandpipers, but a suite of other bird species, including game species such as Sharp-tailed Grouse in the UP. The Upland Sandpiper is not a listed species in Michigan, but is a US Fish and Wildlife Service Region 3 Conservation Priority Species (USFWS 2002) and a US Forest Service Region 9 Regional Forester Sensitive Species (USFS 2003).

Upland Sandpiper *(Bartramia longicauda)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	203	10.71%	147	7.63%
Probable	143	7.54%	77	4.00%
Confirmed	86	4.54%	22	1.14%
Total Breeding	432	22.78%	246	12.77%

Data presented by Township/Range

0 30 60 120 Miles

Wilson's Snipe *(Gallinago delicata)*

Torrey Wenger



Allen Chartier ©

Wilson's Snipe is a victim of the lumpers and splitters. In 1945, Wilson's Snipe was combined with other snipe species worldwide as the Common Snipe, *Gallinago gallinago* (AOU 1945). In 2002, based on behavioral and structural differences, it was split off again (Banks et al. 2002). While this frustrates casual birders and competitive listers alike, the bird itself certainly does not care. This on-again, off-again status is not the origin of the infamous "snipe hunt", where children are sent into the bushes searching for a non-existent bird.

All snipe feed by using their long bills to probe for small insects and larvae in mud and moist soils. A snipe can open just the tip of its bill, enabling it to capture and swallow small prey items without removing its bill from the soil.

The snipe can be found in nearly all of North America during some part of the year. It breeds throughout much of Canada and in the northern states and winters in the southern two-thirds of the U.S. and south through Central America. Michigan lies at the edge of its breeding range.

Distribution

Contrary to expectations in the previous Michigan Atlas, the distribution of the Wilson's Snipe has diminished. In MBBA I, this marsh-dwelling sandpiper was reported in 23% of Michigan's townships; in MBBA II, they were reported in only 14.5%, a drop of nearly 40%. The most significant decrease occurred in the SLP: Wilson's Snipe were found in almost 60% fewer townships and were not found in 14 counties where they were previously documented.

Some of this decline may be caused by observer bias. First, snipe are most detectable during their early mating season, as males make "winnowing" flights above their territories – if observers delayed the start of their fieldwork, they missed this species. Second, the snipe is a habitat specialist, preferring wetlands with low herbaceous vegetation, sparse shrubs, and scattered trees (Mueller 1999) – if observers concentrated on other wetland types, they missed this species. However, these two factors cannot account for the entire observed decline.

Breeding Biology

Wilson's Snipe arrive in Michigan as soon as the soil thaws and food becomes available, typically by early April in the LP (Amman and Urbain 1991). The males arrive up to two weeks earlier than the females and establish territories using winnowing flights. The "winnow" noise is created by air flowing over specialized tail feathers. The female is courted by and will mate with several males, establishing a pair bond once she begins to lay eggs (Mueller 1999). Experienced females nest early in the season while yearling females nest up to two months later; snipe only produce one clutch (excluding replacement clutches after predation) but nests can be found for months due to this age-related asynchrony of breeding (Mueller 1999).

The well-concealed nest is placed on the ground close to water. Unlike other shorebirds, the nest is well constructed. A typical clutch consists of four eggs, each approximately 15% of the female's mass (Mueller 1999.) Only the female incubates, starting when the last egg is laid. The eggs hatch 18 to 20 days later and the chicks can leave the nest as soon as they are dry. The young are divided between the pair, the male taking the first two hatched chicks; the small family units do not maintain contact with each other (Mueller 1999).

Newly hatched snipe grow quickly. Their bills start off "remarkably short", growing to almost adult length by 35 days (Mueller 1999). They can fly short distances at two weeks. Chicks weigh about 10% of adult mass when they hatch and reach full adult size by three weeks, at which point they are typically independent (Mueller 1999). At six weeks of age, they begin to congregate.

Abundance and Population Trends

Population sizes and abundance trends are essentially unknown at the flyway and national levels, with no snipe-specific surveys currently done (Association of Fish and Wildlife Agencies 2009).

Population trends from the Breeding Bird Survey, while showing declines at national, regional, and state levels, are not significant (Sauer et al. 2008). The BBS does not provide enough data to return statistically significant trend results due to this species' crepuscular tendencies and habitat restrictions.

The snipe is a game bird and is regulated by the U.S. Fish and Wildlife Service. Reports submitted to the Migratory Game Bird Harvest Information Program (HIP) generally indicate a decline in harvest. The 2008 Michigan harvest was estimated at 1,200 birds while the 10-year average is 2,320; the 2008 U.S. harvest was also below its 10-year average, 95,500 compared to 110,600 (Raftovich et al. 2009, USFWS 2006, 2007a, 2007b, Padding et al. 2005). Another 13% can be considered "unretrieved kills" (USFWS 2006, 2007a). Fewer hunters seem to be pursuing snipe than in previous years (Raftovich et al. 2009, USFWS 2006, 2007a). Thus, the decline in harvest cannot be attributed solely to a decline in the population.

Wilson's Snipe *(Gallinago delicata)*

Torrey Wenger

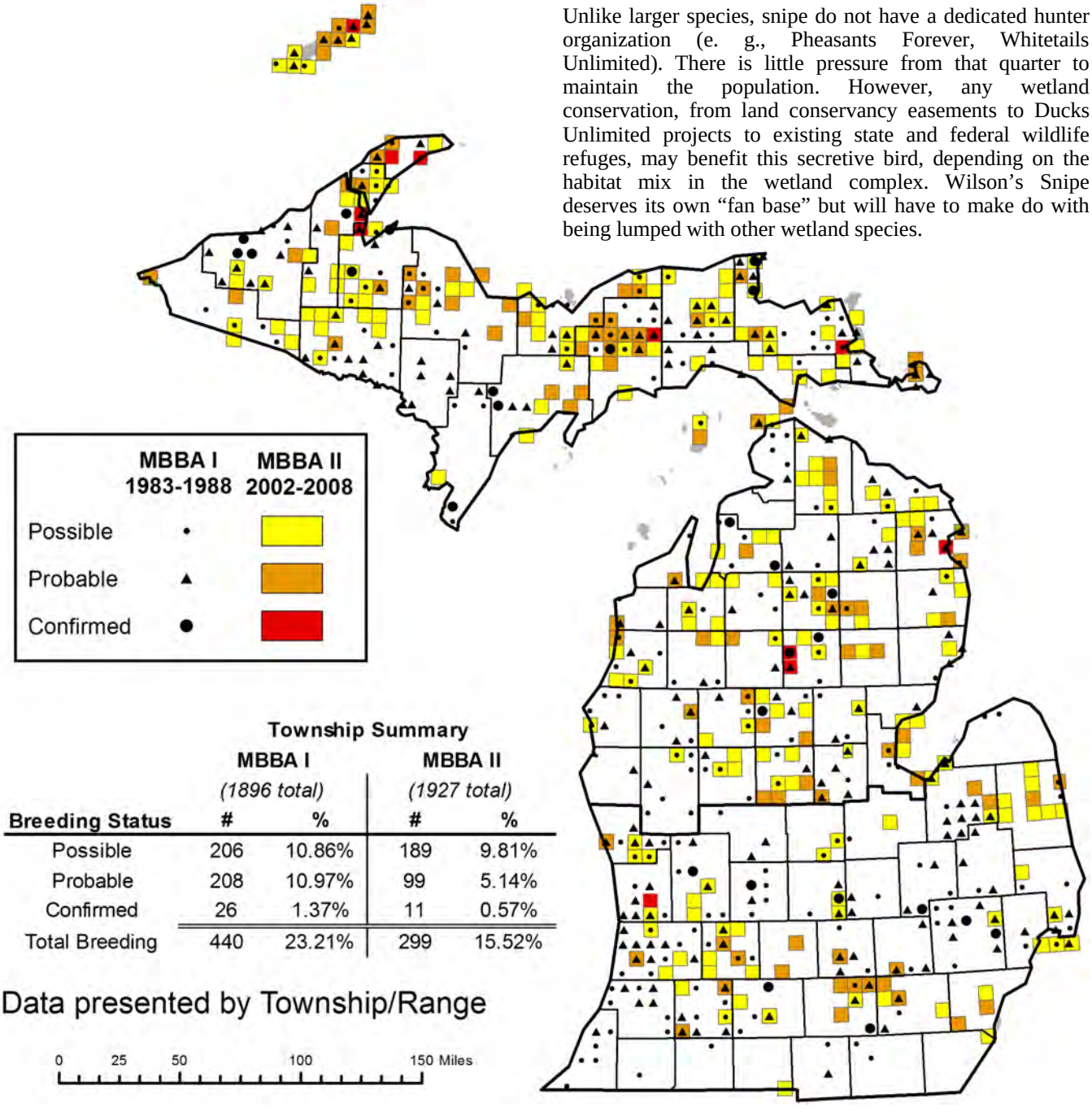
Conservation Needs

Habitat loss is a problem for any habitat specialist. The wetlands required by snipe can be lost to successional plant growth, conversion to developed land, or changes in hydrology. Much of the breeding range and a large part of the wintering range fall outside of U.S. borders, necessitating international cooperation.

The following recommendations were made by the Association of Fish and Wildlife Agencies' Priority Information Needs for Rails and Snipe funding strategy (2009), which recognizes that current management decisions for snipe are fraught with uncertainties. A national monitoring plan should be implemented: improved survey techniques have been developed for this difficult-to-access and hard-to-spot species but are not yet in use nation-wide. The HIP hunter screening and sampling protocol should be improved, thus recovering more valid data. The Parts Collection Survey, in which hunter-submitted wings are used to determine the age ratio of the harvested population and potentially the geographic origin of the individual birds (by isotope analysis of the feathers), should be improved.

Several other research avenues exist. The response of snipe to habitat management should be more fully studied. Migration routes are poorly known. Extra-pair copulation is common and raises questions about differences in paternal care.

Unlike larger species, snipe do not have a dedicated hunter organization (e. g., Pheasants Forever, Whitetails Unlimited). There is little pressure from that quarter to maintain the population. However, any wetland conservation, from land conservancy easements to Ducks Unlimited projects to existing state and federal wildlife refuges, may benefit this secretive bird, depending on the habitat mix in the wetland complex. Wilson's Snipe deserves its own "fan base" but will have to make do with being lumped with other wetland species.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	206	10.86%	189	9.81%
Probable	208	10.97%	99	5.14%
Confirmed	26	1.37%	11	0.57%
Total Breeding	440	23.21%	299	15.52%

Data presented by Township/Range

American Woodcock (*Scolopax minor)*

John G. Bruggink



Darlene Friedman ©

Species sponsored by: Cecil Kersting

Extravagant twilight displays of male American Woodcock can be observed in Michigan almost as soon as patches of ground start appearing from beneath the melting snow. Woodcock generally inhabit dense young forests, particularly those of aspens or alders, during the day but in spring, the males of this otherwise secretive species move into clearings at dusk and dawn to perform their conspicuous courtship rituals. Prior to the departure of woodcock in the fall, tens of thousands of hunters take to the Michigan woods to pursue these unusual birds, and more woodcock are taken by hunters in Michigan than in any other state (Cooper and Parker 2009). The American Woodcock occurs throughout much of eastern North America, from as far north as southern James Bay, Ontario, to as far south as southeast Texas and central Florida (Straw et al. 1994). The woodcock is found throughout Michigan, with highest densities in the NLP and central and eastern UP (Thogmartin et al. 2007).

Distribution

The American Woodcock almost certainly was far less abundant and more scattered in Michigan prior to European settlement when the proportion of the land area comprised of young forests was relatively small (Lorimer 2001). However, the extensive logging and subsequent frequent wildfires, fuel wood cutting, and eventual farm abandonment that accompanied settlement in the late nineteenth and early twentieth centuries greatly increased the amount of young forest habitat (Whitney 1994, Lorimer 2001) and shifted forest composition toward types that favored woodcock. For example, the aspen-paper birch forest type increased from <5% of the pre-settlement forest area in Michigan to >26% of the forest area by 1935 (Whitney 1994). There is little doubt that these changes resulted in an expansion of the distribution and increase in abundance of American Woodcock throughout much of Michigan.

Michigan Breeding Bird Atlas II records indicate that the American Woodcock is widespread in Michigan, with reports of at least possible breeding evidence from nearly every county and 37% of the townships. However, this represents a decrease from MBBA I, when woodcock were reported from 49% of the townships. There do not appear to be broad areas of range contraction or expansion between MBBA I and MBBA II, with the exception of the north central UP, where reports of woodcock increased, and the south central UP and extreme northern LP, where there were fewer confirmed reports than with MBBA I.

The decline in evidence of breeding woodcock from MBBA I to MBBA II is noteworthy but it should be interpreted cautiously. Most confirmed woodcock breeding records, 94% in MBBA II, and a "high percentage" in MBBA I (Ammann 1991) came from cooperators who used dogs to locate broods for the woodcock banding program coordinated by the DNRE. Because the efforts of these cooperators were not standardized between MBBA I and MBBA II, changes in confirmed breeding records in a particular area may reflect changes in cooperator effort rather than changes in the presence of breeding woodcock. Further, Ammann (1991) indicated that MBBA I underrepresented the distribution of breeding woodcock in Michigan, particularly in the northern forested areas, and this also appears to be the case with MBBA II. For example, the lack of confirmed breeding records and somewhat sparse distribution of woodcock in Dickinson, Iron and Delta Counties suggested by MBBA II are inconsistent with the strong woodcock presence in this area suggested by predicted woodcock densities (Thogmartin et al. 2007), captures of hundreds of woodcock during 2002-2004 (Oppelt 2006), and wing receipts from hunters in the U. S. Fish and Wildlife Service's Woodcock Wing-collection Survey (WCS) (U. S. Fish and Wildlife Service, unpublished data).

Breeding Biology

Reproductive success of woodcock, as measured by the WCS (ratio of immature per adult female in the harvest), has been below long-term averages for most of the last two decades (Cooper and Parker 2009). The reasons for this are unclear.

Abundance and Population Trends

The population status of the American Woodcock is monitored at state/provincial, regional and national levels by the Singing-Ground Survey, which is a roadside survey conducted throughout the central and northern portions of its breeding range (Cooper and Parker 2009). The average number of woodcock heard along survey routes in the Central Region, which includes Michigan, increased during the 1970s but declined in the early 1980s (Sauer and Bortner 1991). After stabilizing during the mid-1980s, the decline accelerated during the 1990s to a rate of -4.4% per year at the regional level during 1987-97, with significant declines in most states in the region, and in Ontario (Bruggink 1997). In Michigan, significant negative trends (-2.3% per year from 1985-95 and -1.1% per year from 1968-95) were first detected in 1995 (Bruggink and Kendall 1995). The rate of decline in Michigan was greatest (-3.0% per year) during 1987-97. Declines gradually slowed after 1997, and no significant 10-year trends have been detected in Michigan

American Woodcock (*Scolopax minor*)

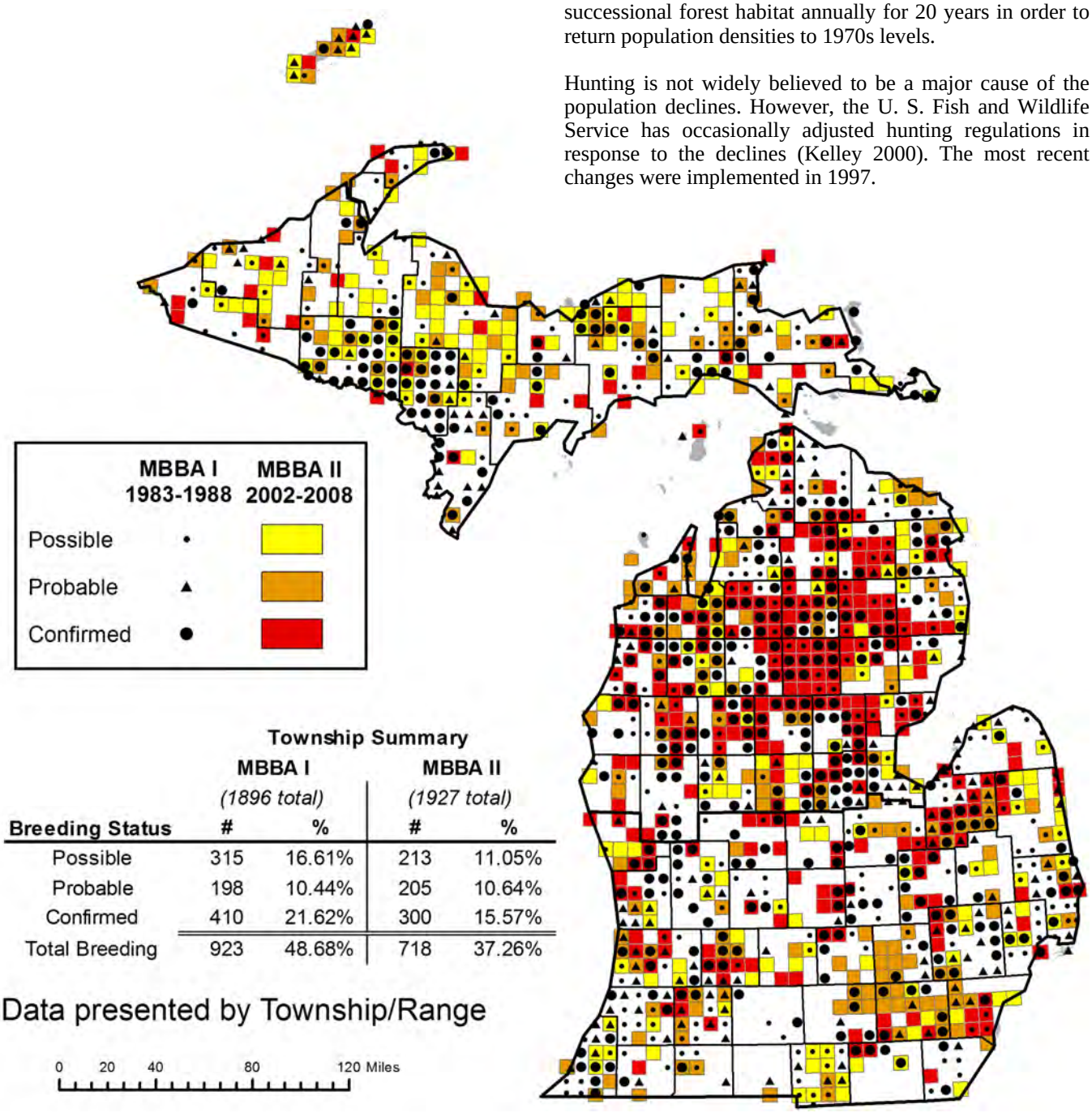
John G. Bruggink

since 2001, except in 2008 when a negative trend (-2.8% per year for 1998-2008) was detected (Kelley 2001, Cooper et al. 2008, Cooper and Parker 2009). However, the long-term (1968-2009) trends in Michigan (-1.18% per year) and the region (-1.1% per year) have remained negative.

Conservation Needs

The American Woodcock Conservation Plan (Kelley et al. 2008) was developed to address the apparent declines in woodcock populations. The goals of the Plan are to stabilize woodcock populations by 2012 and ultimately increase them to levels that occurred in the early 1970s. Because the loss of early successional forest and shrubland habitats is thought to be the primary cause of the declines, the focus of the Plan is on maintaining and expanding the area of early successional forest habitat throughout the breeding range of the woodcock. The Upper Great Lakes Woodcock and Young Forest Initiative (Cooper 2008) was developed to begin implementing the habitat goals of the Plan in Michigan, Minnesota, and Wisconsin. This ambitious initiative calls for the creation of about 71,700 ha (177,170 acres) of early successional forest habitat in Michigan annually for 20 years in order to stabilize the amount of this type of habitat. Further, it calls for the creation of an additional 31,800 ha (78,578 acres) of early successional forest habitat annually for 20 years in order to return population densities to 1970s levels.

Hunting is not widely believed to be a major cause of the population declines. However, the U. S. Fish and Wildlife Service has occasionally adjusted hunting regulations in response to the declines (Kelley 2000). The most recent changes were implemented in 1997.



Wilson's Phalarope *(Phalaropus tricolor)*

Allen T. Chartier

Status: *Special Concern (MNFI)*



Andy Johnson ©

Of the three phalarope species in the world, the Wilson's Phalarope is the only one that is restricted to North America as a breeding species; it also breeds farther south here than either the Red Phalarope or the Red-necked Phalarope. Wood (1951) cites an 1859 record from "Keweenaw Point" published by Kneeland in 1857 as the first Michigan record, but Barrows (1912) considered this record "doubtful" and describes the first state record as occurring in 1875. Subsequent authors (Wood 1951, Granlund 1994) have accepted the 1857 record as the first in the state.

The Wilson's Phalarope prefers to breed in shallow wetlands of interior North America from western Minnesota north to northern Alberta south to northeastern California and northern Utah (Colwell and Jehl 1994). Small numbers of birds breed from central Wisconsin (Harriman 2006) across southern Michigan (Adams 1991) to southern Ontario (Sandilands 2007), which forms a disjunct breeding population that is apparently somewhat stable. Nesting has also occurred once or twice in northwestern Ohio (Peterjohn and Rice 1991), and summering birds have been found in Indiana but with no evidence of breeding (Castrale et al. 1998). Wilson's Phalarope winters primarily in Peru, Chile, Bolivia, and Argentina (Colwell and Jehl 1994).

Distribution

Breeding in Michigan appears to occur at widely spaced intervals with years and even decades between nesting records, with very few confirmations. Barrows (1912) cites an apparent pair collected along with their nest from Portage Lake northeast of Ann Arbor, Washtenaw County, on 2 July 1875 as the first confirmed nest in the state. Wood (1951) claims the first confirmed nesting as consisting of small downy young collected by R.T. Peterson on 25 June 1929 near Stony Lake, Napoleon Township, Jackson County. The only other confirmed nesting described by Wood was two small young collected on 12 July 1934 from Lone Tree Island, Huron County.

During MBBA I, the Saginaw Bay area provided a number of records that were considered possible and probable breeders by Adams (1991), with evidence of courtship being noted in Alpena County and agitated behavior in Huron and Bay Counties. Perhaps breeding in this species is easily overlooked unless special efforts are being made to look for them, as is the case during Atlas periods.

During MBBA II, breeding was confirmed in Michigan for the first time perhaps since 1934 (Wood 1951). An adult with four chicks was observed on 18 July 2004 at Shiawassee NWR, Saginaw County (Byrne 2005, L. Abraham obs.). Adults and two fledglings were observed at the Muskegon Wastewater System, Muskegon County during June and July 2005 (Byrne 2006, C. Weng, M. Moran obs.). Six individuals, including adults with chicks, were observed on 11 July 2006 at Portage Marsh, Delta County (Dombroski 2007, S. Haas obs.).

A probable breeding record was documented with a female on 9 June and a male on 13 June 2007 at Au Gres Point, Arenac County (Dombroski 2008). Apparent pairs were also reported on 11 May 2004 in Oceana County (C. Shumacher obs.), and on 5 June 2002 (B. Johnson obs.) and 15 May 2007 (C. Weng obs.), at Muskegon Wastewater System, Muskegon County, though all these probable records fall within the spring migration period for the species.

Presence in suitable breeding habitat does not necessarily suggest possible breeding in shorebird species. Late spring and early fall migrants often occur in the summer months in many shorebird species. In the Wilson's Phalarope, spring migrants seem to have departed by 10 June and fall migrants generally do not arrive until around 15 July peaking in mid-August, with most gone by late September but with a few lingering into October some years (Granlund 1994). Individuals present between these periods can be considered possible breeders, with caution, based on their presence in suitable habitat during their breeding season. Such reports came from Shiawassee NWR in 2002 (Murphy 2003), 2003 (Murphy 2004), 2004 (Byrne 2005), and 2008 (J. Dastyck obs.), from Pte. Mouillee SGA, Monroe County in 2002 (Murphy 2003), 2003 (Murphy 2004), 2004 (Byrne 2005), and 2005 (Byrne 2006), and the Muskegon Wastewater System in 2004 (Byrne 2005). One male on 4 June 2008 in Alpena County was felt by the observer to indicate possible breeding (Dombroski 2009), but could also represent a late spring migrant.

Breeding Biology

Spring migrants arrive in Michigan primarily during the month of May, though rarely some arrive in mid-April, and most are gone by early June. The Wilson's Phalarope breeds in freshwater marshes and wetlands or uplands close to wetlands with sparse to dense emergent vegetation. They are non-territorial, often forming loose breeding colonies (Colwell and Jehl 1994).

As with all phalarope species, the roles of the sexes are reversed. The larger, more brightly-plumaged females compete for mates. The females lay the first egg in a bare scrape around which the males gather vegetation to form the

Wilson's Phalarope *(Phalaropus tricolor)*

Allen T. Chartier

Status: *Special Concern (MNFI)*

nest. Only the males incubate the eggs and provide parental care to the precocial young. Egg-laying occurs from late May to early June. Incubation by the male begins after the third egg is laid (normal clutch size is four), and lasts 18-27 days. The females tend to be polyandrous and desert the male once the clutch is complete, usually seeking out other males to court (Colwell and Jehl 1994).

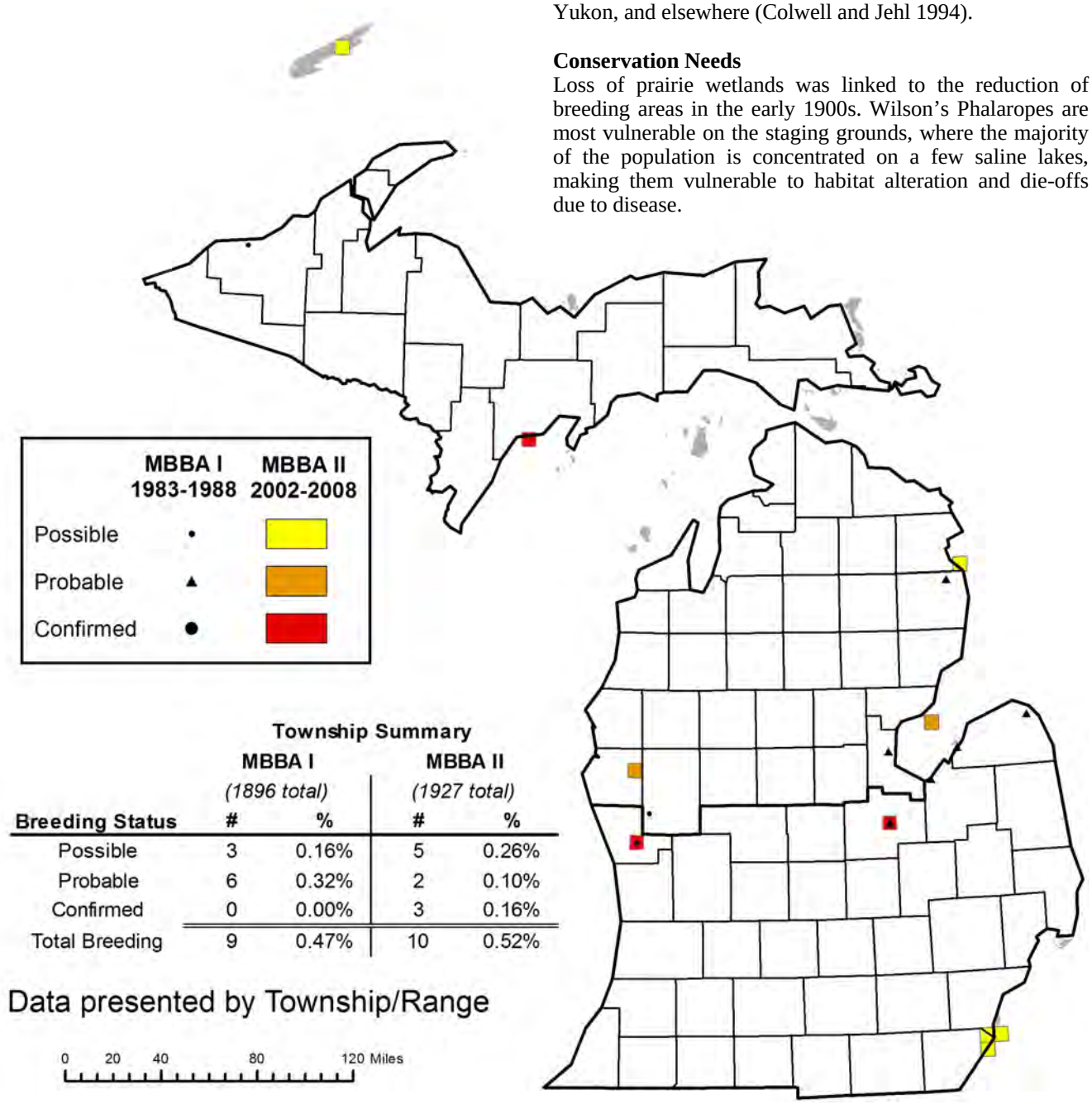
After the breeding season, adults undertake a molt migration to staging areas, with the bulk of the world population moving primarily to a few saline lakes in the Great Basin. Females arrive at staging areas by mid-June, followed by adult males, then juveniles. All individuals depart these staging areas by September and most undergo a direct, nonstop migration from the southwestern U.S. to the northwest coast of South America. From there they move south through the Andes to the high elevation saline lakes in Peru, Chile, Bolivia, and Argentina where most of them overwinter (Colwell and Jehl 1994).

Abundance and Population Trends

In 1982, Jehl estimated the population of Wilson's Phalaropes, based on counts from major staging areas in the fall, as 1.5 million birds. Since then, regular censuses have detected major declines since the 1980s at some lakes, but evidence for overall declines is inconclusive. The breeding range appears to be expanding into southeastern Alaska and Yukon, and elsewhere (Colwell and Jehl 1994).

Conservation Needs

Loss of prairie wetlands was linked to the reduction of breeding areas in the early 1900s. Wilson's Phalaropes are most vulnerable on the staging grounds, where the majority of the population is concentrated on a few saline lakes, making them vulnerable to habitat alteration and die-offs due to disease.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	3	0.16%	5	0.26%
Probable	6	0.32%	2	0.10%
Confirmed	0	0.00%	3	0.16%
Total Breeding	9	0.47%	10	0.52%

Data presented by Township/Range

0 20 40 80 120 Miles

Ring-billed Gull *(Larus delawarensis)*

Greg Norwood



Darlene Friedman ©

It is nearly impossible to visit a Michigan shoreline of the Great Lakes without seeing the Ring-billed Gull in all but the coldest months. In a little over 80 years, its status has changed from a non-breeder to a successful breeder nesting in colonies with up to tens of thousands. This surely is one of the most impressive population expansions of any species covered in both the MBBA I and MBBA II. The Ring-billed Gull is highly adaptable to a wide range of habitat and food, allowing it to thrive during the enormous ecological changes that have occurred in the Great Lakes during the 20th century. The Ring-billed Gull breeds over much of North America, and is widely distributed in Michigan; this distribution is remarkably similar to the Herring Gull, with which it is a common co-nester. The species primarily winters along the coast of Florida to the Mississippi River Delta, with juveniles concentrating on the Gulf coast of Florida and adults on the Atlantic coast (Southern 1974).

Distribution

The Ring-billed Gull is as widely distributed today as during the first atlas. These atlas data indicate a substantial increase in the number of townships in the UP where the species is confirmed. Confirmed colonies likely better reflect the real distribution of the species than "possible" records that appear inland since non-breeders and post-breeding dispersal could account for many of those records. An increase from 13 to 33 townships had confirmed nesting, although the NLP and SLP did not significantly change. Since MBBA I, the species has shown a dramatic increase in abundance in all of the Great Lakes, especially between the first and second of the first three decadal surveys (1976–1977, 1989–1990, 1997–1999) (Cuthbert et al. 2003, Scharf 1978, Scharf and Shugart 1998). The significant increase in possible records is centered inland from Grand Traverse Bay. These records are especially suspect since some of the largest Ring-billed and Herring Gull colonies exist offshore in Lake Michigan at Bellows Island in Northport Bay (Leelanau County), Ile Aux Galets (Emmet County), and those at the Beaver Islands (Charlevoix County). It is apparent that where the species was recorded with possible status in MBBA I, it is now confirmed. This is especially evident around the St. Marys River, northern Lake Huron, and Isle Royale. The increase in the number of inland records may be due to the increased inland coverage with the Breeding Bird Survey routes. These inland sites do not reach the magnitude of the major coastal colonies, which likely contribute more to the population trends observed; however, roof-nesting Ring-billed Gulls have increased since the last atlas and may contribute to these inland records in some places (Dwyer et al. 1996). A significant inland site, the Muskegon Wastewater Management System (Muskegon Co.), continues to have a colony of a few thousand pairs that was present during MBBA I.

Breeding Biology

MBBA I noted the more varied diet of the Ring-billed Gull in comparison with the Herring Gull as one reason for its original population explosion in the 1960s. As the negative effects of contaminants reached a peak in the 1970s, this generalist diet may have contributed to less adverse reproductive effects. Chudzik et al. (1994) showed the varied diet in Ring-billed Gulls may have been the main reason for its greater reproductive success than the Herring Gull. Morris et al. (2003) further suggests food as a more limiting factor for the Herring Gull. Ludwig (1974) describes the early expansion of the Ring-billed Gull in the Great Lakes citing lower water levels in the 1960s, invasion of alewives, large clutch-size and low adult mortality contributing to its expansion. This expansion generally has continued (L. Wires pers. comm.).

In Michigan, the species nests amidst or near Herring Gulls, Caspian Terns, Common Terns and Double-crested Cormorants. Numerous colonies in the state number in the tens of thousands where the birds are within inches of each other. A wide variety of nesting habitats is used, but typically near water (Ryder 1993). Further supporting the likelihood that many inland records are not breeders, Baird (1976) found that they forage 2-31 km from the colony. Artificial sites are common including the Saginaw Bay Confined Disposal Facility, as well as a diversity of islands throughout the Michigan Great Lakes.

Abundance and Population Trends

The best record of the population trend for the Ring-billed Gull is obtained through the decadal surveys (Cuthbert et al. 2003, C. Weseloh unpub. data). These data show the significant increase in the species in the Great Lakes from the first survey to the second and a modest decline from the late 1980s to the late 1990s (Cuthbert et al. 2003, C. Weseloh unpub. data, Scharf 1978, Scharf and Shugart 1998). It is most relevant to report the trends of the Great Lakes, since there is significant inter-colony movement (Gabrey 1996). The species' Great Lakes population went from 297,158 breeding pairs to 721,574 between the first and second decadal surveys with a 9% decline during the third. (Cuthbert et al. 2003, C. Weseloh unpub. data). The Michigan Great Lakes reached a peak during the second survey at 132,790 breeding pairs and declined to 101,781 during the third (Cuthbert et al. 2003).

Some of the largest colonies in the state are in northern Lake Michigan at Snake and Round Island in Big Bay de Noc

Ring-billed Gull *(Larus delawarensis)*

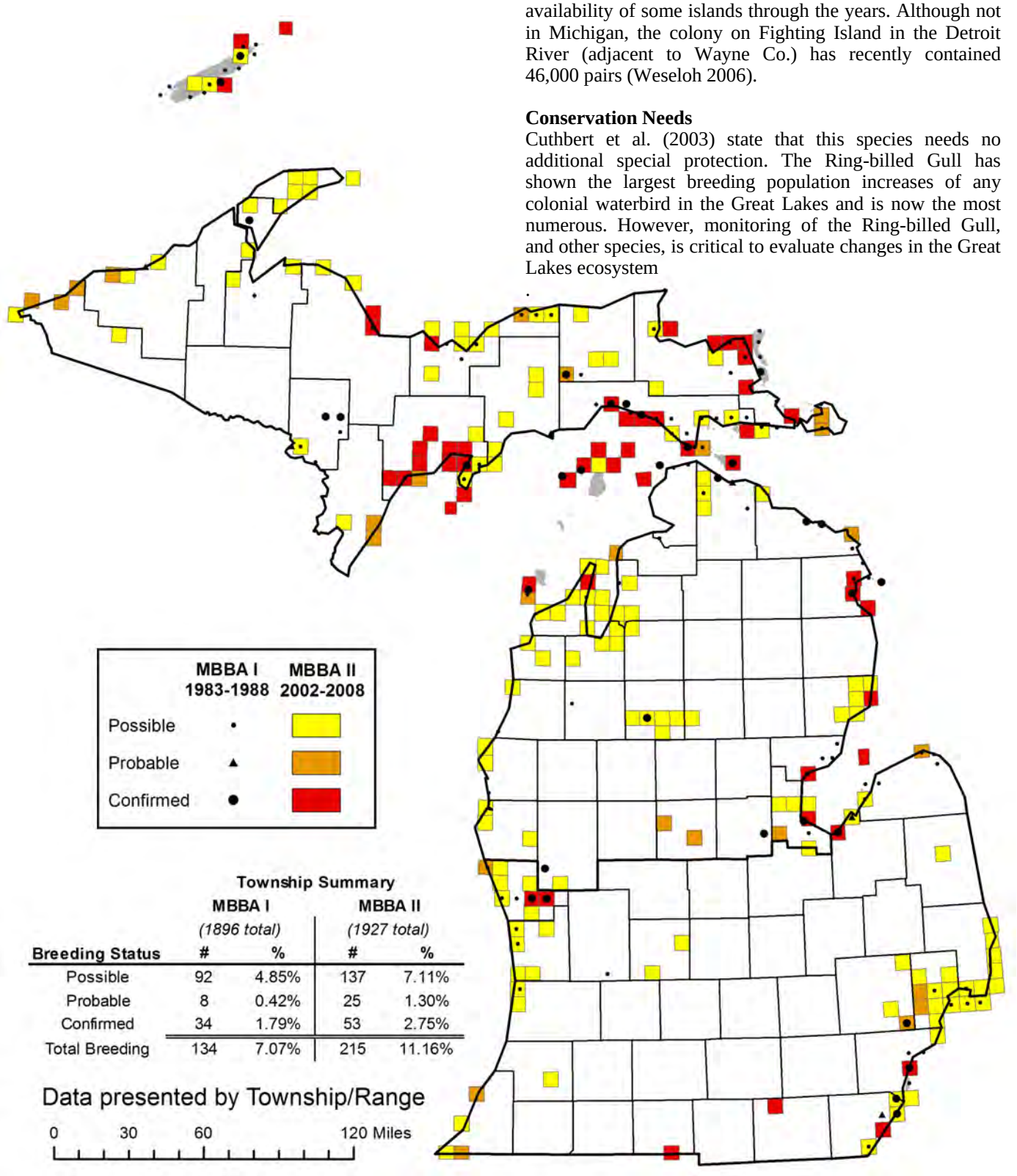
Greg Norwood

(Delta Co.), Rocky Island off the Garden Peninsula (Delta Co.), and Green Island (Mackinac Co.) totaling over 50,000 pairs. The colony at the Saginaw Bay Confined Disposal Facility (Bay Co.) was estimated at 36,197 nests in 2008 (F. Cuthbert unpub. data). Inter-colony movement has likely occurred in Michigan as evidenced by changing colony size, especially in northern Lake Michigan where colonies no longer exist at South Manitou Island (Leelanau Co.) and East and West Grape Island in the Beaver Island Archipelago (Cuthbert et al. 2003, Cuthbert and Wires 2008). Great lakes water level fluctuation has altered the availability of some islands through the years. Although not in Michigan, the colony on Fighting Island in the Detroit River (adjacent to Wayne Co.) has recently contained 46,000 pairs (Weseloh 2006).

Conservation Needs

Cuthbert et al. (2003) state that this species needs no additional special protection. The Ring-billed Gull has shown the largest breeding population increases of any colonial waterbird in the Great Lakes and is now the most numerous. However, monitoring of the Ring-billed Gull, and other species, is critical to evaluate changes in the Great Lakes ecosystem

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Herring Gull *(Larus argentatus)*

Greg Norwood



Judi Manning ©

Michigan has a diversity of offshore islands, and it is here where the fascinating breeding displays of Herring Gulls give way to established breeding colonies inextricably linked to the Great Lakes food web. Significant breeding colonies are patchily distributed along the Great Lakes at suitable island habitats characterized by open, barren, rocky substrate, short vegetation and sometimes near trees along the shoreline. Often these larger colonies of Herring Gulls support co-nesting Ring-Billed Gulls, terns and Double-crested Cormorants. Herring Gulls are found throughout the breeding season at many inland sites; these could represent small colonies at large lakes, sewage lagoons, and artificial impoundments. Great Lakes Herring Gulls spend the winter along Lakes Erie, Michigan and Ontario, with many sub-adults descending to the Gulf Coast (Moore 1976, Gabrey 1996).

Distribution

Herring Gull distribution has remained relatively stable since MBBA I and shows similarity to other colonial waterbirds in the state that require similar habitat. The UP showed the greatest change in the number of townships with an increase from 43 to 60. The NLP and SLP changed very little. The addition of coastal blocks in the UP may explain some of the increase in distribution. The atlas map suggests coastal areas in Delta County, the Beaver Archipelago (Charlevoix County), and the Les Cheneaux Islands (Mackinac County) continue to be important nesting areas. A clear increase in blocks along the St. Marys River is found in MBBA II. However, Cuthbert et al. (2003) noted a 63% decline in the number of sites used (30 sites) with a 39-100% breeding pair decline in five of the largest colonies between the late 1980s and late 1990s, possibly caused by contaminants. Data is not yet compiled for the St. Marys River from the fourth decadal survey at the time of this writing. The Isle Royale Islands (Keweenaw County) continue to provide nesting habitat for numerous small colonies. Although Sulphur Island in Thunder Bay (Alpena County) no longer supports gull colonies, Scarecrow Island has nearly doubled its Herring Gull breeding population in the last ten years to reach over 700 pairs (Cuthbert and Wires 2008).

Efforts to control Double-crested Cormorants may also impact the distribution of the Herring Gull in Michigan, but data is lacking. Where the two species co-nest, inter-specific aggression may occur during human disturbance events that negatively affects productivity of both species (F. Cuthbert and L. Wires, pers. comm.). Somers et al. (2007) suggest that Herring Gulls have diminished productivity when nesting among Double-crested Cormorants.

Breeding Biology

Herring Gull diet in the Great Lakes is fish-based, historically being alewife and smelt (Fox et al. 1990, Belant et al. 1993, Chudzik et al. 1994). However, these two non-native fish species have declined in the Great Lakes (Madenjian et al. 2005, Gunderson 2008). Breton et al. (2008) linked alewife abundance as a strong explanatory variable in their model of adult survival of Herring Gulls in a Lake Ontario colony. They suggest that PCB-associated sublethal effects documented in the gulls may have exacerbated lower fish abundance. With the passage of over 25 years since MBBA I, the effect of organochlorine compounds bioaccumulating in the eggs of Herring Gulls continues to be an important environmental indicator (Grasman et al. 2000).

Polychlorinated biphenyls (PCBs) in Herring Gull eggs from the Detroit River and western Lake Erie have declined by 83% and 75%, respectively (Weseloh 2007). The breakdown product of DDT, DDE, in Herring Gull eggs from the Detroit River and western Lake Erie continued to decrease from the late 1970s to the early 2000s, although PCBs have leveled off since the early 1990s, while dioxin has generally decreased in the late 1990s and early 2000s (Weseloh 2007). Few growth abnormalities are being seen, although birds in this region show high levels of these compounds compared to other monitoring locations in the Great Lakes. The Herring Gull Biosentinel Sampling Program has developed a contaminant monitoring protocol utilizing eggs from approximately twelve sites within Michigan's Great Lakes waters.

Herring Gull populations may also be limited by food in the Great Lakes; however, many declines seen in some large colonies may be explained by inter-colony movements (Morris et al. 2003).

Abundance and Population Trends

The region with the largest numbers of nesting Herring Gulls in Michigan continues to be northern Lake Michigan, centered in the Beaver Islands (Charlevoix County) at Gull and Hat Island (> 2,000 nests total). Some of the largest colonies in the state are at Bellows Island in Leelanau County (> 1,400 nests), Snake Island in Big Bay de Noc (> 900 nests), and Big Gull and Little Gull Islands off the Garden Peninsula (Delta County), which recently contained over 1,200 nests combined (Cuthbert and Wires 2008). The colony at the Saginaw Bay Confined Disposal Facility (Bay County) was estimated at 909 nests in 2008 (F. Cuthbert

Herring Gull *(Larus argentatus)*

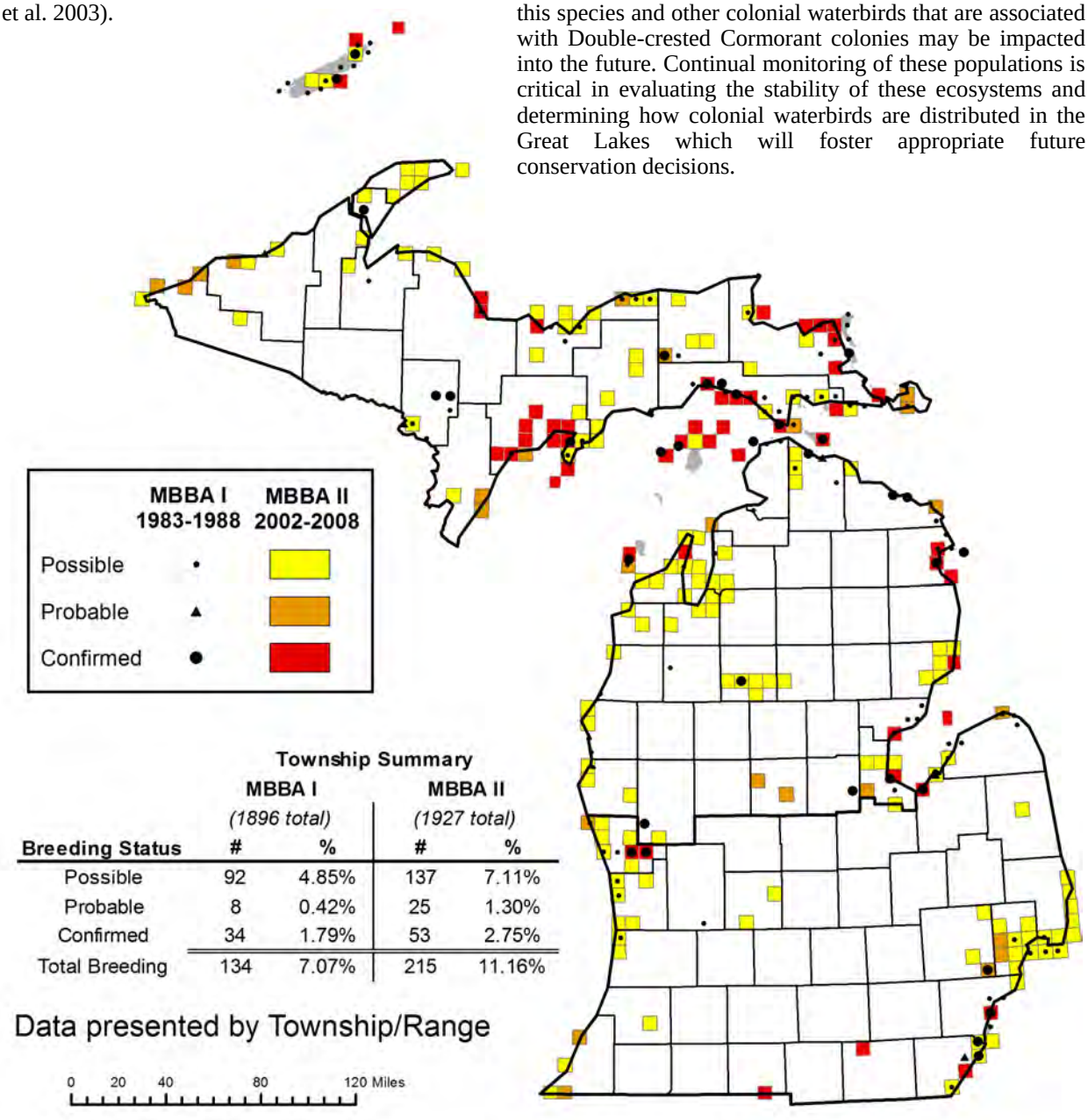
Greg Norwood

unpub. data). In addition, Crow Island and St. Martin Shoal in northern Lake Huron (Mackinac County) contain over 800 nests. These continue to be the strongholds of the Michigan Herring Gull breeding population (Cuthbert et al. 2003).

It is most relevant to report the trends of the Great Lakes, since there is significant inter-colony movement (Gabrey 1996, Morris et al. 2003). The best record of the population trend for the Herring Gull is obtained through the decadal surveys (1976–1977, 1989–1990, 1997–1999) (Scharf 1978, Scharf and Shugart 1998, Cuthbert et al. 2003). Herring Gulls increased between the first and second decadal surveys from 68,159 breeding pairs to 87,140, with a modest decline through the 1990s to 74,281 (Cuthbert et al. 2003). In Michigan waters, the species increased from 19,966 to 25,471 between the first and third surveys (Cuthbert et al. 2003).

Conservation Needs

The Herring Gull is a key biological resource in the Great Lakes; a year-round resident of the lakes as an adult and heavily dependent on fish, it is a tremendous indicator of environmental contaminants. Polychlorinated biphenyls may be causing negative physiological impacts, but other contaminants, microcystins, and infectious diseases may be contributing to the reproductive impairment of the Herring Gull in the western basin of Lake Erie (Grasman et al. 2000). Its population is also affected by food availability, making it a good candidate for ecological studies of the Great Lakes ecosystem, especially its response to changing populations of species such as alewife and smelt. Many of the islands where the species nests in Michigan are protected as part of the Michigan Islands National Wildlife Refuge and Huron National Wildlife Refuge administered by the U.S. Fish and Wildlife Service. The distribution of this species and other colonial waterbirds that are associated with Double-crested Cormorant colonies may be impacted into the future. Continual monitoring of these populations is critical in evaluating the stability of these ecosystems and determining how colonial waterbirds are distributed in the Great Lakes which will foster appropriate future conservation decisions.



Caspian Tern *(Hydroprogne caspia)*

Nancy Seefelt

Status: *State Threatened*



Jerry Jourdan ©

Acrobatic plunge dives and a raucous squawk are the calling cards of the Caspian Tern, the largest of the crested terns. This cosmopolitan species occurs on all continents, except Antarctica. In North America it breeds along the Pacific, Atlantic and Gulf coasts, as well as the Great Lakes, the Prairie Provinces and the interior west (Cuthbert and Wires 1999). Great Lakes populations of Caspian Terns are migratory, overwintering in the Gulf and Atlantic states, as well as the Caribbean and as far south as northern South America (Cuthbert and Wires 1999).

Distribution

The Caspian Tern is not a common breeder in Michigan but records indicate that it has a long history in the state. In 1848, breeding Caspian Terns were documented on small islands at the end of the Garden Peninsula (Delta County) and also in the Beaver Archipelago of northern Lake Michigan (Charlevoix County) by the early 1900s (Barrows 1912). Many records are available from islands and coasts throughout Michigan but traditional nesting locations in northern Lake Michigan appear to be used most consistently over time. Other areas, including sites in northern Lake Huron and Saginaw Bay, have been used less consistently over the long-term, perhaps due to water level fluctuations (Ludwig 1968), habitat features, or prey availability. Disturbance, contaminant levels, and fluctuations in fish populations may also influence Caspian Tern colony locations (Scharf and Shugart 1998).

During the MBBA I period, 85% of Michigan's nesting Caspian Terns chose Lake Michigan habitats. Only eight blocks were confirmed breeding sites, including five Lake Michigan islands, two islands in Saginaw Bay, and one island in Thunder Bay near Alpena. During the MBBA II period, there were still relatively few confirmed breeding locations (10 blocks in 9 Townships); the distribution of these confirmed sites included areas in the northern LP (Bay, Alcona, Arenac, Leelanau, and Charlevoix counties) and in the UP (Delta and Mackinac counties). Caspian Tern sightings have also increased in all areas, but given the relatively low population estimates for the Great Lakes, many of these observations may be migrating birds, foraging individuals (adults may travel some distance to find food), and/or other non-breeders (typically this species does not breed until age three) (Cuthbert and Wires 1999). Lake Michigan islands and coastal areas still appear to be important nesting locations for Caspian Terns in Michigan.

Breeding Biology

Caspian Terns are ground nesters and typically make a simple scrape nest in sand and/or gravel, usually in areas with sparse vegetation (Cuthbert and Wires 1999). The nests are sometimes lined with dried plants, pebbles, shells, and other debris (Bent 1921). Caspian Terns typically return to Michigan in late April or early May. Eggs are laid as early as May and renesting occurs as late as the latter half of June. When young fledge, they typically stay with their parents in family groups (Ludwig 1968). Caspian Tern fledglings enjoy the longest period of parental care of any tern, lasting several months (Cuthbert and Wires 1999). Birds begin migration southward in August, with most birds gone by the end of September.

Abundance and Population Trends

In 2002, the continent-wide estimate for breeding Caspian Terns was between 66,000 and 70,000 birds (Kushlan et al. 2002). The distribution and abundance of colonial waterbirds in the Great Lakes has been more specifically documented by decadal surveys in 1976-77 (Scharf 1978), 1989-91 (Scharf and Shugart 1998), and 1997-1999 (Cuthbert et al. 2003). Currently, the fourth decadal waterbird census is near completion (Cuthbert and Wires 2008). Breeding pairs of Caspian Terns increased by 86% in the Upper Great Lakes between 1977 and 1989; this is possibly due to more tern nesting areas documented in Lake Michigan and also in other areas including northern Lake Huron (Scharf and Shugart 1998). The number of breeding pairs continued to increase through 1997 (Cuthbert et al. 2003). Over these first three decadal census periods (1976-1977, 1989-1991, and 1997-1999), Caspian Terns have increased in nest numbers (+69.5%) and in the number of active colony sites (+50%) in the Great Lakes (Morris et al. in press). However, the current census suggests that this species is declining in Michigan (particularly in Lake Michigan), although more terns are nesting elsewhere, including Lake Ontario (Cuthbert and Wires 2008).

Conservation Needs

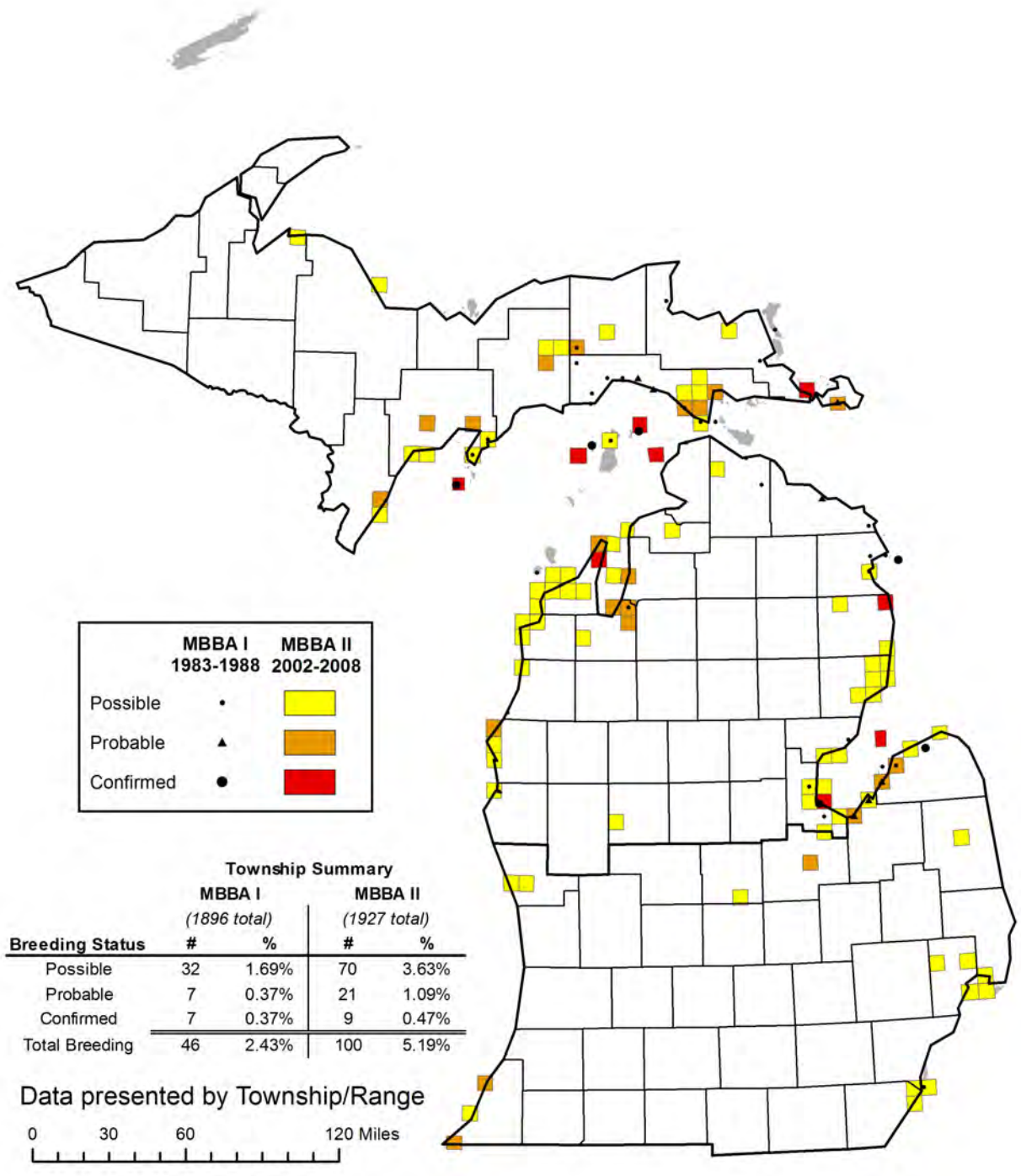
Although the continental population appears robust, the relatively small numbers of Caspian Terns in the Great Lakes and the decline of this species at historical nesting locations in Lake Michigan led to listing this species as State Threatened in Michigan. There is concern from agency staff, university scientists, and others that Caspian Terns may continue to decline in the Upper Great Lakes. Since many Caspian Terns co-nest with other species (typically gulls and cormorants), management actions aimed at these

Caspian Tern *(Hydroprogne caspia)*

Status: *State Threatened*

Nancy Seefelt

other species (particularly cormorants) have the potential to negatively impact Caspian Tern reproductive success. In addition, disturbance at the breeding colonies, especially early in the breeding season, can lead to site abandonment (Cuthbert and Wires 1999). Conservation of breeding habitats, many of which are state and federally owned, is key to protection of this species in Michigan.



Black Tern *(Chlidonias niger)*

William C. Scharf

Status: *Special Concern (MNFI)*



Jerry Jourdan ©

Black Terns are sleek birds flying buoyantly low over water and marshlands "a restless waif of the air, flitting about hither and thither with wayward desultory flight" (Bent 1921) foraging for insects, and fish. Some have called them the "jewel" of the marsh, and recent Michigan observations indicate that it is not only for their appearance, but also for their scarcity. Once a common sight over Michigan wetlands, the species is becoming less common than ever.

Distribution

MBBA II shows four inland sites in the UP and eight along the coasts including a recently reported nesting site in the marshes along the Portage ship canal. There are approximately 22 sites in the UP that were abandoned since MBBA I. In MBBA II, the NLP had six coastal sites and 16 inland sites, but 23 former inland sites in the NLP were abandoned since MBBA I. The SLP had eight coastal nesting sites and sixteen inland sites in MBBA II. There were 44 sites in the SLP that were abandoned since MBBA I. Michigan Great Lakes regions with the largest concentrations are the St. Marys River, Lake St. Clair, and the northern Lake Huron marshes. Black Terns readily change colony sites, rendering detailed studies of specific locales less useful for population monitoring (Dunn and Agro 1995). However, when the abandoned sites exceed the new sites, as has been the case recently in Michigan, it indicates declining populations.

Breeding Biology

Black Terns nest in shallow marshes forming small colonies of up to 50 nests, but will occasionally nest alone, or with Forster's Terns. Average colony size for 64 colonies on the Great Lakes was 6.8 nests (Scharf 1999). They nest on floating windrows of dead stems of reeds or cattails that have been broken by winter ice and piled by wind and waves at high water lines, and occasionally will nest on muskrat dens. Water depths at nests are .5-1.2 m (17-32 inches) (Cuthbert 1954, Dunn and Agro 1995, and Scharf 1999). The flooding of floating nests during storms is a common factor in nest losses of this species, but one to which Black Terns seem adapted, unless the flooding is repeatedly caused by unnatural sources such as ship or recreational boating wakes.

Their eggs have 50% more pores than expected based on size and weight. This is probably an adaptation to the moist nest environment (Davis and Ackerman 1985).

This agile flier frequently forages socially for insects including dragonflies, mayflies, caddisflies, beetles, true flies, and many other insects and spiders as well as small mollusks and crayfish. Fish consumed by the terns include cyprinid minnows and young game fish of several species (Dunn and Agro 1995). In the UP, peak egg laying for 254 nests over three years was in the first week of June (Scharf 1999) and in the NLP about a week earlier (Cuthbert 1954). Renesting occurs after initial nest failures, and Scharf (1999) found a second peak of laying around the last week in June into the first week and a half of July. Bailey (1977) found the mean of four replacement nests to be 15.5 days after first nest was destroyed. The fate of late season nesting is not known, but the prognosis may not be good because of advanced season and diminishing nesting and parental care drive of adults.

Chicks of this species are quickly hyper-mobile. One method of determining chick survival is by confining the chicks with a fence in order to get an accurate count before dispersal (Dunn 1979). Cuthbert (1954) counted 46 damselflies per hour fed to ten day old chicks. Family groups persist for at least five days after leaving the nest, with one or both parents in attendance (Cuthbert 1954). Rarely, second year birds with white under-parts return to breed (Mossman 1980).

Abundance and Population Trends

MBBA II shows steep declines in the number of townships where Black Terns were observed in all three Michigan regions. The UP shows a 71% decline (8.52% of townships in MBBA I to 2.42% of townships in MBBA II), the NLP a 48% decline (8.98% to 4.71%), and the SLP a 63% decline in observations (9.91% to 3.69%). An alternate measure is nests counted only along the Great Lakes. Scharf (1998) counted 440 nests at 47 colonies in 1991, and Cuthbert et al. (2003) counted 292 nests at 26 colonies in 1997-1999: a 34% decrease in nests and a 45% decrease in colonies along the Great Lakes shoreline. Even along the St. Marys River declines overtook a consistently stable population documented from 1989-1991 (Scharf 1999).

Conservation Needs

Black Terns are a species of Special Concern in Michigan; several surrounding states list them as endangered, but Ontario has no special recognition (Hands et al. 1989, Austen and Cadman 1994). Wetland loss and degradation is given as the main reason for population declines (Clapp et al. 1984, and Gerson 1987). However, other topics in need

Black Tern *(Chlidonias niger)*

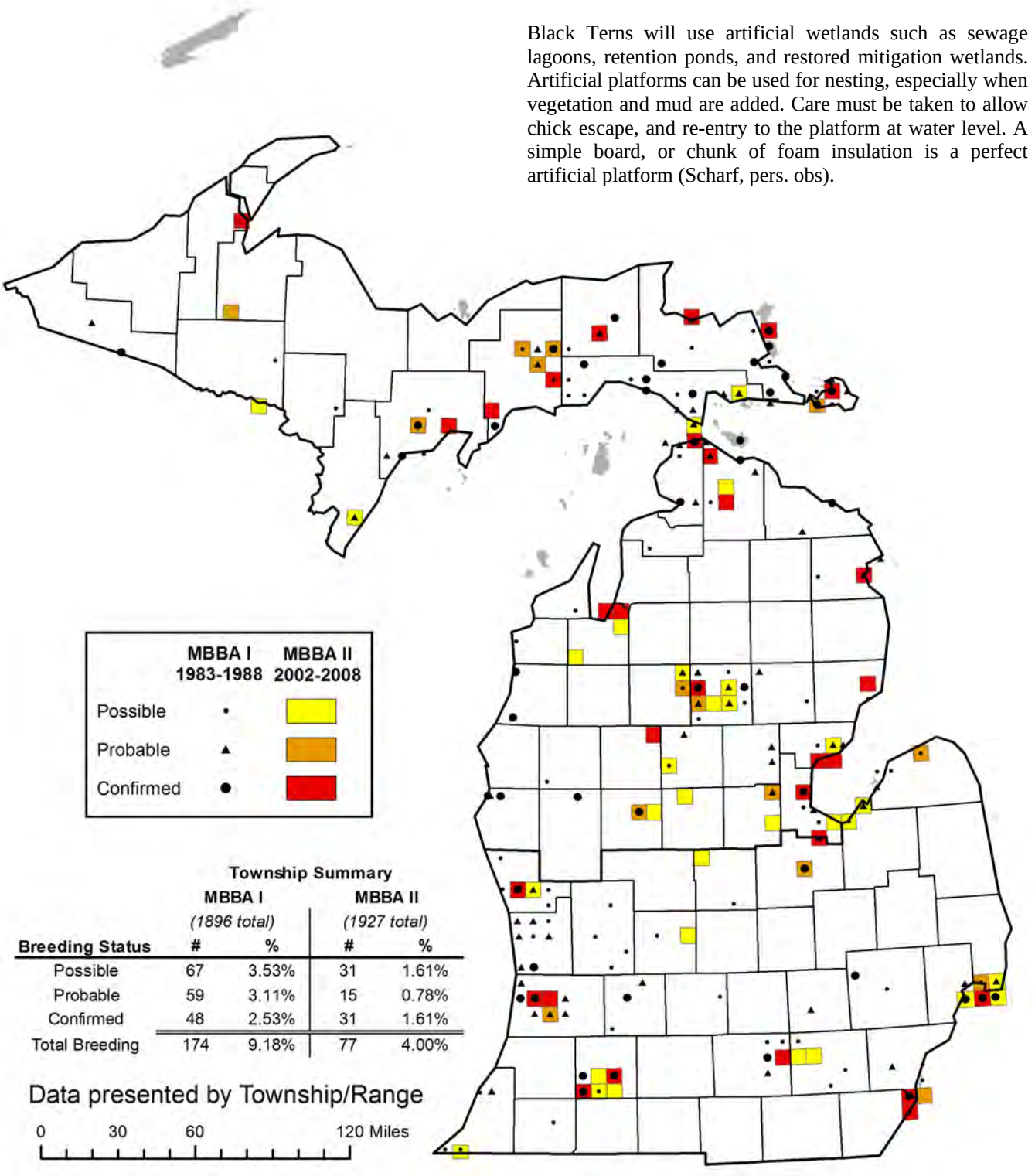
William C. Scharf

Status: *Special Concern (MNFI)*

of study are the ecology of stopover migration sites and wintering biology. The introduction of game fish to tropical freshwater lakes is a concern for Black Terns. The new predatory fish thrive on forage fish that Black Terns depend on, and may create competition for food in tropical wintering grounds (Zaret and Paine 1973).

Eggshells in Wisconsin decreased by 15% during the DDT era (Faber and Hickey 1979), but despite the presence of measurable amounts of DDE, PCB and Dieldrin, Dunn and Agro (1995) maintain that the levels are too low for direct toxicity. However, indirect effects of pesticides may reduce insect food, inhibit reproduction, and decrease embryonic vigor.

Black Terns will use artificial wetlands such as sewage lagoons, retention ponds, and restored mitigation wetlands. Artificial platforms can be used for nesting, especially when vegetation and mud are added. Care must be taken to allow chick escape, and re-entry to the platform at water level. A simple board, or chunk of foam insulation is a perfect artificial platform (Scharf, pers. obs).



Common Tern *(Sterna hirundo)*

Greg Norwood

Status: *State Threatened*



Jerry Jourdan ©

In the state of Michigan, nesting Common Terns are found on islands and along the Great Lakes shoreline. Yet despite over 3,000 miles of lakefront and a diversity of islands, these colonies are sparse, with just a few reaching 100 pairs or more. Common Terns arrive in early April at the southern part of the state and early to mid-May at the UP colonies after migrating along the Atlantic Coast (Haymes and Blokpoel 1978). It is the early season that offers the observer a fascinating show of complex and coordinated aerial displays. Colonies are heavily defended against intruders, especially as chicks get closer to fledging, creating an intense, raucous environment and seemingly chaotic organization if disturbed. Yet there is high site and mate fidelity across years and a large and a well-developed vocal repertoire hidden in these colonies (Nisbet 2002). In the broader North American context, the species nests from southern Labrador to the southern Northwest Territories, extending south to Illinois, Indiana, and Pennsylvania, with colonies found to northern South Carolina (Nisbet 2002). Banding data suggests that adult Common Terns from the Great Lakes winter primarily on the mainland of central and South America (Haymes and Blokpoel 1978), and Blokpoel et al. (1987) state the importance of coastal areas in Florida and western South America to southern Peru.

Distribution

The statewide distribution of the Common Tern has changed little since MBBA I. The largest colonies are still centered in the eastern and central UP, as well as Saginaw Bay (until recent years), and state distribution has held relatively constant. Changes in the distribution of this species have been primarily on a local scale. For example, a small colony noted in MBBA I is no longer found at Pointe Mouillee State Game Area (Monroe County) due to water level changes in the managed wetland units. However, other colonies were found in the MBBA II period within a few miles at artificial sites in or near the Detroit River, Wayne County (D. Best and J. Robison, pers. comm.). Similarly, the High Island colony in the Beaver Islands (Charlevoix County) specifically mentioned in MBBA I had only a few nests in 2008 (F. Cuthbert and N. Seefelt, pers. comm.), but relatively significant colonies have recently been found at Snake and East Hog Islands (Cuthbert and Wires 2008).

There was very little change in the number of townships recording evidence of breeding, and the distribution map looks remarkably similar given the species presence is heavily influenced by water level changes, plant succession, and disturbance on islands and shorelines. Much of the change appears to be local scale movements as habitat changes or becomes available through time. This may partly explain the increase from 14 to 22 confirmed colonies in the UP.

Water levels play an important role in the distribution of Common Terns in the Michigan Great Lakes. During years of high water levels, Common Terns primarily use artificial nesting sites in the St. Marys River and Saginaw Bay (>70%; F. Cuthbert, unpub. data). Furthermore, Lamp et al. (2003) found that Common Terns there use primarily natural sites during years of low water levels. The fluctuations of Great Lakes water levels contribute to the ephemeral nature of many sites, especially in Delta County where birds use temporarily exposed areas offshore (S. Haas, pers. comm.).

Breeding Biology

A transition of the species from natural sites to artificial islands, piers, jetties, or breakwalls began in the early 1970s (Scharf 1981, Shugart and Scharf 1983), which some of the largest colonies use today. The ephemeral use of sandy spits or beaches along the Great Lakes shoreline still support small colonies present one year and gone the next, but these sites have been unpredictable and difficult to fully monitor (Cuthbert et al. 2003a). The species' transition to artificial sites at Lime Island in the St. Marys River (Chippewa County) has created a long term colony with annual vegetative growth and easy access for mink, fox, feral dog, and coyote (Lamp et al. 2003), which has necessitated the need for management. Similarly, long term artificial sites in the Detroit River are prone to predation from mink, raccoon, and Black-crowned Night Heron (Norwood 2009). Higher vegetation at these artificial sites may serve to better protect chicks from predation (Cook-Haley and Millenbah 2002). In conjunction with the previous work at Lime Island, Lamp et al. (2003) suggest that Common Terns may have better hatching success in less vegetation cover (10-50%) on natural nesting sites, but more vegetation (40-50%) at artificial sites.

Common Tern *(Sterna hirundo)*

Greg Norwood

Status: *State Threatened*

Abundance and Population Trends

The Great Lakes Common Tern population has declined significantly between initial estimates (1927-1960) and those from the last decade (Cuthbert et al. 2003b). Since approximately 1980, the number of nests in the Great Lakes has declined by 19.1%, and the number of colony sites has decreased by 23.2% (Morris et al. 2010). Michigan is among a number of states where nesting pairs have shown a precipitous decline throughout most of the 20th century (Cuthbert 2003a). In the Great Lakes basin, the species has continued to decline as indicated by the three decadal surveys (1976–1980, 1989–1990, 1998–2000) with breeding pairs numbering 9,578, 9,080, and 8,231, respectively (Cuthbert et al. 2003a, C. Weseloh unpub. data). Statewide nesting pairs during the three decadal surveys were 1,390, 1,577, and 1,221, respectively (Cuthbert et al. 2003b).

The frequent shifting in habitat use at a relatively minor scale has resulted in seemingly robust colonies in the St. Marys River and St. Ignace, but dwindling colonies in Saginaw Bay. The colony at Lime Island has fluctuated between approximately 400 and 700 nesting pairs for most years since MBBA I (Lamp et al. 2003, Cuthbert and Wires 2008). During years of low water levels, the nearby Andrews Reef and Harbor Island Reef (Chippewa County) are used, sometimes exclusively, and contain 100 to 300 pairs most years (Lamp et al. 2003, Cuthbert and Wires 2008).The colony at the St. Ignace Coast Guard Station (Mackinac County) has become one of the largest in the Upper Great Lakes where approximately 200 to 450 nests have been counted by the U.S. Fish and Wildlife Service (Cuthbert and Wires 2008; G. Corace, pers. comm.). Interestingly, approximately 100 pairs currently nest inland at the Manistique Lakes, Schoolcraft County (G. Corace, pers. comm.). Saginaw Bay nesting pairs have declined in recent years. A major colony in the 1980s and 1990s was at the Saginaw Confined Disposal Facility (Bay County) and ranged from reports of 320–445 pairs in 1989 (Ludwig and Hull 1989) to 46 pairs in 1985 (Millenbah and Winterstein 1999). Mid-1990s estimates ranged from 204–239 during 1995–1997 to 119 in 1998 (Millenbah and Winterstein 1999). Estimates from 2003 to 2008 range from 11 to 29 nests (D. Best and L. Williams, unpub. data) at the Confined Disposal Facility. The Beaver Islands archipelago had approximately 100 nests in 2008, but there is significant movement in the area in relation to water level fluctuation, and monitoring has proven difficult (Cuthbert and Wires 2008; N. Seefelt, pers. comm.). Estimates in recent years from the Detroit River total approximately 200 nests located at two bridge protection piers in the lower Detroit River. There were 135, 180, and 164 between 2008 and 2010, respectively (Cuthbert and Wires 2008, G. Norwood unpub. data). A colony in western Lake St. Clair was estimated at 200 individuals in 2005.

Conservation Needs

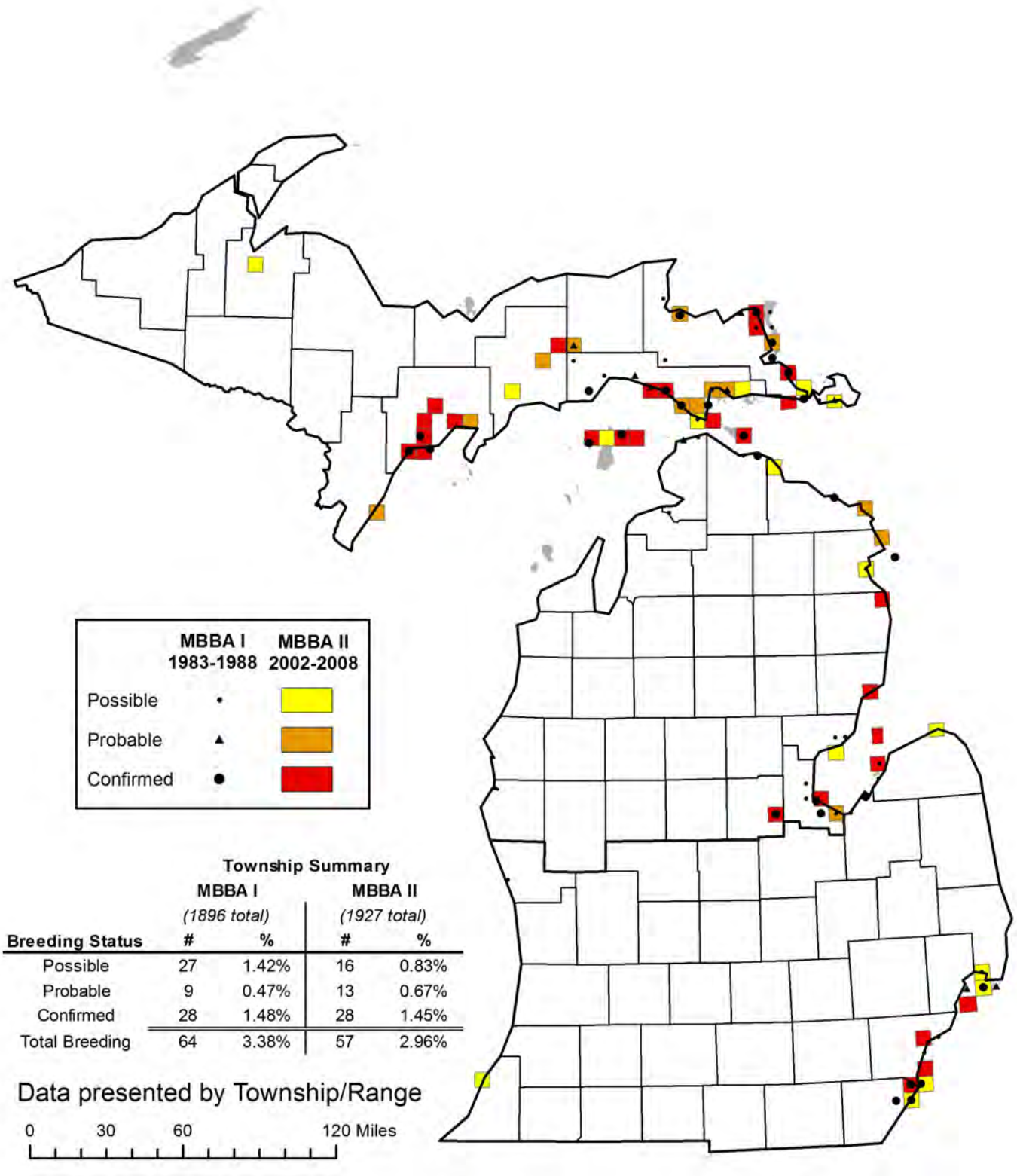
The Common Tern is a U.S. Fish and Wildlife Service Region 3 species of concern in the Great Lakes and is designated as a high conservation priority in all regions of the Great Lakes under the Upper Mississippi Valley/Great Lakes Waterbird Conservation Plan (Wires et al. 2010). It is listed as a threatened species by the State of Michigan. Habitat is being managed and sign posting installed to discourage human disturbance at Lime Island and St. Ignace, the latter through a partnership with the U.S. Coast Guard (Cuthbert et al. 2003a; G. Corace, pers. comm.). Habitat was enhanced at a former colony at Belle Isle in the Detroit River which resulted in the establishment of 12 nests in 2011, but site managers found them predated by a raccoon prior to fledging.

Monitoring and long-term management of colonies are critical to maintaining productive Common Terns in Michigan. MBBA I speculated that lower water levels could enhance the Michigan breeding population of Common Terns. So far, Common Tern populations have indeed been responding to smaller fluctuations in water levels on a local scale, but more dramatic distribution and abundance changes may still occur in light of recent projections of dropping lake levels in the midst of climate change. Predation and lack of habitat appear to be the most pressing issues at existing colonies at this time, and investment in vegetation control at artificial sites must occur annually. However, much study is required to understand the entire spectrum of habitat use and how it relates to productivity. This information could be used to guide “customized” management decisions for each colony. Managers lack knowledge regarding how the species disperses after a colony declines and what effects this has, if any, on the Great Lakes population. Such information would lend insight into prioritizing the location of future habitat creation projects and management to mitigate the loss of colonies and reach population goals.

Common Tern *(Sterna hirundo)*

Greg Norwood

Status: *State Threatened*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	27	1.42%	16	0.83%
Probable	9	0.47%	13	0.67%
Confirmed	28	1.48%	28	1.45%
Total Breeding	64	3.38%	57	2.96%

Data presented by Township/Range

0 30 60 120 Miles

Forster's Tern *(Sterna forsteri)*

William C. Scharf

Status: *State Threatened*



Jerry Jourdan ©

A small tern seen in a marsh that physically resembles the Common Tern but with a lower more rasping voice, white body, silvery white primaries and all white tail, is likely a Forster's Tern. This species is found only in North America, where it nests in marshes of the Atlantic, Pacific and Gulf coasts, with some populations limited to prairie rivers and marshes, and in Great Lakes marshes (McNicholl et al. 2001). They depend on dense vegetation with floating mats adjacent to open water. This habitat is often ephemeral and subject to shifts in winds, waves, water levels and human intrusions.

Distribution

Michigan nesting of this species has been historically limited to marshes around Saginaw Bay and in Lake St. Clair at the delta of the St. Clair River (Kenaga, 1957, Scharf and Shugart 1984, Best 1998). An occasional nest has been reported and verified in the eastern UP from the inland lake on Bois Blanc Island (Scharf 1991) and from the Lake Erie marshes (MBBA I and MBBA II). Atlas observers in MBBA II confirmed nesting in nine townships, compared with ten for MBBA I. A new nesting area was located during MBBA II, along Lake Erie. This compares to eight nesting sites in Saginaw Bay, and eighteen nesting sites in Lake St Clair in 1991 (Scharf 1991). The 1991 record number of colonies was an increase from three sites in Saginaw Bay and eight in Lake St. Clair in 1982 (Scharf and Shugart 1984).

Breeding Biology

Terns begin their nesting cycle in late April or early May (Mossman 1988). The 1982 census in the first week of June showed that of the 850 nests found, 67% had nests with complete three egg clutches (Scharf and Shugart 1984). The species is thought to be single brooded, but will re-nest if the first nest is destroyed. The later that Forster's terns nest, or if they lay replacement clutches (McNicholl 2001), the more vulnerable they become to Black-crowned Night-Heron predation (Best 1998). Fledglings and adults begin to disperse southward in late July (Kenaga 1957).

Nesting of Forster's Terns takes place in marshes on floating rootstocks, muskrat houses, and mats of floating dead reeds pushed up by ice from the previous winter (Scharf and Shugart 1984). A departure from normal habitat was found at the vegetated interface of impounded water and dredged material at the Saginaw Bay confined disposal facility, but this situation is ephemeral and leaves the terns vulnerable to the Black-crowned Night-Herons which also nest in close proximity (Scharf 1991).

Forster's Terns feed on small 1-10 cm (½-4 inches) fish and some arthropods (McNicholl 2001). They usually capture prey fish in clear, shallow water < 1 m deep and plunges are typically shallow (McNicholl 1971). They often drop fish prey from a height of 20 m and re-catch them at 10 m, and may repeat the behavior 3-4 times (Salt and Willard 1971).

Abundance and Population Trends

When analyzing breeding data, the number of nests is more meaningful than the number of colonies cataloged above. In 1982 there were 850 Forster's Tern nests counted by Scharf and Shugart (1984). In 1991, there were 1470 nests – a 73% increase (Scharf 1991). However, more recently, in over a decade of work on Saginaw Bay, Best (1998) found dwindling numbers of Forster's Terns, but had over 100 nests at three sites in the last year of his study. A survey by Cuthbert et al. (2003) of the entire Michigan Great Lakes from 1997-1999 found 1172 Forster's Tern nests – a 20% decline from the 1991 number.

It is likely that the number of nests of this species varies with the available habitat, and the intensity of search. This fluctuation in numbers is coupled with shifting tern populations between Michigan and Canadian portions of Lake Huron, Lake St. Clair, the Detroit River and Lake Erie where wetlands support populations of this species (Cadman et al. 2007). The result of a bi-national effort (including Michigan, Ontario and Wisconsin) to census Forster's Terns in 1991 was 3030 nests (Scharf et al. 1993). There are indications that recent population fluctuations from permanent alteration of habitat and growing human disturbance have resulted in fewer nests of this species (Best 1998).

Conservation Needs

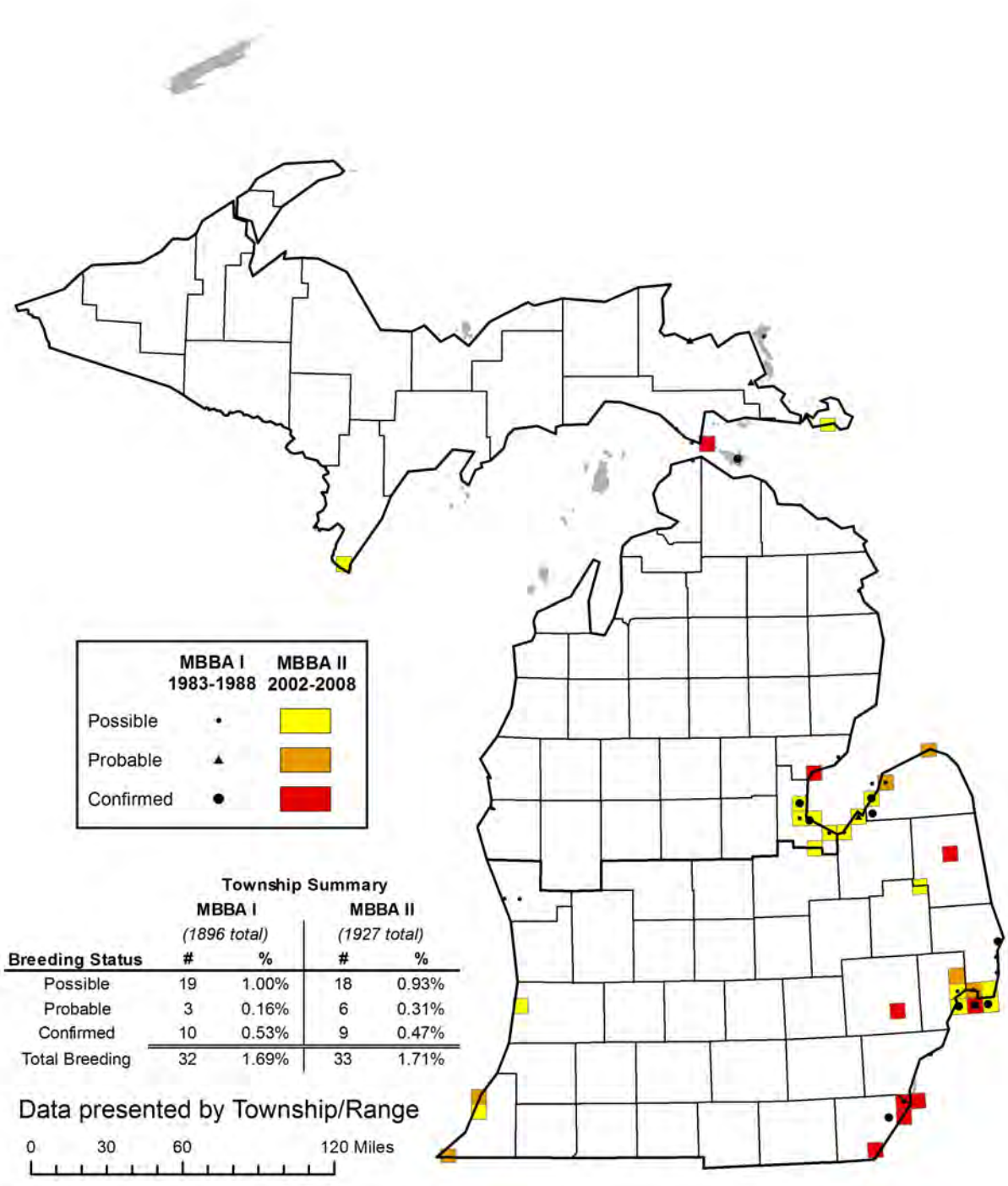
Monitoring surveys should be both aerial and water-based. That method was used by Scharf and Shugart (1984), Scharf (1991), and Cuthbert et al. (2003) who observed from a floatplane and landed to count individual nests. Human disturbances arise from power boaters and jet skis, that cause reproductive failure by keeping birds off the nest while incubating eggs or brooding young (MBBA I). The boats also tend to break up nesting mats and swamp nests with their wakes. Best (1998) mentions nest desertion caused by fishermen on a nearby shore, but Mossman (1989) has observed habituation to fishermen. Marsh vegetation needs all the protection and enforcement the law affords for conservation of this species. Residential and commercial developments have intruded on marsh habitat with vegetation clearing and dredging for water access.

Forster's Tern *(Sterna forsteri)*

William C. Scharf

Status: *State Threatened*

Artificial nesting platforms have been tried in Wisconsin to take the place of absent floating vegetation (Mossman 1989). Experience has shown that such platforms can attract nesters, but need to be built in a way that lets chicks exit and enter back on the platform with ease (pers. obs.). One of the worst threats to Forster's Tern is persistent toxic chemicals in the food chain (Harris et al. 1993, Best 1998). This threat causes severe reproductive impairment, lengthened incubation periods, abnormal embryos, and reduced hatching (McNicholl 2001).



Rock Pigeon *(Columba livia)* ***KTC***



Jerry Jourdan ©

An abundant species, the Rock Pigeon is familiar to all residents of Michigan in their gregarious flocks that have adapted to coexist with man. First domesticated around 4500 BC in the Mediterranean (Link 2004), the Rock Pigeon has accompanied European explorers and settlers around the globe both as a food source and a means of communication. Their value for both food and recreation is hinted at through the retention of the term "clay pigeon" for the targets used to replace live birds in the mid-1800s at trapshooting events (Ammer 1997).

Distribution

Native to the Old World, the Rock Pigeon was introduced to North America by early settlers who often kept domesticated birds. Early records of domesticated Rock Pigeons in Michigan date from the founding of Detroit where the inventory of Cadillac's estate in 1711 included a dovecote (Schorger 1952). Little is known of the actual establishment of the Rock Pigeon as a naturalized species in Michigan since few natural histories acknowledged the species until very recently; this is probably due to its domesticated status and the likelihood that releases of birds were accidental and sporadic.

Rock Pigeons can be found in Michigan wherever man has settled and built structures that simulate their natural cliff habitat. While they are ubiquitous in urban environments, making use of tall buildings for nesting, they are also found using small alcoves typical of suburban and agricultural structures. The distribution of the Rock Pigeon in Michigan is little changed from MBBA I.

Breeding Biology

Nesting occurs primarily from late winter through early fall but may take place year-round in suitable areas of the SLP (McPeek 1994). Pairs are monogamous and generally lay two to three clutches of two eggs annually, but relatively low survival rates (20-45%) for hatchlings are typical of the species across the U.S. (Johnston 1992). Nests are generally built on sheltered ledges, with bridges, industrial installations, and open agricultural structures replacing more natural cliff ledges and rocky fissures as nesting habitat across most of Michigan (Eastman 1991).

Abundance and Population Trends

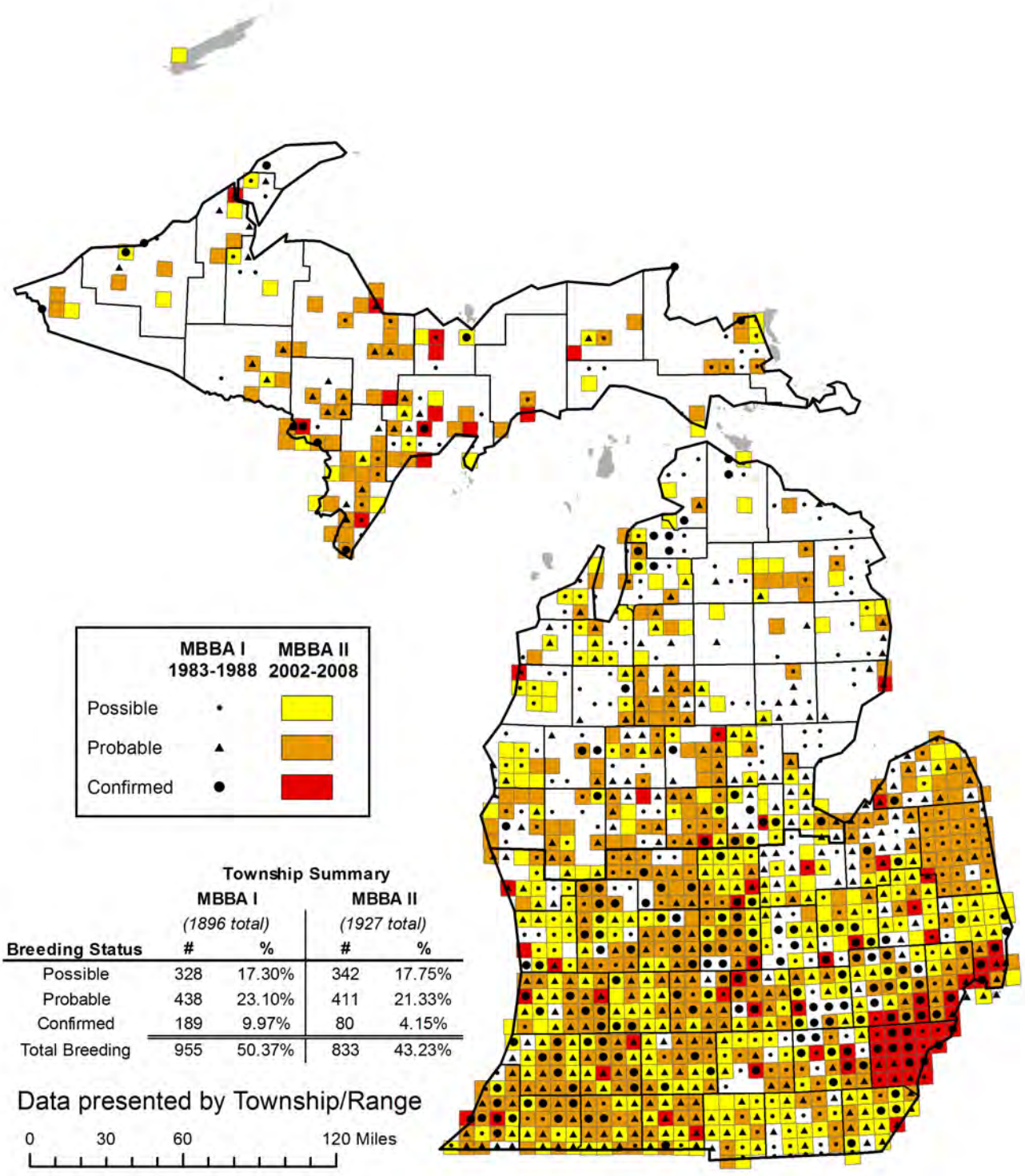
The Rock Pigeon is a common resident in urban and suburban areas as documented in both MBBA I and MBBA II. However, long term population trends documented in the BBS indicate declining numbers of Rock Pigeons in Michigan since 1980. This may be the result of a number of factors including changing land use patterns as agricultural land has been converted for development or succeeded to forest, increasing densities of urban and suburban predators including the Cooper's Hawk, and the development of additional pigeon control techniques.

Conservation Needs

While the Rock Pigeon is a well established non-native species, no organized efforts have been undertaken to eliminate the Rock Pigeon from Michigan. This is in contrast to the bounties enacted in state law for the House Sparrow and European Starling in an effort to eradicate these species from Michigan (Public Act 4 of 1885) and is likely a result of the domesticated status of the Rock Pigeon. Since 1893, laws have been in place in Michigan to protect homing and racing pigeons (Public Act 105 of 1983, Public Act 269 of 1925, Public Act 451 of 1994). Pigeon keeping and racing continues to be a popular activity with at least 45 pigeon racing clubs in Michigan as of 2009.

The success of the Rock Pigeon has led to conflicts in some locations where significant numbers of birds roost and actual or perceived risks to human health or safety exist. Given the current abundance and productivity of the species, control activities are unlikely to have an effect at anything greater than a local level. The most common methods of removal include lethal control using either pesticides or traps and the use of nonlethal pesticides to reduce productivity. Nonlethal exclusion practices meet with varying levels of success depending on the technique used and ability to fully exclude all access. Populations have not been significantly reduced by increasing populations of urban Peregrine Falcons, but the combined predation pressure of common urban and suburban predators such as cats and Cooper's Hawks may be important.

Rock Pigeon *(Columba livia)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	328	17.30%	342	17.75%
Probable	438	23.10%	411	21.33%
Confirmed	189	9.97%	80	4.15%
Total Breeding	955	50.37%	833	43.23%

Data presented by Township/Range

0 30 60 120 Miles

Eurasian Collared-Dove *(Streptopelia decaocto)*

Allen T. Chartier

Status: *Casual (MBRC)*



Robert Epstein ©

A relatively new addition to the avifauna of Michigan and North America, the Eurasian Collared-Dove is destined to become the next abundant and ubiquitous alien species in the coming decades.

Distribution

The Eurasian Collared-Dove was originally native to India and Sri Lanka east to Myanmar (Romagosa 2002). During the 1600s, it expanded its range northwestward to the Middle East and Mediterranean. During the 1900s, this species expanded its range northwestward into Europe, becoming common throughout in a few decades. Introductions in Japan and Korea have resulted in an expansion across northern China westward (Gibbs et al. 2001, Romagosa 2002). It has not yet expanded into northern and northeastern Asia. In the mid-1970s the species was introduced into the Bahamas and it has been spreading northwestward, mirroring its European expansion, quickly establishing itself throughout Florida after the first verified record there in 1986 (though it probably reached there by the late 1970s). It had reached as far northwest as Montana by 1997, Saskatchewan by 1999 (Romagosa and McEneaney 1999, Romagosa 2002), and southeastern Alaska by 2006 and 2007 (Gibson et al. 2008). It is still extremely rare in the eastern Great Lakes, New England, and the Canadian Maritimes, mirroring the expansion pattern in the Old World.

Breeding Biology

The breeding biology of the Eurasian Collared-Dove has been little studied in North America. Romagosa (2000) provides the most complete summary of the courtship, breeding habitat and nesting, combining information from European and American sources. Males engage in courtship flights, climbing steeply with wings clapping, followed by a spiraling descent. The typical vocalization given in defense of breeding territory and to attract mates is a three-syllable, repeated *"koo-KOO-kook"*. Breeding density in Europe ranges from one pair per hectare in sparsely populated areas up to 10-20 pairs per hectare in its preferred habitat of suburban, urban, and agricultural areas. Nests are usually built in trees or shrubs but sometimes on buildings, and consist of a flimsy platform of twigs, stems, roots, and grasses. Usually two eggs are laid mainly from February to May in Florida, probably during May and June in northern regions. Incubation begins once the second egg is laid and lasts about 15 days. Young fledge at about 18 days of age.

Abundance and Population Trends

During the MBBA I period, Eurasian Collared-Doves had just barely colonized Florida. In our region, Ontario has had fewer than ten records since the first in 1993, with two breeding season records consisting of one calling in suitable habitat in 2002 and another male in courtship display (no mate found) in 2003 (Cadman et al. 2007). Ohio's first breeding bird atlas did not report this species (Peterjohn and Rice 1991). Since then, the state has documented the presence of Eurasian Collared-Dove seven times between 2001-2008, including at least one over summer (i.e., 21 April to 22 August 2008) though breeding has not yet been confirmed (Harlan 2008). Before 2007, Ohio only had two accepted records; Crawford Co. on 1 Sep 2001 and Licking Co. on 15 Apr – 28 May 2006. In 2007, there were reports of multiple birds from Williams, Darke, Preble, Butler, and Mercer Counties including birds observed copulating (Whan 2007a).Breeding was confirmed when a juvenile was seen with adults on 27 Sep 2007 in West Manchester, Preble County (Whan 2007b, 2007a).

The first Indiana Breeding Bird Atlas did not report this species (Castrale et al. 1998). The state's first arrival was documented with one individual in Newton County in late June 1999 and three there in September 1999 (Jackson 2001, Gorney and Hedge 2001). The first confirmed Indiana nest was found containing a single egg on 13 April 2002 in Lebanon, Boone County. This nest failed and was collected. The birds built another nest, found on 7 May 2002 containing two eggs. Another nest with fledglings was found in Lawrence County on 28 June 2003 (Brock 2006). The Eurasian Collared-Dove has been considered to be locally rare but easily found at established breeding locations, and it has been removed from the state review list (Brock 2006, Indiana Audubon Society 2009). Through 2009, records had been confirmed for 30 mainly southern and western Indiana counties, with most consisting of one colony with a few to 40+ birds each (D. Gorney pers. comm.). The second Indiana Breeding Bird Atlas, begun in 2005, will surely continue to track the expansion of the species across the state.

The first arrival of Eurasian Collared-Dove in Illinois is obfuscated by the presence of birds, as well as possible hybrids, in Joliet as early as 1982 that were likely locally released (Romagosa and McEneaney 1999). The Illinois Breeding Bird Atlas did not report this species (Kleen et al. 2004). The first confirmed Illinois record was of a pair and a single bird from Carlyle Lake, Clinton County from 22

Eurasian Collared-Dove *(Streptopelia decaocto)* *Allen T. Chartier*

Status: *Casual (MBRC)*

December 1996 to 21 February 1997, with a single bird present to 8 March 1997, resulting in a failed nesting attempt (Johnson et al. 1998). In 1998, there were four unsuccessful nesting attempts at Lincoln Park, Chicago between April and 27 July, and 10 birds including young seen in Montgomery County on 22 June (Kleen 1999, Johnson and Stotz 1999). The species is no longer listed on the state's review list (IOS 2009), and occurs over most of the southern two-thirds of the state. Some large numbers are now being reported, for example 225 at Granite City, Madison County in summer 2007 (Bailey 2008) and a total of 462 statewide in 58 counties on the spring bird count on 10 May 2008 (Kleen 2008). Herkert (2008) reported an increase of 144.2% per year ($p < 0.05$) based on 15 Illinois BBS routes.

Wisconsin's first records were of one bird from 19 May to 27 June 1998 at West Bend, Ozaukee County (Soulen 1999) and a second bird from 26 July to 22 September 1998 in Portage County (Cutright et al. 1999; Domagalski 1999; Frank 1999a, 1999b; Polk 1999). The first confirmed breeding in the state was a nest found on a silo in Arlington, Columbia County on 15 May 2004, with an adult seen on the nest on 13 June 2004 (Harriman et al. 2004, Cutright et al. 2006). By 2009 the Eurasian Collared-Dove was considered to be an uncommon breeder, and was removed from the state records committee review list (Frank 2009, Mueller and Kowalchuk 2009).

Michigan's first record of Eurasian Collared-Dove occurred during the MBBA II period with two birds in Kalamazoo County from 13-24 June 2002 (Murphy 2003, Byrne 2004), providing evidence for possible breeding based on birds present in appropriate habitat during the breeding season. From at least 20 December 2003 through the end of the MBBA II period, four Eurasian Collared-Doves were present at Chums Corner south of Traverse City, Grand Traverse County. Up to eight individuals have been reported here but only four have been adequately documented and some may be hybrids with Ringed Turtle-Dove (Murphy 2004, Byrne 2005, Chu 2006, MBRC 2009). Apparently no definite pairs, nor persistently calling individuals have been noted, so the status of these birds is entered as possible, not probable.

The presence of Eurasian Collared-Doves over the course of 15 months from May 2005 to August 2006 in Berrien County has been well documented in the literature (Wuepper 2006, Murphy 2006, Reinoehl 2006, Chu 2006, Dombroski 2007a, 2007b). But details of the first and only confirmed breeding records in the state from this locale were not published. The original finder of these birds (K. Miller, pers. comm.) has kindly provided the following details of these breeding efforts. On 15 May 2005, Miller found two birds carrying nesting material into a conifer in a small city park in Three Oaks, Berrien County. Although numerous birders came to see these birds through the summer and fall, the outcome of this nest is unknown. They attempted to breed again in summer 2006 when an individual was seen by several observers on 20 May sitting on a nest in a conifer on private property just south of the 2005 sighting. The reported presence of five individuals there in June 2006 (not reviewed by MBRC) suggested successful breeding to Miller, and the birds remained in the area until 10 August 2006.

It is unclear if individuals recorded from 28 August to 6 September 2005 at Grand Marais, Alger County (Wuepper 2006, Putnam 2007), and 24 May 2009 in Mason County (MBRC 2009) represent potential new breeding areas or wandering individuals. No other Michigan records are known at this time, but undoubtedly the number of records will eventually increase. This species should be thoroughly documented, preferably with good photos as well as written description, whenever it is encountered in the state as a number of hybrids continue to be found in Michigan.

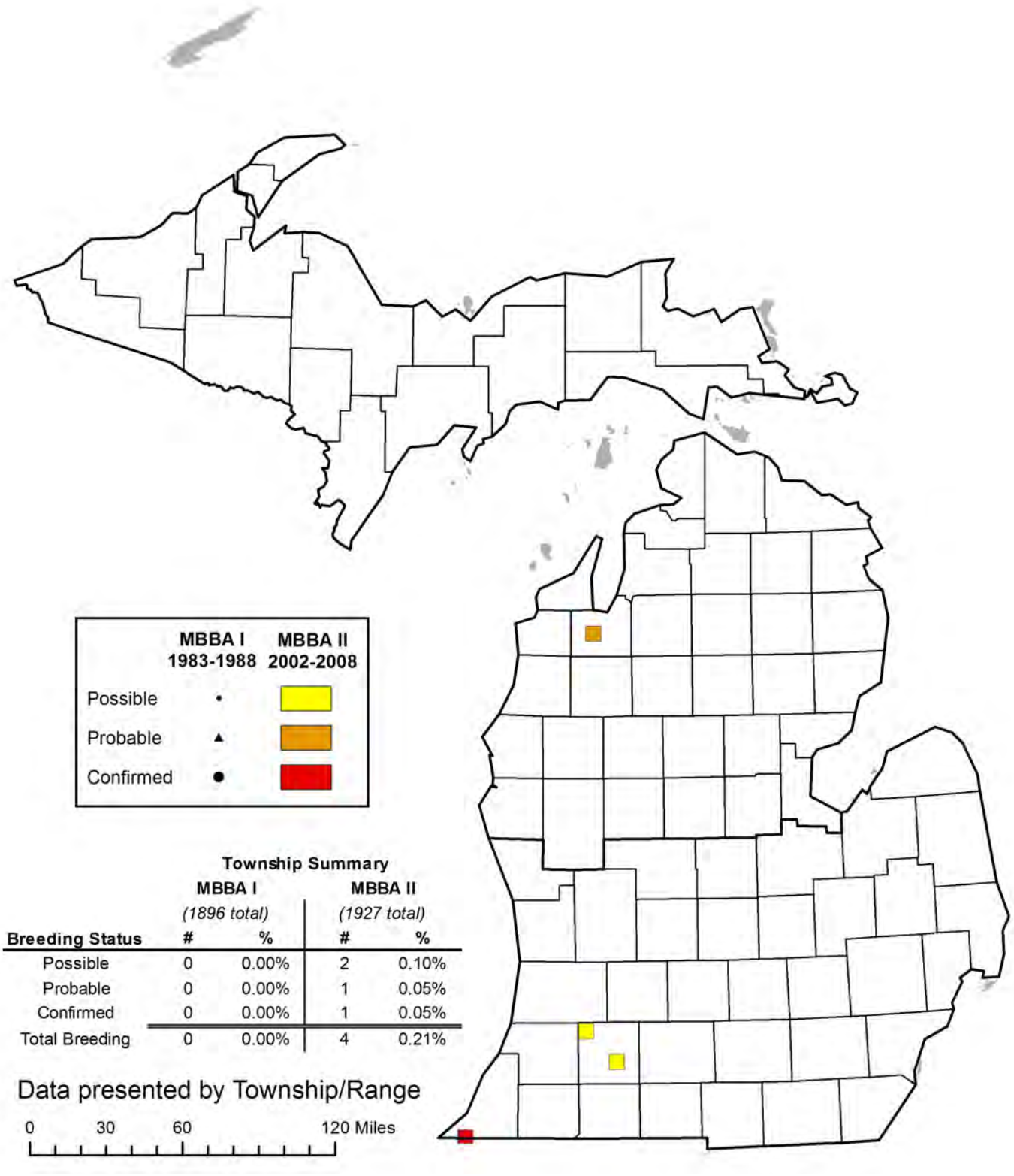
Conservation Needs

It is unclear how the Eurasian Collared-Dove will impact native wildlife in North America as it has been on the continent less than four decades. It has been observed chasing other birds including Mourning Doves, Northern Cardinals, Painted Buntings, and Blue Jays away from feeders in Florida while they have been noted as prey items of several raptor species (Romagosa and McEneaney 1999). The Eurasian Collared-Dove will likely remain scarce in Michigan and the northeastern U.S. for some time, if it follows the same expansion pattern evident in Europe and Asia, but it will almost certainly become more common in the coming decades.

Eurasian Collared-Dove *(Streptopelia decaocto)*

Allen T. Chartier

Status: *Casual (MBRC)*



Mourning Dove *(Zenaida macroura)*

Skye Christopher G. Haas



Alice Van Zoeren ©
Species sponsored in honor of: Ditty Harrington

The Mourning Dove is a common sight throughout Michigan in a wide variety of both urban and rural habitats due to its abilities as a habitat generalist. The species is found in nearly every type of habitat available, though extensive mature forests are typically avoided. This species has spent much of the 20th Century expanding northward, as many other species of Columbids have also done. The range of the Mourning Dove is extensive and is uniform across Mexico, The United States, and southern Canada. Its namesake mournful cooing is one of the most recognizable dawn sounds around our homes and neighborhoods. Even though the dove's dirge-like song conveys sadness for some, many others find that it lauds the ending of winter, as the Mourning Dove will often initiate its breeding cycle in early spring, weeks before many migrants have returned north.

Distribution

One of the most obvious changes in the status of the Mourning Dove in Michigan is its shift in the last 150 years from a summer resident to permanent resident in most of the state, as well as its complete colonization of the entire state. Birds withdraw from more northerly portions of the range in winter, with banding recoveries documenting migrations taking them hundreds of miles south in some cases (Otis et al. 2008), while in southern Michigan they may move shorter distances (Carpenter and Carpenter 1995). While found breeding in the extreme SLP in 1885, it was only occasionally found during the winter period (Gibbs 1885). Barrows (1912) found it to be a common summer resident in the SLP north to Saginaw with it occurring in small numbers during the winter season. Sightings north of the tension line were sporadic, but there were numerous records, even for the UP (Barrows 1912). By the 1950s, the species had become locally common in the NLP with scattered sightings in the UP, but Zimmerman and Van Tyne (1959) remarked that there still was no breeding record north of the Mackinaw Straits. This was further supported by Dodge (1961), who stated that there was no breeding record for the UP, though Binford (2006) felt that this was more a reflection of the scarcity of birders in the region. By MBBA I, breeding Mourning Doves had colonized portions of the UP, with breeding confirmations mostly confined to agricultural lands in the south-central and far eastern regions. Residential areas along the Superior basin also had begun to be colonized, with confirmed breeding in both Marquette and Sault Ste. Marie. Notable was a post-MBBA I breeding confirmation of a bird on a nest on the surprisingly early date of 26 Feb 1998 in L'Anse, Baraga County, with the young fledging on 3 April (Youngman 1999), marking the first breeding confirmation for the Keweenaw Peninsula. With the ending of MBBA II field work, the distribution has changed yet again, with Mourning Doves found breeding in every corner of Michigan and breeding confirmations from nine UP counties, including Keweenaw. A notable 10% increase in the proportion of townships where Mourning Doves were recorded has occurred, with MBBA I results showing birds in 76% of all townships, while 86% of all townships recorded birds in MBBA II. The most notable increase was in the UP, where the percentage of townships recording doves nearly doubled, from 36% to an impressive 68%. There was virtually no change in the percentage of townships occupied in the NLP and even a slight decrease in the SLP, from 98% to 96% of all townships. Atlas efforts in New York showed that Mourning Doves used roads and highways to infiltrate heavily wooded areas (McGowan 2008). This may explain some of the gaps found in Baraga, Luce and Marquette Counties in regions still largely lacking paved roads and residential communities. A post-MBBA II confirmation came from Newberry in Luce County in 2010 (pers. obs.).

Breeding Biology

Across the U.S., the breeding biology of the Mourning Dove is quite peculiar and rather than falling within the more traditional breeding season, nesting is typically initiated in late winter, though nests have been found in all months of the year (Otis et al. 2008). However, in Michigan broods are commonly found from March to September (KNC 2004). Due to several adaptations of the species, multiple broods per year are possible, and only 30 days are needed between the initiation of a successful clutch and the beginning of a subsequent clutch. The nest is one of the more poorly constructed among Michigan's avifauna, consisting of a simple platform made of sticks, twigs and grasses. Clutch size is small, with only two eggs laid; reports of more are likely attributed to nest dumping by other females (Otis et al. 2008). Both parents incubate, and incubation lasts for 14 days. Young are altricial, but grow rapidly with fledging occurring typically within 13-15 days, sometimes earlier. Adults may renew the nesting cycle even while still feeding fledged young (Otis et al. 2008).

Mourning Dove *(Zenaida macroura)*

Skye Christopher G. Haas

Abundance and Population Trends

Certainly one of our most abundant and successful species, Partners in Flight estimates the population of Mourning Doves in Michigan to be around 1.5 million birds (PIF 2007). Recent totals from the 2008-2009 CBC season recorded Mourning Dove as the eighth most numerous species with 25,935 individuals counted (Trapp and Palmgren 2010). It is likely that regional population increases, particularly during the winter periods, are a result of bird-feeding stations, as well as grain farms (Binford 2006, Otis et. al 2008). In addition to Michigan, Mourning Doves are considered to be abundant across the U.S., with a national population estimated to be 350 million birds (Otis et al. 2008). Mourning Doves ranked second in occurrence on national BBS routes, and eleventh in relative abundance among 251 bird species analyzed (Droege and Sauer 1990). Mourning Doves increased an average of 1.5% per year from 1983-2007 in Michigan, a rate slightly higher than in other Great Lakes States (Sauer et al. 2008).

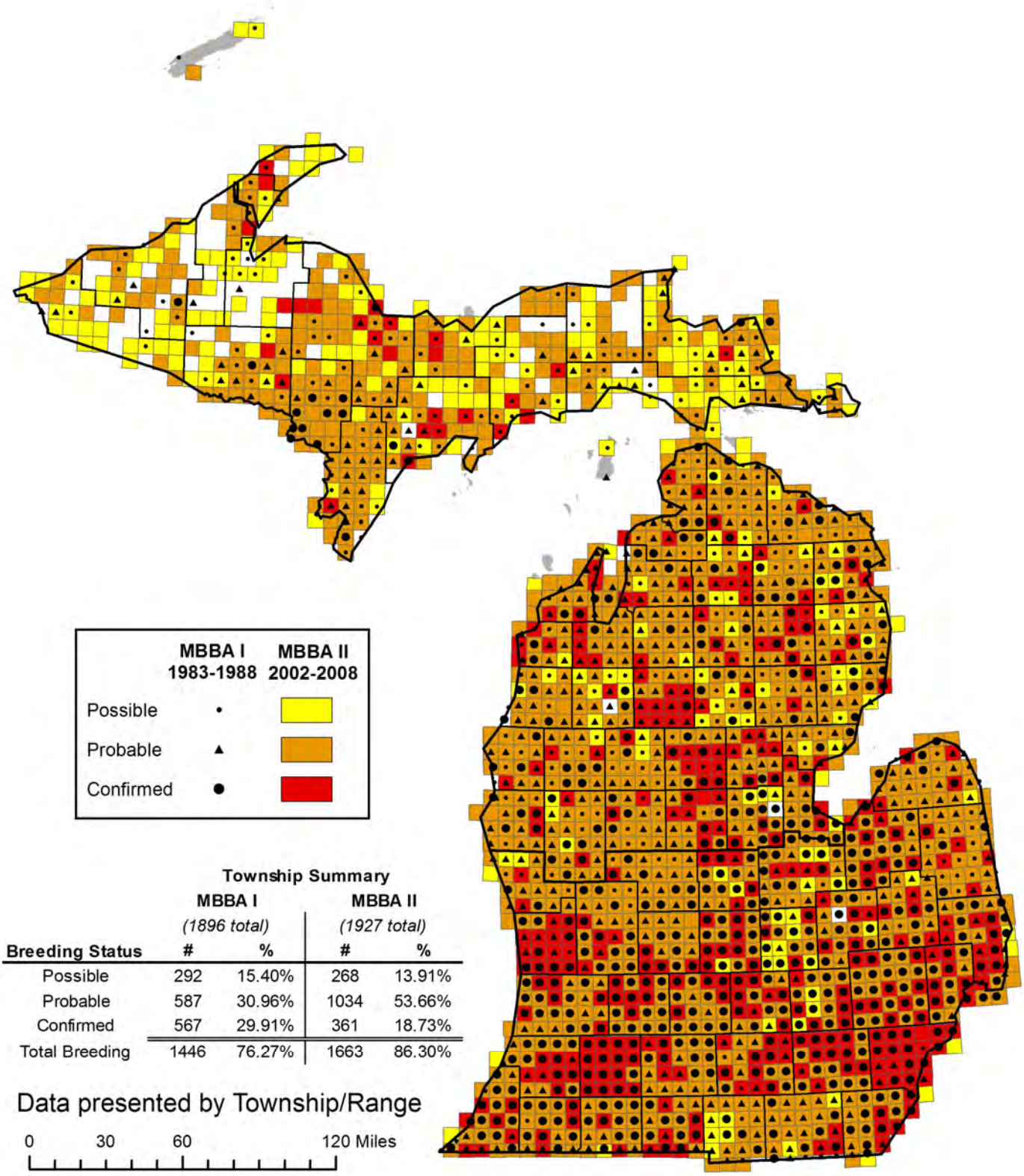
Other atlas efforts in the Great Lakes have shown similar results of Mourning Dove populations all exponentially increasing from pre-settlement times to becoming one of the most abundant species in the region. Ontario has shown a population increase at the approximate rate of 13% annually from 1977 to 2001, and BBS data showing almost a three-fold increase in abundance since the 1980s (Armstrong 2007). Wisconsin BBS data has shown a 1.1% annual increase in populations over the last 37 years, and the population is considered to be stable (Warnke 2006). New York also showed a significant increase in population with BBS data showing an annual 2.6% increase since 1960 (McGowan 2008). States from the southern Great Lakes region have not shown such increases, rather BBS data from Ohio, Indiana and Illinois all show stable populations indicating that carrying capacity for these populations was reached in the 20th Century (Peterjohn and Rice 1991, Castrale and Keller 1998, Kleen 2004).

Conservation Needs

There is little reason for concern about the future of Mourning Doves in Michigan. It has successfully colonized the entire state, and numbers may continue to grow as there are still regions in the northern portions of Michigan that could support more birds. The Mourning Dove is a popular game bird in much of North America, and is the leading species in terms of total harvest and distribution of hunting effort (Otis et al. 2008). It is not currently hunted in Michigan. Currently, all management needs for this species relate to the need to monitor harvest management strategies with more generalized population surveys. There has been some speculation about effects of the growing Eurasian Collared-Dove population on Mourning Doves (Romagosa 2002), but that species' colonization of the U.S. has been so rapid and recent that studies have not yet been conducted. Currently, Eurasian Collared-Doves are considered primarily as a vagrant to Michigan with only one consistently occupied breeding colony in the NLP (MBRC 2010). It will be interesting to see how these two species interact in the coming years. As long as the climate continues to grow milder during the winters, and the popularity of feeding birds does not dwindle, Mourning Doves should be a regular and abundant resident of the State for many years to come.

Mourning Dove *(Zenaida macroura)*

Skye Christopher G. Haas



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	292	15.40%	268	13.91%
Probable	587	30.96%	1034	53.66%
Confirmed	567	29.91%	361	18.73%
Total Breeding	1446	76.27%	1663	86.30%

Yellow-billed Cuckoo *(Coccyzus americanus)* ***Torrey Wenger***



Willie McHale ©
Species sponsored in memory of: Peter Wolfe,
by Joan & Willard Wolfe

The dapper Yellow-billed Cuckoo suffers from a public image problem. First, it's reclusive and shy, often "freezing" when an observer is nearby. Second, it is often painted with the same brush as its Old World cousin, the European Cuckoo. While the Yellow-billed Cuckoo will occasionally leave an egg in another bird's nest, the female most commonly builds her own nest and incubates her own eggs (Hughes 1999). In addition, birdwatchers easily confuse it with the Black-billed Cuckoo. The Yellow-billed Cuckoo is a fascinating bird that deserves droves of fans.

Distribution
The Yellow-billed Cuckoo can be found in the eastern two-thirds of the United States with scattered populations west to the Pacific and north into Canada. In the West, it is restricted to riparian corridors. Cuckoos spend the winter in South America, migrating primarily at night. They arrive on the breeding grounds late and leave early (Hughes 1999).

The Yellow-billed Cuckoo's distribution across Michigan has remained stable and even increased slightly compared to the first Atlas in the 1980s. The map is virtually unchanged, especially in the SLP. The cuckoo was present and possibly breeding in 35% of townships, compared to 31% during MBBA I. All three sections of the state showed slight increases, with the smallest difference in the UP. Yellow-billed Cuckoos become less common in the northern reaches of the state.

A confounding factor is the similarity of Yellow-billed and Black-billed Cuckoos in voice and even appearance (Sandilands 2007a, 2007b, Peterjohn and Rice 1991, Keller 1998). While questionable records were verified, most cuckoo observations were accepted as submitted.

Breeding Biology
A typical cuckoo nest is well-concealed and contains up to five (typically only two or three) pale blue-green eggs. Each egg is about 14% of the mass of the female, representing a third or more of her daily energy intake (Hughes 1999). Incubation takes nine to 11 days. The altricial nestlings are extremely robust and can perch at two days old (Hughes 1999). On day seven, the pin feathers burst open and within two hours the nestling is fully feathered; it will leave the nest the following day, although it will not be able to fly until it is 21 days old (Hughes 1999).

Timing of the nesting attempt is dependent on local prey availability. In Michigan, two broods are possible. Nests often contain eggs and young at various stages of development. One adult will attend the first fledged young, leaving the second adult with the remaining nestlings (Hughes 1999).

Nest parasitism is apparently rare. Females may lay eggs in the nests of other Yellow-billed Cuckoos during years of high food abundance but rarely lay eggs in the nests of other birds. The most common interspecific host is the Black-billed Cuckoo (Hughes 1999). Black-billed Cuckoos also occasionally lay eggs in Yellow-billed Cuckoo nests.

Abundance and Population Trends
Yellow-billed Cuckoo populations have declined nationwide and regionally (Sauer et al. 2008). Western states like California and Nevada are in danger of losing their cuckoos or have already lost them (Hughes 1999, McKernan and Braden 2001). Michigan seems to be gaining cuckoos, although the BBS data do not yield any significant trends (Sauer et al. 2008).

Fewer breeding attempts were confirmed during MBBA II as compared to MBBA I. This may not be indicative of a decrease in nesting attempts or lower nesting success. More emphasis was placed on documenting all the species present in the survey area than on finding an active nest in MBBA II (KNC 2004).

Cuckoos are adapted to exploit insect outbreaks, including those of hairy caterpillars unpalatable to most other birds (Hughes 1999). Cuckoo numbers are strongly influenced by local prey abundance (Hughes 1999). An area with a caterpillar outbreak may support dozens of cuckoos one year and have only a few birds the next. During the Atlas period (2002-2008), the number of Yellow-billed Cuckoo observations as a percentage of all bird observations ranged between 0.17 and 0.50. A long-term study at Fort Custer Training Center (FCTC) near Battle Creek shows a similar erratic pattern, with the proportion of Yellow-billed Cuckoos ranging from 0.27% in 1999 to 1.0% in 2008 (Miller et al. 2008, 2009).

However, the patterns do not match; the population changes at FCTC do not reflect those of the population state-wide. Since insect outbreaks are local, affecting only portions of the state at a time, cuckoo population increases will be local as well. It cannot be ruled out that these apparent increases are primarily a redistribution of the population into areas with more food resources (Eastman 1991).

Conservation Needs
More research is needed on nearly every aspect of the cuckoo's life history. Very little is known about the Yellow-billed Cuckoo as they do not lend themselves to study. The young leave the nest at nine days old and the degree of

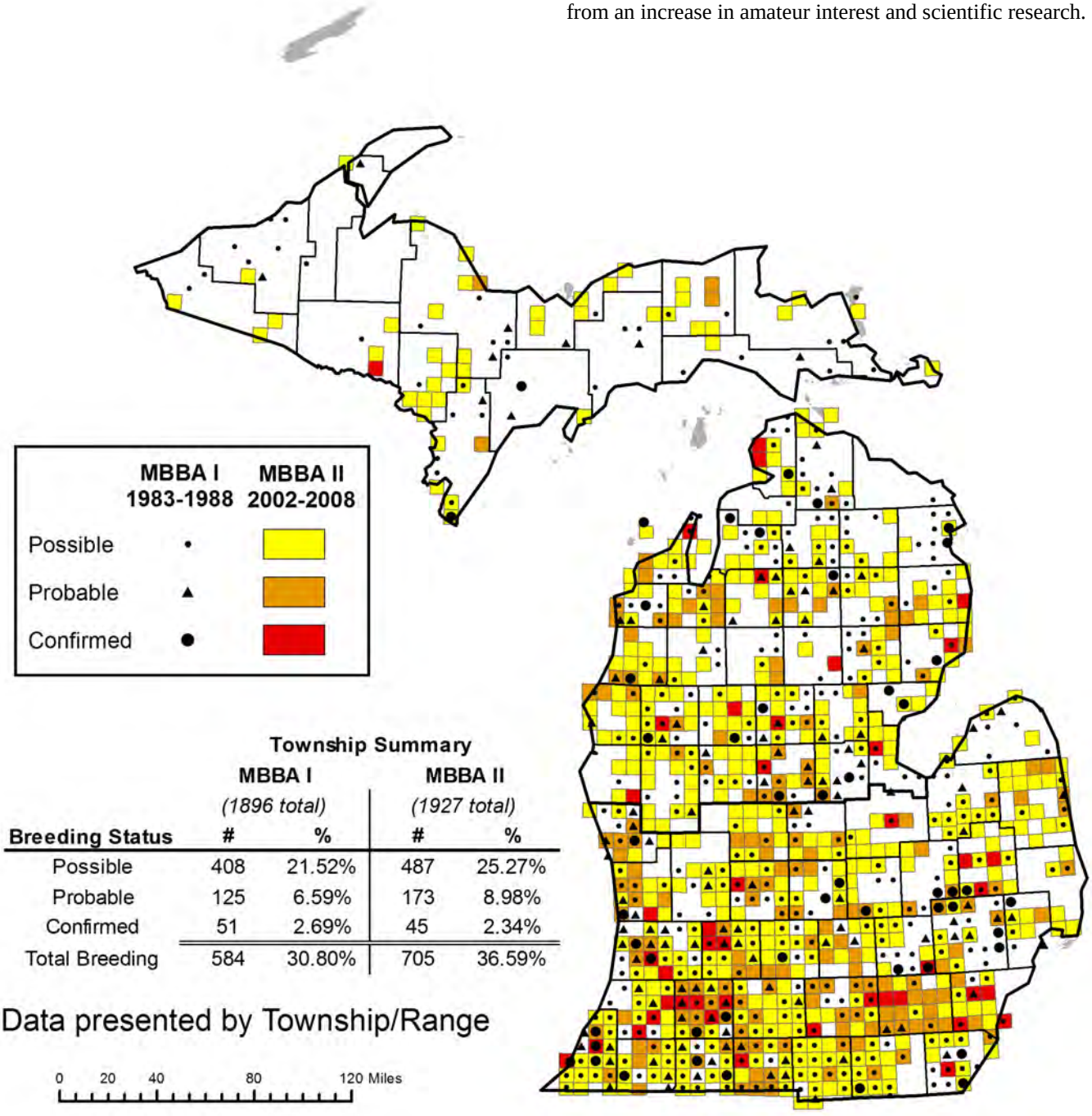
Yellow-billed Cuckoo *(Coccyzus americanus)*

Torrey Wenger

parental care required until they are fully independent is not known. Adults wander prior to establishing breeding territories; population structure and dynamics are poorly understood. This bird prefers open forests and clearings with dense undergrowth. In the West, it is restricted to riparian corridors but it uses a greater variety of habitats in the East. Laymon and Halterman (1989) found that habitat loss was the largest cause of population decline in California and western Arizona: Are Western/ riparian management recommendations applicable to Michigan and the Great Lakes states?

Several issues are tied into dietary needs. As an insectivore, the Yellow-billed Cuckoo is vulnerable to sublethal and sometimes lethal effects of pesticides (Hughes 1999). When caterpillar outbreaks are controlled chemically, this decreases the food available to cuckoos; the importance of outbreak-induced population increases for long-term population growth is unknown. Insect emergence is cued by temperature; the migratory cues for the cuckoo are not known but, as in other Neotropical migrants, are likely to include day length. Warming trends mean that cuckoo arrival could become mis-timed to insect emergence, thus creating a decrease in food available.

Yellow-billed Cuckoos are fascinating birds that will benefit from an increase in amateur interest and scientific research.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	408	21.52%	487	25.27%
Probable	125	6.59%	173	8.98%
Confirmed	51	2.69%	45	2.34%
Total Breeding	584	30.80%	705	36.59%

Data presented by Township/Range

Black-billed Cuckoo *(Coccyzus erythropthalmus)* ***Torrey Wenger***



Jerry McHale ©

The Black-billed Cuckoo is a bird of mystery. It becomes somewhat nocturnal during the summer, singing and feeding at night and remaining relatively inactive during the day. A shy and secretive bird, it often "freezes" in the presence of observers. These behaviors make studying or even finding cuckoos difficult. Even more interestingly, this bird preys on fuzzy caterpillars that other species avoid, occasionally coughing up a pellet of indigestible spines and growing a new stomach lining (Hughes 2001). There are lots of reasons to admire the Black-billed Cuckoo.

Distribution

The Black-billed Cuckoo can be found in the eastern half of the United States, excluding the Southeast, and north into Canada with scattered populations west to the Pacific and along the Atlantic coast. Cuckoos travel to South America, moving primarily at night. It arrives on its breeding grounds late and leaves early (Hughes 2001).

Statewide, the Black-billed Cuckoo was reported in 17% fewer townships in the second Atlas period. The greatest decrease, a difference of 36%, came in the SLP. However, the cuckoo increased its presence in the UP, occurring in 21% more townships. Some but not all of this change may be due to differing levels of effort between the two Atlases: The UP was covered more thoroughly during MBBA II. A confounding factor is the similarity of Black-billed and Yellow-billed Cuckoos in voice and even appearance (Sandilands 2007a, 2007b, Peterjohn and Rice 1991, Keller 1998). While questionable records were verified, most cuckoo observations were accepted as submitted. Of the two cuckoos in Michigan, the Black-billed is the more northerly species.

Breeding Biology

A typical cuckoo nest is well-concealed and contains up to five (typically only two or three) pale blue-green eggs. Both parents incubate, and the young hatch in 10 to 11 days. The altricial nestlings are extremely robust with strong legs; they are able to cling to a branch and raise themselves up within three hours after hatching (Hughes 2001). On day seven, the pin feathers open and within 12 hours, the nestling is fully feathered; it may leave the nest that day, although it will not be able to fly until it is 21 days old (Hughes 2001).

Timing of the nesting attempt is dependent on local prey availability. Nests can contain eggs and young at various stages of development. Adults may divide the out-of-nest offspring between them (Hughes 2001). Second nest attempts have not been verified (Hughes 2001).

Unlike the Common Cuckoo of Europe, Black-billed Cuckoos are not obligate nest parasites. Nest parasitism is apparently rare. Females may lay eggs in the nests of other Black-billed Cuckoos during years of high food abundance but rarely lay eggs in the nests of other birds. The most common interspecific host is the Yellow-billed Cuckoo (Hughes 2001). Yellow-billed Cuckoos also occasionally lay eggs in Black-billed Cuckoo nests.

Abundance and Population Trends

Black-billed Cuckoo populations have declined nationwide and within the Great Lakes region; trend data for Michigan are negative but not significant (Sauer et al. 2008). This decline was readily apparent in MBBA data. Compared to the first Atlas in the 1980s, total observations were down 16% and confirmed nesting observations were down 64%. While the MBBA II protocol placed more emphasis on documenting all the species present in the survey area than on finding an active nest (Kalamazoo Nature Center 2004), this does not explain the decline: Confirmed nesting observations for the Yellow-billed Cuckoo, which has similar nesting habits, were down only 14%. However, while the Black-billed Cuckoo declined in the Lower Peninsula, it increased in the UP.

Cuckoos are adapted to exploit insect outbreaks, including those of periodic cicadas (Koenig and Liebhold 2005) and hairy caterpillars unpalatable to other birds (Hughes 2001). Additionally, cuckoo numbers are strongly influenced by local prey abundance (Hughes 2001, Gale et al. 2001). An area with a caterpillar outbreak may support dozens of cuckoos one year and have only a single bird the next. During the Atlas period, the number of Black-billed Cuckoo observations as a percentage of all bird observations remained fairly stable, ranging from 0.17 to 0.30 and averaging 0.27. A study in southwestern Michigan over the same period shows much more fluctuation, ranging from 0.02 to 0.21 and averaging 0.09. During 1997, this same study reported Black-billed Cuckoos as 0.68% of all birds observed but later values never reached half that (Miller et al. 2008, 2009), providing an indication of the cuckoo's possible decline in southern Michigan.

Conservation Needs

More research on nearly every aspect of the cuckoo's life history is needed. Little is known of the species' breeding behavior and territoriality, nest parasitism, fidelity to nesting territory, dispersal from natal territory, migratory behavior, or survivorship. The juvenile period, from the chick leaving the nest at seven days until its first flight at 21 days, is virtually unknown (Hughes 2001).

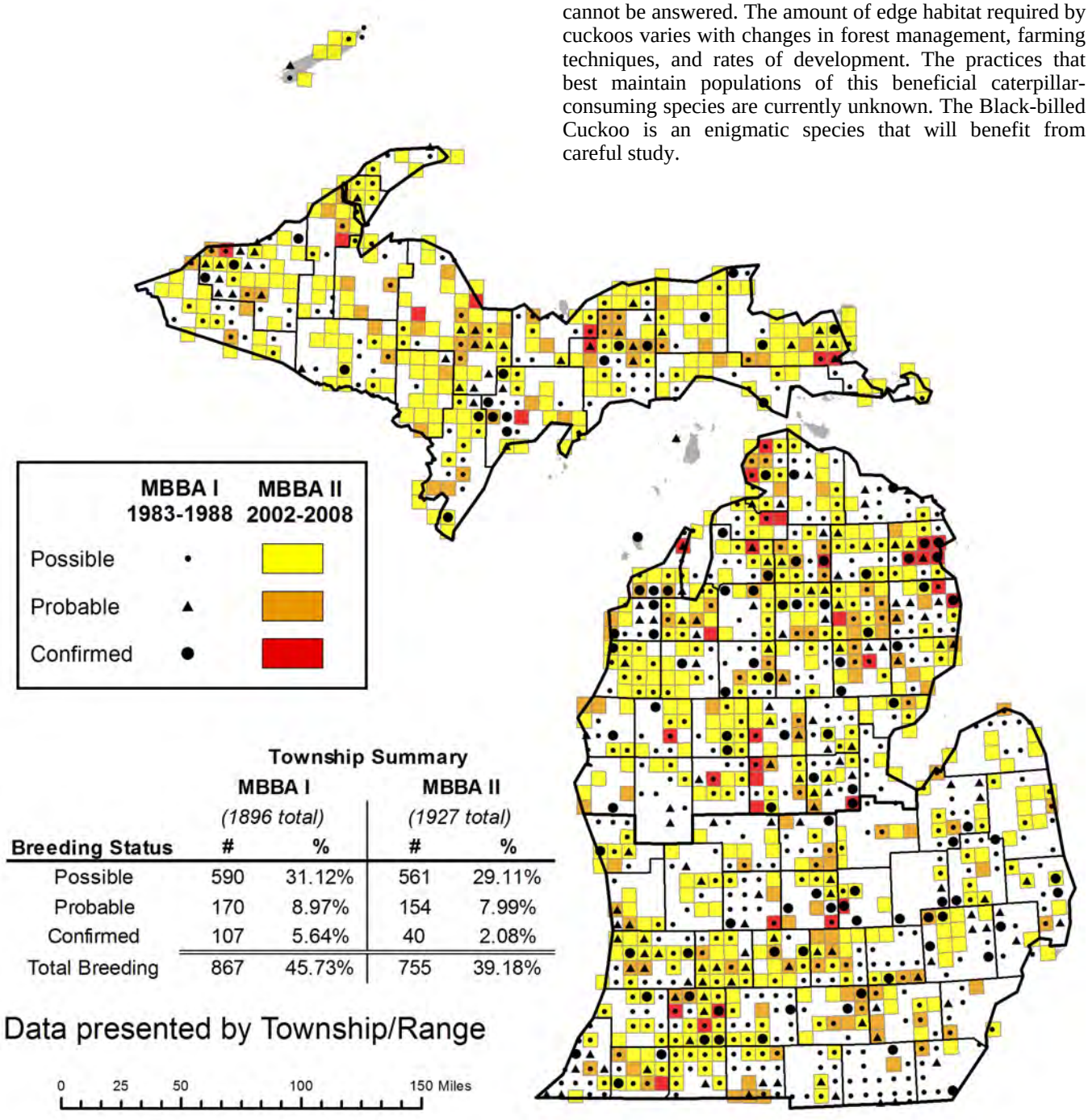
Black-billed Cuckoo *(Coccyzus erythropthalmus)*

Torrey Wenger

Partners in Flight (2007) lists the Black-billed Cuckoo as a species of Regional Concern and Regional Stewardship requiring management attention in the Prairie Hardwood Transition region (SLP) and planning and responsibility (a lower category) in the Boreal Hardwood Transition region (NLP and UP). The different management recommendations correspond to the changes documented by MBBA II.

Several issues are tied into dietary needs. As an insectivore, the Black-billed Cuckoo is vulnerable to sublethal and sometimes lethal effects of pesticides (Hughes 2001). When caterpillar outbreaks are controlled chemically, this decreases the food available to cuckoos; the importance of outbreak-induced population increases for long-term population growth is unknown. In addition, the migratory cues for the cuckoo are not known but, as in other Neotropical migrants, are likely to include day length (Berthold and Terrill 1991). As insect emergence is cued by temperature, warming trends mean that cuckoo arrival may no longer be timed to insect emergence, thus creating a decrease in available prey.

Studying such a reclusive species is challenging but necessary. Without research, questions about habitat requirements for nesting, foraging, stopover, and wintering cannot be answered. The amount of edge habitat required by cuckoos varies with changes in forest management, farming techniques, and rates of development. The practices that best maintain populations of this beneficial caterpillar-consuming species are currently unknown. The Black-billed Cuckoo is an enigmatic species that will benefit from careful study.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	590	31.12%	561	29.11%
Probable	170	8.97%	154	7.99%
Confirmed	107	5.64%	40	2.08%
Total Breeding	867	45.73%	755	39.18%

Data presented by Township/Range

Eastern Screech-Owl *(Megascops asio)*

Thomas Carpenter



Joe Soehnel ©
Species sponsored by: Delaina Wilkin

Unique among Michigan owls because of its two color morphs (red and gray), the Eastern Screech-Owl is a ubiquitous denizen of the small woodlots that typify the southern LP. As implied by its name, it occurs east of the Rocky Mountains north to southeast Saskatchewan, west central Montana and the southern borders of Quebec and Manitoba (Adam 1987). The southern portion of its range extends into northeast Mexico, and from west Texas east to the Atlantic Ocean (Gehlbach 1995). In Michigan, Eastern Screech-Owls are common in the southern LP and uncommon in the northern LP.

Distribution

Prior to European settlement, Eastern Screech-Owls were likely uncommon. As settlers cleared away the forest, the owls apparently flourished. They were considered abundant by the beginning of the 20th century (Barrows 1912) and likely peaked in numbers soon thereafter (Carpenter 1991, Peterjohn and Rice 1991).

MBBA I and MBBA II found Eastern Screech-Owls to be widespread in the southern LP, with a few records in the northern LP and no confirmed records for the UP. The absence from the UP is not surprising; the species reaches the edge of its range in the northern LP, where winter temperatures and snow depth apparently limit it. The ecological tension zone between the southern oak-hickory/beech-maple forest and the northern mixed coniferous forest also characterizes the northern boundary (Shea 2006).

Differences in distribution between MBBA I and MBBA II were minor. More townships had confirmed breeding during MBBA I. MBBA II established more records for Sanilac County and documented possible or probable breeding status in three counties without records during MBBA I (Alpena, Oscoda and Muskegon). In the southern LP, both atlases show a preponderance of records in the southeast and southwest. These differences probably reflect variations in coverage rather than an actual change in distribution. Confirmed breeding was documented north to Montmorency and Antrim Counties, with probable breeding in Emmet County during MBBA I. The northernmost confirmed breeding was in Grand Traverse County, with possible records north to Montmorency and Alpena Counties, during MBBA II. Thus, the northern extent of distribution during MBBA II is slightly south of that shown by MBBA I. Whether this is real or an artifact of differences in coverage cannot be readily ascertained, but the northern boundary may fluctuate in response to winter weather conditions (Shea 2006).

Both atlases probably underestimated the true distribution, especially in the southern LP where Eastern Screech-Owls likely inhabit most townships. The most effective way to locate Eastern Screech-Owls is through nocturnal playback of their calls during winter. Townships without records were probably not censused via this technique.

Eastern Screech-Owls occupy a variety of habitats including urban and rural woodlots, parks, cemeteries, residential areas with mature deciduous trees, marshes, and riparian areas. In areas with extensive timber, they are usually confined to the edge rather than the forest interior (Peterjohn and Rice 1991). The major requirement for breeding is apparently the presence of mature trees with suitable nesting cavities; birds can be enticed into areas with younger trees via nest boxes (Gehlbach 1995).

Breeding Biology

Eastern Screech-Owls have an 18 week breeding cycle (Gehlbach 1995). Egg laying commences from mid-March to mid-April in the southern LP (Craighead and Craighead 1956, Peterjohn and Rice 1991), and probably begins earliest in urban and suburban locations (Gehlbach 1995). Young fledge during May and June and are dependent on their parents for eight to ten weeks thereafter (Gehlbach 1995). Once independent, young disperse to new locales, usually less than 32 km (20 mi) from their place of birth (Van Camp and Henny 1975, Gehlbach 1995). However, this may not hold true at the northern edge of the range, where significant post-breeding dispersal is purported to occur (Shea 2006). Once post-natal dispersal is completed, Eastern Screech-Owls are considered non-migratory (Gehlbach 1995). However, Shea (2006) states that there is some southward migration at the northern edge of the range.

Abundance and Population Trends

Eastern Screech-Owls were recorded in 34% of townships in the southern LP and five percent in the northern LP during MBBA II, with confirmed breeding in 23 and three townships, respectively. No obvious changes in abundance are evident between the two atlases, and the population appears to be stable. The Breeding Bird Survey does not effectively detect this species, which does not even appear as a selection choice in the trend section of its website. Confirmation of breeding is quite difficult unless birds are utilizing nest boxes, as natural nesting cavities are difficult to locate. Breeding is most readily confirmed by detecting fledged young responding to playback during the summer months.

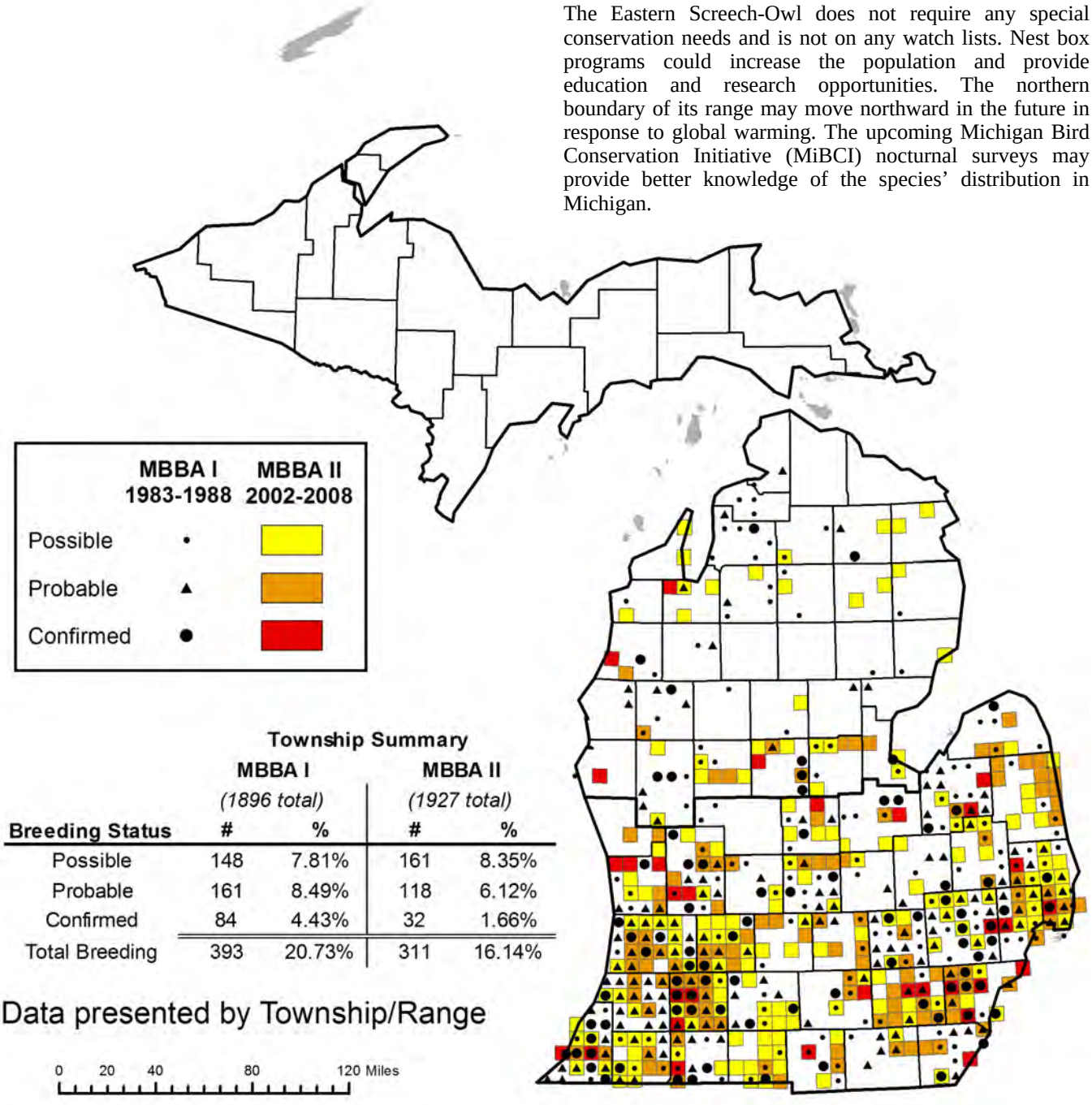
Eastern Screech-Owl *(Megascops asio)*

Thomas Carpenter

Extremely severe winters cause temporary reductions in population (Carpenter 1991), which usually rebound within a few years once more normal conditions return (Peterjohn and Rice 1991). Competition with fox squirrels for nesting cavities is common, and may limit breeding opportunities, particularly in urban and suburban areas (DeCandido 2005). Nestlings are susceptible to predation by raccoons. Vehicular collisions cause a number of fatalities, with dispersing young and males provisioning broods apparently most at risk (Gehlbach 1995). Predation by larger owls, particularly Great Horned Owls, is also a significant source of mortality. Rodenticides can inflict mortality in both rural (Hedgal and Colvin 1988) and urban (Stone et al. 2003) environments, but their impact does not appear to be significant. The spread of the West Nile virus into Michigan probably had the most impact on raptors since MBBA I and may have caused some mortality in Eastern Screech-Owls (Komar 1996, Nemeth et al. 2006), but some evidence suggests its effects were minimal (Gancz et al. 2004). The long-term impact of urbanization is equivocal. There is no evidence that Eastern Screech-Owls have disappeared from urban parks in Michigan, but it has happened in New York City (DeCandido 2005), and the long-term viability of urban populations needs more study.

Conservation Needs

The Eastern Screech-Owl does not require any special conservation needs and is not on any watch lists. Nest box programs could increase the population and provide education and research opportunities. The northern boundary of its range may move northward in the future in response to global warming. The upcoming Michigan Bird Conservation Initiative (MiBCI) nocturnal surveys may provide better knowledge of the species' distribution in Michigan.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	148	7.81%	161	8.35%
Probable	161	8.49%	118	6.12%
Confirmed	84	4.43%	32	1.66%
Total Breeding	393	20.73%	311	16.14%

Data presented by Township/Range

Great Horned Owl *(Bubo virginianus)*

Thomas Carpenter



Joan Tisdale ©

It's a cold winter night just before dawn. Off in the distance a series of low hoots resonate through the still air. This scenario plays out across the state, as Michigan's notorious 'hoot' owls proclaim their breeding territories. A permanent resident from southern South America to the tree line of the arctic, the Great Horned Owl breeds throughout Michigan (Houston et al. 1998).

Distribution

The continuous forest that characterized the state prior to European settlement afforded poor habitat for Great Horned Owls, which were probably restricted to the forest edge and occasional clearings. The clearing of the forest created more favorable habitat, but the owls were persecuted throughout the early part of the 20th century due to their proclivity to occasionally kill poultry and small game. As agriculture became more specialized, fewer farms raised poultry, and those that did kept birds indoors where they were less available to predators. This change, coupled with the passage of protective legislation, allowed Great Horned Owls to proliferate starting in the 1940s (Peterjohn and Rice 1991).

Both MBBA I and MBBA II recorded the species throughout the state. During both atlases, most probable and confirmed records were in the southern LP. Although this trend may be somewhat accurate ─ the more extensively forested northern LP and UP probably contain less favorable habitat ─ Great Horned Owls were undoubtedly easier to detect in the small, scattered woodlots that characterize the southern LP. Coverage was also more extensive in the southern LP. Thus, both atlases probably underestimated the species distribution in the UP and northern LP.

Overall, there were more reports of Great Horned Owls in MBBA I than MBBA II. Statewide, MBBA I detected Great Horned Owls in 34.7% of townships versus 18.3% during MBBA II. The difference is largely due to fewer reports in the LP during MBBA II. For the southern and northern LP, MBBA I reported the species in 55.6% and 32.0% of townships, respectively; the percentages fell to 28.9% and 10.9% for MBBA II. UP reports are consistent for both atlases at 13.4% and 13.3% of townships, respectively. Most likely, there was less effort to locate Great Horned Owls during MBBA II rather than an actual decline in abundance since MBBA I.

Great Horned Owls do not construct nests; they rely on nests of other raptors, tree cavities and the tops of broken trees to breed. Thus, wooded areas with suitable nesting structures and open areas for hunting seem to be the primary habitat requirements. There may be a preference for hardwood and mixed forests (Petersen 2006), but research on the habitat utilized in areas with coniferous forest is needed for confirmation. The species also occurs in suburban woodlots and urban parks.

Breeding Biology

Breeding populations appear to be limited by the ability to successfully establish territories (Rohner and Krebs 1998), and non-breeding, non-territorial floaters can form a substantial portion of some populations (Rohner 1997). Not all territorial pairs breed every year; 10-38% of pairs failed to breed in southern Wisconsin and southern Ohio, respectively (Petersen 1979, Holt 1996). During the lowest point of the snowshoe hare cycle in the boreal forest of Canada, no pairs of Great Horned Owls attempted to breed (Rohner and Krebs 1998). Once they establish a territory, birds are thought to occupy it for life (Houston et al. 1998).

Abundance and Population Trends

Great Horned Owls are not readily censused by the Breeding Bird Survey, which shows a nonsignificant decline for Michigan for the years 1966-2007 (Sauer et al. 2008). The Christmas Bird Count could potentially provide information on population trends, but changes in its methodology are required in order to accurately quantify owls. The Michigan Bird Conservation Initiative (MiBCI) citizen science monitoring project for nocturnal birds may provide additional knowledge of the distribution of this and other secretive nocturnal species. Roughly every 10 years, the UP and possibly the LP receive an influx of owls from the boreal forest of Canada when populations of snowshoe hares crash. The long-term viability in urban/suburban habitats is uncertain. Some suburban areas that had owls in the past do not have them today (Carpenter, unpublished) and, with the exception of Staten Island, they are not found in New York City (Eaton 1988). When it first appeared in Michigan, the West Nile virus was thought to be particularly detrimental to Great Horned Owls (Gancz et al. 2004) but research in Wisconsin suggests that it has had no detectible effect on breeding populations (Stout et al. 2005).

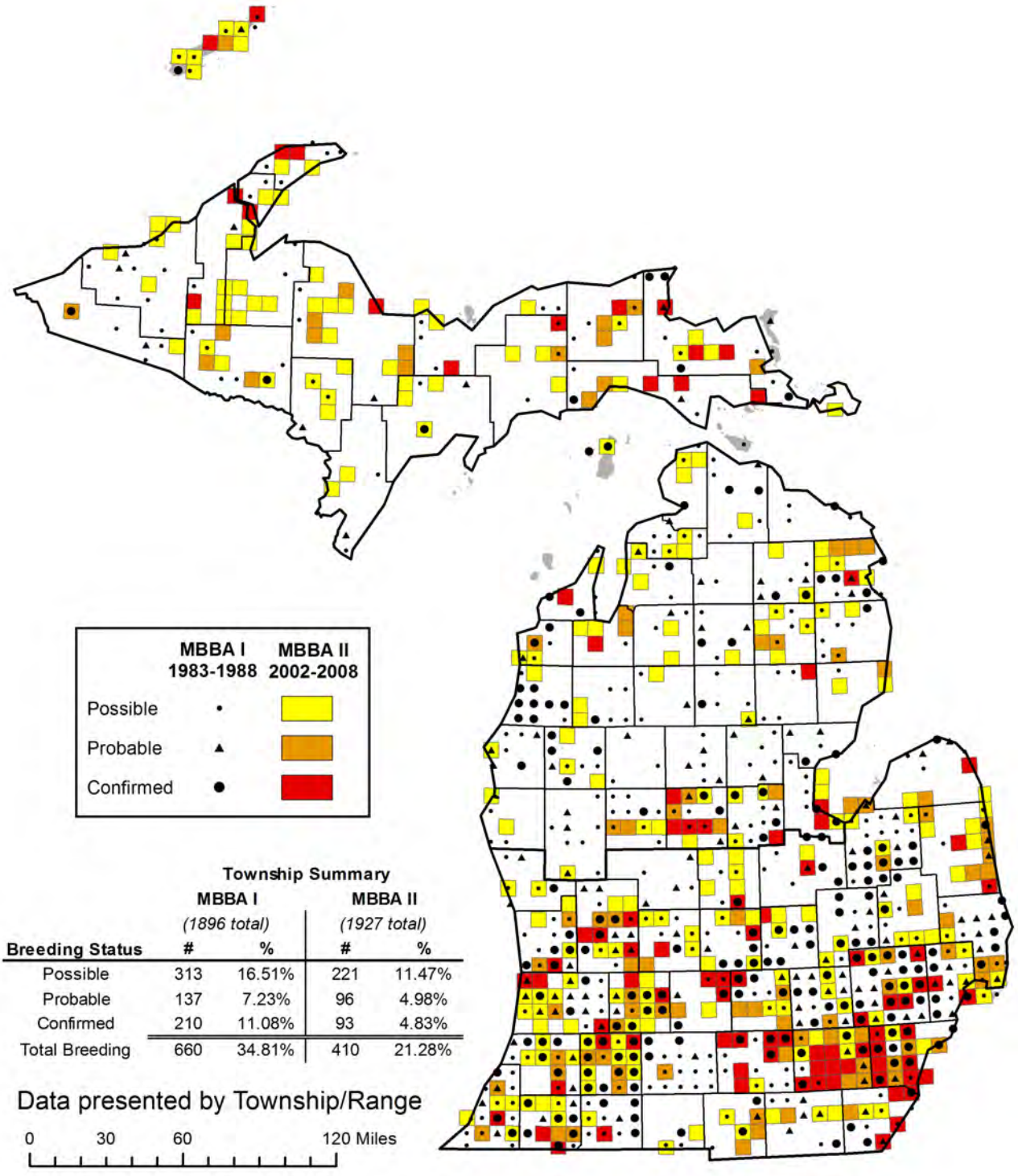
Conservation Needs

No specific management is needed for Great Horned Owls; Michigan populations appear to be stable. Erection of artificial nests may entice birds to nest in less mature woodlots that lack naturally occurring nest sites, and could facilitate research and educational opportunities. As top predators, Great Horned Owls accumulate contaminants

Great Horned Owl *(Bubo virginianus)*

Thomas Carpenter

from their prey and are therefore susceptible to secondary poisoning (Sheffield 1997, Houston et al. 1998). Rodenticides (Stone et al 1999), organochlorines (Blus 1996) and lead shot (Clark and Scheuhammer 2003) have caused mortality. Great Horned Owls that inhabit areas near human dwellings may be particularly susceptible to rodenticides given their propensity to feed on rats.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	313	16.51%	221	11.47%
Probable	137	7.23%	96	4.98%
Confirmed	210	11.08%	93	4.83%
Total Breeding	660	34.81%	410	21.28%

Data presented by Township/Range

0 30 60 120 Miles

Barred Owl *(Strix varia)*

Brenda S. Keith



Judi Manning ©

This medium-sized owl with liquid dark eyes is best known for its vocalizations. The typical call is described as *"who-cooks-for-you, who-cooks-for-you-all."* During the breeding season of mid-to-late winter, loud raucous caterwauling duets take place. Barred Owls are widespread east of the Great Plains from southern Canada to south Florida and the Gulf Coast. They also occur in a band across central Canada to southeastern Alaska, and into the Pacific Northwest. A disjunct population is also found in southern Mexico (Mazur and James 2000).

Distribution

Bent (1938) states that, "The Barred Owl is our most common large owl east of the Prairie States." They were considered abundant during Michigan's post-settlement time but dropped to common due to deforestation and shooting practices (Brewer 1991). This was especially true in the southern L.P. By the late 1950s the Barred Owl was considered uncommon in the southern counties (Zimmerman and Van Tyne 1959) as land clearing continued for agriculture. As in MBBA I, during MBBA II, Barred Owls were found statewide with most territories detected in the UP and NLP, however the current Atlas shows that the population in the southwestern LP has grown.

Preferred habitat for the Barred Owl consists of mature woods with numerous old trees and large cavities for nesting. A study of nest sites of the Barred Owl in northern Michigan showed large beech trees seem to be favored but cavities in maples and dead snags are also utilized (Postupalsky et al. 1997).

Breeding Biology

Courtship behavior begins in mid-winter with egg dates ranging from mid-March in the southern parts of Michigan to early May in the more northern regions. Typically one brood of two to three eggs is laid with an incubation period of 21 to 28 days. Young fledge between mid-May to early July with some observations in the southwest LP and surrounding states as early as mid-April. Young owls remain near their parents for several months, begging for food with their strange squeaky, hissing calls.

Abundance and Population Trends

During MBBA II, there was a slight increase in the percentage of townships where Barred Owls were encountered compared to MBBA I. The number confirmed in the UP and the NLP was substantially lower during MBBA II, while the numbers listed as probable were nearly the same. The number confirmed in the SLP increased over that of MBBA I with the majority of confirmations coming from the western SLP. This may be attributed to the maturation of wood lots. While Barred Owls are nocturnal and nest early, it is often difficult to confirm nesting. Since this species is very vocal and tends to stay on territory, it is likely that blocks with probable and possible records are also nesting sites. Increases in central and northern Canada are in part attributed to the initiation of the Ontario Nocturnal Owl Survey (Allair 2007).

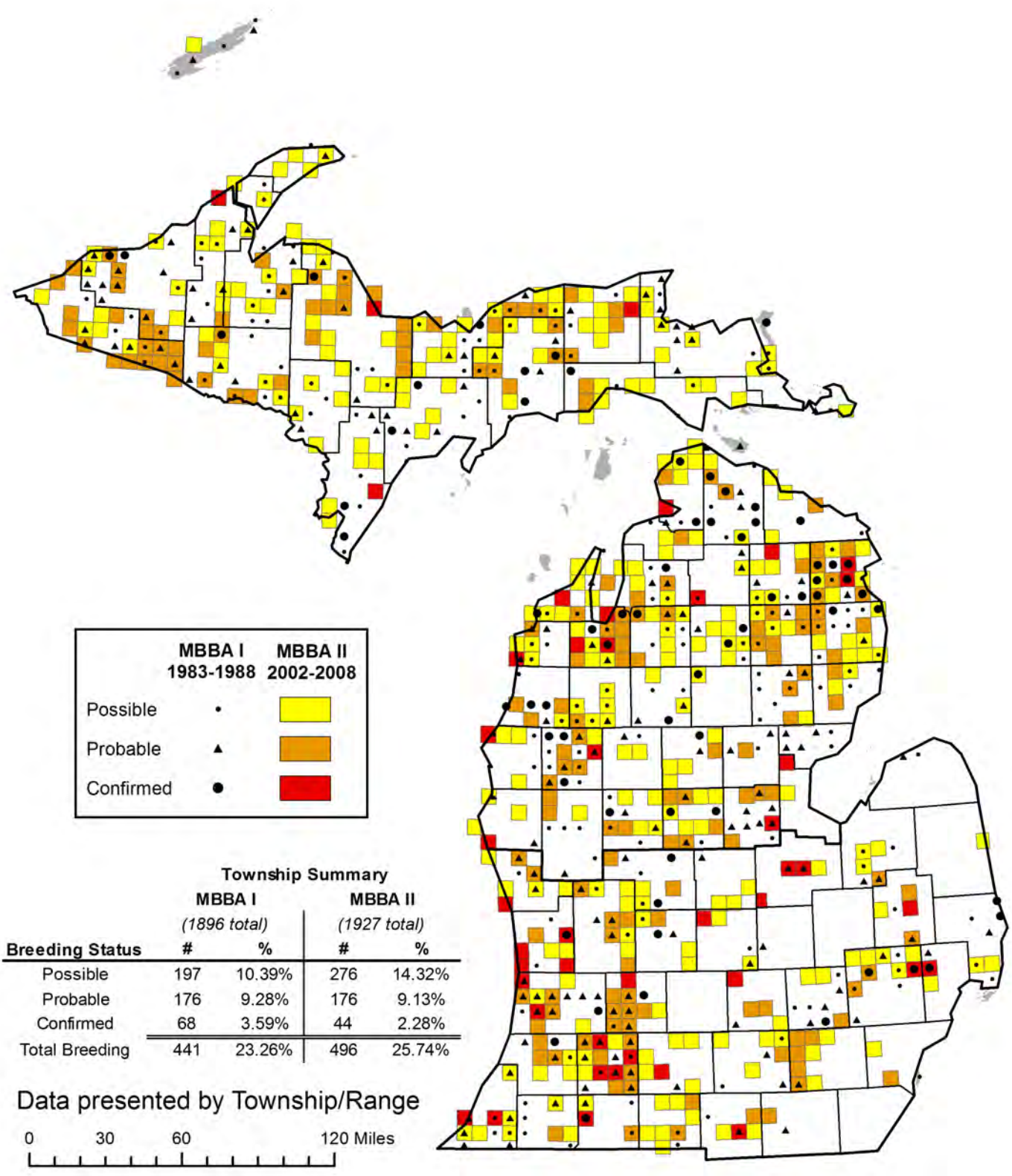
BBS trends for the Midwest (USFWS Region 3) and Michigan show a slight but steady increase since 1983. The Partners in Flight population estimate for Michigan was 5,000 individuals, but it also states there was poor coverage for this species (PIF 2007).

Conservation Needs

Across USFWS Region 3, Barred Owl numbers have been on the increase in recent years (Sauer et al. 2008). The species is not on any watch lists for Michigan but forest management practices should still be considered. Snags and an adequate number of large live trees (> 50 cm dbh) that contain or are likely to develop suitable cavities should be preserved. It is particularly important to maintain conifers in forests otherwise dominated by deciduous trees. This species will also use nest boxes if placed in suitable locations that provide cover for safety and open areas for hunting (Postupalsky et al. 1997).

Barred Owls pose no negative effects on humans and are beneficial for keeping crop damaging rodents under control (Quimby 2000).

Barred Owl *(Strix varia)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	197	10.39%	276	14.32%
Probable	176	9.28%	176	9.13%
Confirmed	68	3.59%	44	2.28%
Total Breeding	441	23.26%	496	25.74%

Data presented by Township/Range

0 30 60 120 Miles

Great Gray Owl *(Strix nebulosa)*

R. Gregory Corace III, Ph.D.



John Van Orman ©

Perhaps no other member of the bird community of Michigan instills the sense of the North Woods more than the Great Gray Owl. Characterized by its large size, dappled gray plumage, prominent facial disks, and secretive nature, this species has long fascinated many birders and other naturalists (Nero 1980). However, with a primary breeding range that encompasses boreal regions throughout the Northern Hemisphere, the Great Gray Owl is only a regular breeder among the northern tier of states of the conterminous U. S. and within several associated western mountain ranges (Bull and Duncan 1993). In the Upper Great Lakes region, scattered confirmed breeding records exist for Minnesota (Janssen 1987), Wisconsin (Merkel 1989, Cutright et al. 2006), and now Michigan (Baetsen et al. 2005), while substantially more records exist for northern Ontario (Johnson 1987).

Distribution

Although Barrows (1912) was skeptical regarding any assertions that the Great Gray Owl bred in Michigan, sporadic breeding-season observations of adult birds and their young have occurred over the intervening decades. Most observations have come from the eastern UP, especially Neebish Island of Chippewa Co. (Wood 1951, Master 1979, Jensen et al. 1982). However, MBBA I resulted in no confirmed survey blocks. Instead, five probable blocks were in three UP counties: Chippewa, Mackinac (Bois Blanc Island), and Gogebic. Three possible blocks were in Chippewa Co., including Neebish Island (Evers 1991).

Relative to MBBA I, MBBA II produced a slight increase in the percentage of blocks and townships with records. Most of these records were from the eastern UP counties of Alger, Schoolcraft, Luce, and Chippewa, with one possible block in northern Emmet Co. of the NLP. In 2004 the first confirmed breeding record for this species in Michigan came from the U. S. Fish and Wildlife Service at Seney National Wildlife Refuge (NWR) in Schoolcraft Co. (Baetsen et al. 2005), with an adjacent block later having another confirmed record.

During invasion years, the dedicated birder has a fair chance of observing wintering birds in the eastern UP. Neebish Island offers one of the best spots to observe birds, but one should not discount the agricultural lands in Chippewa and Mackinac counties either, especially around Rudyard, Pickford, and Sault Ste. Marie. As past records from MBBA I and MBBA II indicate, observing breeding birds is much more difficult. Any observation of breeding birds should be reported to the Michigan Audubon Society.

Breeding Biology

Although little is known about the breeding biology of the Great Gray Owl in the Upper Great Lakes region relative to populations found elsewhere, some geographic variation in breeding biology and habitat selection does exist (Bull and Duncan 1993). Baetsen et al. (2005) provided a detailed chronology of nesting behavior for the breeding pair at Seney NWR. First observations of adult birds at the nest were made on 30 April 2004. The initial observation of owlets was on 19 May, with the older of the two owlets fledged by 4 June and the younger by 11 June.

Characteristics of the nest site at Seney NWR were quantified at two spatial scales by Corace et al. (2006). The adult birds nested in a mosaic of forested and non-forested cover types, similar in nature to occupied breeding habitat in adjacent Wisconsin (Merkel 1989) and Ontario (Johnson 1987). The stick nest was located in a large-toothed aspen that was located within a Society of American Foresters Red Pine Research Natural Area dominated by red pine and white pine. Within 50 m (164 ft.) of the nest little variation in measured habitat features existed. Overall, the forest stand had multiple cohorts of relatively large trees (mean diameter at breast height was 44 cm or 17 in). The forest understory was relatively open, and consisted primarily of *Vaccinium spp*. Within a 2-km (1.24-mi) buffer of the nest, a total of 29 land cover types were found based on an analysis of digitized aerial imagery. Forest types dominated the buffer, but average patch size for all land cover types was relatively small (<12 ha or <30 ac), indicating a high degree of heterogeneity in the buffer. Ultimately, Corace et al. (2006) came to the conclusion that relatively little was unique to the nest site relative to many parts of the eastern UP in general and Seney NWR in particular. The fact that seemingly suitable nest sites exist in much of the eastern UP lend some support, albeit weakly, to the contention that more breeding Great Gray Owls may be found in the area.

The diet of the Great Gray Owl consists primarily of small rodents, with voles of considerable importance during both the breeding and wintering seasons (Bull and Duncan 1993). At Seney NWR, skeletal remains from 30 individual prey items were identified from regurgitated pellets collected during the breeding season (Corace et al. 2006). Mammals comprised 87% of the prey items. Those prey species

identified included meadow vole, star-nosed mole, unknown vole species, southern bog lemming, and northern flying squirrel. In particular, star-nosed mole comprised a surprisingly large percentage (23%) of the identified remains, suggesting that the adults spent a considerable period of time foraging over non-forested habitats. Previous research (Master 1979) in the eastern UP indicated that the diet of wintering birds was primarily comprised of voles.

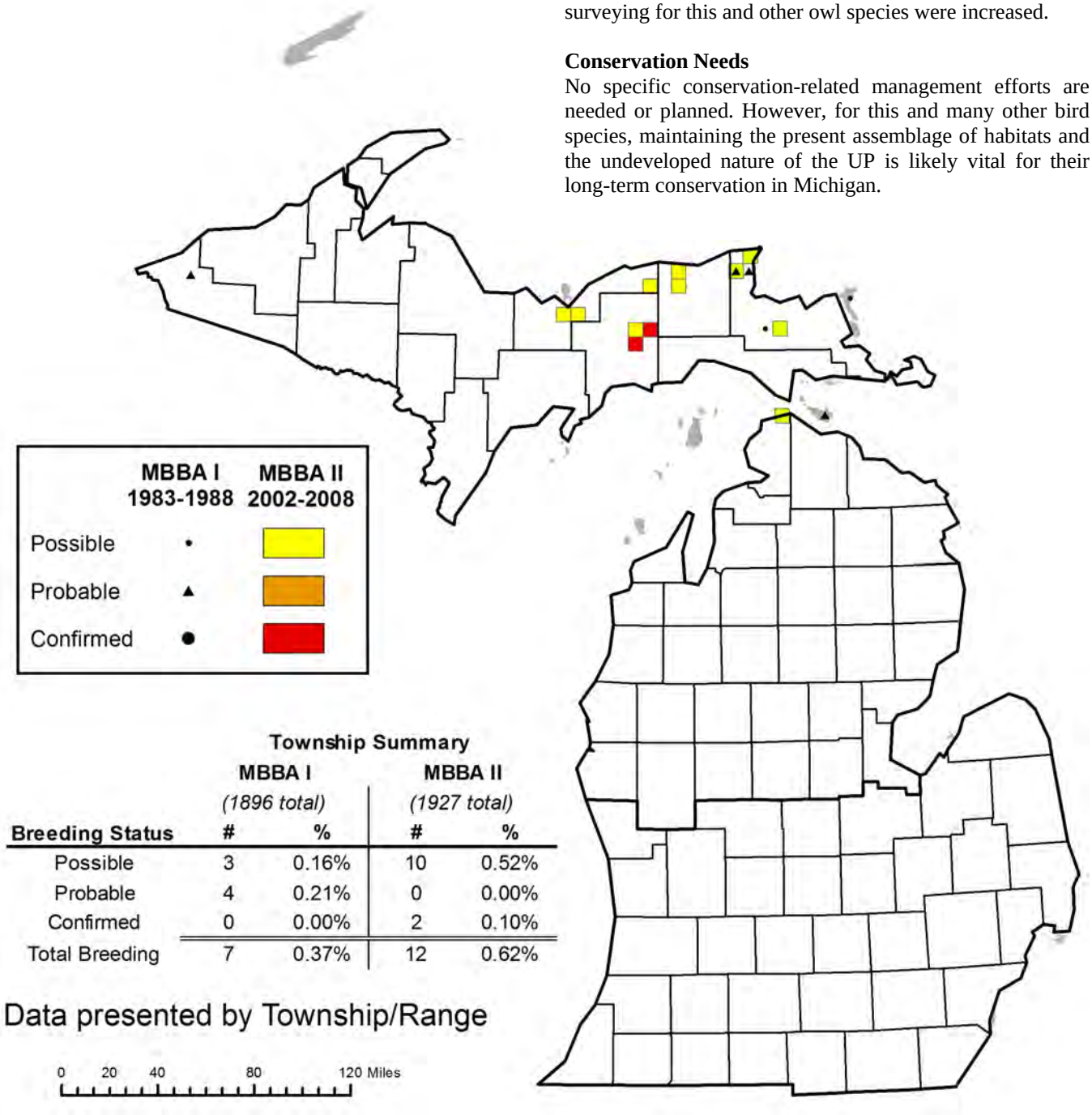
Abundance and Population Trends

No quantitative data exist for tracking the abundance or population trend of this species in Michigan. Evers (1991) and Baetsen et al. (2005) provided thorough documentations of the winter "invasion years", or those years in which a large number of birds can be found wintering in the more northern parts of this state due to cyclically reduced populations of rodent prey in Canada (Bull and Duncan 1993). During the MBBA II sampling period, there seemed to be only one winter (2004-05) in which a large number of birds was observed, mostly in Chippewa County (Murphy 2003, 2004, 2005, 2006, Wuepper 2008).

In other parts of the breeding range of the species, increased surveying efforts have yielded more breeding records (Follen 1987, Gostomski 1997). The same may hold true in Michigan— and the eastern UP in particular—if efforts at surveying for this and other owl species were increased.

Conservation Needs

No specific conservation-related management efforts are needed or planned. However, for this and many other bird species, maintaining the present assemblage of habitats and the undeveloped nature of the UP is likely vital for their long-term conservation in Michigan.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	3	0.16%	10	0.52%
Probable	4	0.21%	0	0.00%
Confirmed	0	0.00%	2	0.10%
Total Breeding	7	0.37%	12	0.62%

Data presented by Township/Range

Long-eared Owl *(Asio otus)*

Chris Neri and Nova Mackentley

Status: *State Threatened*



Joan Tisdale ©

Cryptic coloration on a body stretched tall and thin, long ear tufts raised high, and a bewildered stare from bright yellow eyes. Reluctant to leave the safety of its daytime roost, a Long-eared Owl will frequently exhibit this concealment posture when disturbed during daylight hours. However, in the comfort of the night its body relaxes to stockier proportions, and the ear tufts often are lowered as it begins the night's hunt. With the distinction of having the lightest wing loading of any North American owl, its flight is amazingly buoyant and effortless as it leaves its daytime roost. Chance upon Long-eared Owl breeding grounds and you may witness the male's zigzag courtship flight complete with the sound of wing claps. The North American breeding range of this species spans central Canada from Nova Scotia to southeast Yukon with populations extending south to Baja California, southern Arizona, and southern New Mexico in the west, and into the Appalachian Mountains of Virginia in the east (AOU 1983). The species is migratory through much of its northern range, and birds banded in Saskatchewan, Montana, and Minnesota have been recovered as far south as Mexico (Marks et.al 1994). In the SLP, where the species nears the southern limit of its breeding range, there may be year-round residency (Armstrong 1958, Evers 1991). At Whitefish Point Bird Observatory (WPBO), Long-eared Owls occur spring through fall but are most common in spring when as many as 80 have been observed during a single evening flight.

Distribution

Barrows (1912) described the Long-eared Owl as "by no means uncommon" in southern Michigan during the late 19th and early 20th centuries, but as practically unknown in the NLP and reported just once from the UP. While the distribution of recent reports from the LP are consistent with both Barrows' 1912 assessment and MBBA I results, the scarcity of reports from the SLP continues to be discouraging. During MBBA II Long-eared Owls were reported in just 1.55% of SLP townships, with the only report of confirmed breeding coming from Muskegon County. In the NLP they once again all but eluded detection, with confirmed breeding only from Isabella County. However, atlas results from the UP continue to be relatively promising. Reports increased from 0.98% of townships in MBBA I to 1.45% in MBBA II. The confirmed report from Chippewa Co is one of very few for the UP, and the first for the MBBA project.

In Ontario, nests have been documented in over half of the counties and districts, but were detected within the same atlas square just 6% of the time between atlas efforts. Due in part to this low site fidelity and nomadic behavior, distribution in Ontario remains poorly understood (Konze 2007). In Wisconsin, where this owl had formerly been described as a very common resident, it appears to be an uncommon, yet widespread breeder (Shea 2006). To our south, atlas efforts have confirmed breeding just twice in Ohio and once in Indiana, all occurring in northern counties (Peterjohn and Rice 1991, Squires et al. 1998).

Breeding Biology

Occupying a wide variety of habitats throughout its range, in Michigan this species is most frequently associated with coniferous or mixed coniferous habitats adjacent to large upland and wetland openings (Armstrong 1958, Getz 1961, Bosakowski et al. 1989a). The Long-eared Owl is tolerant of conspecific nesters in close proximity, sometimes forming loose colonies with adults or family groups hunting the same field (D. Holt, pers. comm.) and fledglings from multiple nests roosting together (Marks 1985, 1986). Of 507 Long-eared Owls banded on breeding grounds in Saskatchewan, only five were recaptured in subsequent years, suggesting that breeding populations may be nomadic (Houston 1997). Whereas nesting occurs almost exclusively in trees, a rare case of ground nesting has been documented in Michigan (Jorae 1950). In Michigan, wintering individuals typically disperse in March and early April, but winter roosts in southern Michigan have been occupied by multiple birds as late as 25 April (Reinoehl 2003). In North America, eggs have been reported from 1 March to 5 June (Johnsgard 2002), but 15 April to 5 May was typical in Ontario (Peck and James 1983). On breeding grounds in Muskegon County, vocalizations were first heard on 13 March, courtship displays were observed on 26 March, and young were first observed on 4 June (C. Putnam pers. comm.), but young have been reported as early as the third week of May in Michigan (Kenaga 1958). While possibly representing local breeders, recent summer records at WPBO may indicate that post breeding movements may occur by mid-summer. Long-eared Owls have been recorded during each of the first four seasons (2006-2009) of summer research at WPBO. These records include three birds found day-roosting on 21 July (pers. obs.), and six adult and four hatch year birds banded 1-16 August (Neri

Long-eared Owl *(Asio otus)*

Chris Neri and Nova Mackentley

Status: *State Threatened*

and Mackentley 2009, unpub. report). While limited, these records suggest that by mid-July there are at least limited post breeding movements within Michigan, and possibly into and out of the state by both adult and hatch year birds.

Abundance and Population Trends

While not federally listed, the Long-eared Owl is listed as a species of special concern, or as threatened in most mid-western, eastern, and New England states in which it breeds (Marti and Marks 1989, Melvin et al. 1989, Petersen 1991). Given Barrows' depiction of early status in the SLP, and the fact that seven breeding reports were confirmed from 1966-1970 (Kelley 1966, 1970; Schroeder and DeBlaey 1968), the Long-eared Owl appears to be continually declining in southern Michigan. Historic reports from the NLP and the UP are too limited to allow for any meaningful comparison. Whereas atlas results in the UP have been fairly promising, breeding reports from the NLP continue to be extremely rare. With its nocturnal habits, relatively early breeding season, and cryptic coloration, this species is by its nature particularly difficult to document as a breeder. Overlap in migration and breeding seasons further complicate our ability to correctly document and confirm breeding. Much of our knowledge of the occurrence of this species as a migrant has been gained through the long term owl research conducted by WPBO. The long term spring banding average is 43, with maximum numbers of 173 (1995), 162 (1999), and 138 (2009). Spring migration at WPBO typically occurs from April through May, peaking in mid-April to mid-May, but has peaked as early as 27 March (Mackentley and Neri 2009, unpub. report). Fall records at WPBO have occurred from 8 September to 18 November with peak migration occurring in October. The average number banded in fall (1993-2008) is four, with a maximum of 15 in 2006 (King and Bagnall 2008, unpub. report). While reported fairly regularly in migration and from known wintering sites, they are likely significantly under-reported in all seasons. In Minnesota, where winter reports averaged just four over a 30-year period, targeted surveys yielded 47 individuals in just two winter seasons (Hertzel and Hertzel 2000). Increased monitoring targeted to detect this elusive species would likely result in increased reports. However, a true understanding of the Long-eared Owl's status as a breeder is likely to remain elusive for the foreseeable future.

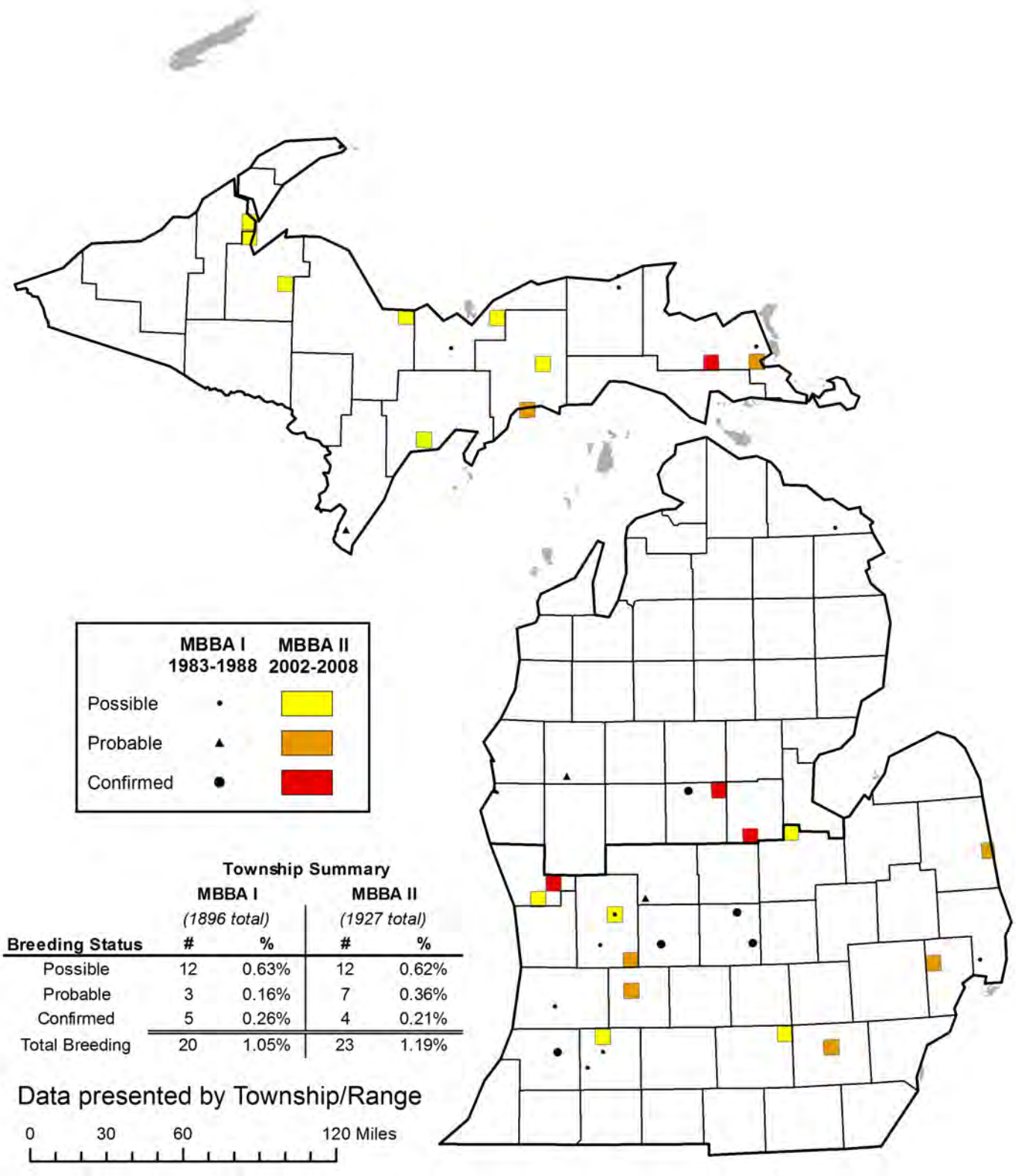
Conservation Needs

Although worldwide and North American populations are considered stable, this species has declined significantly as a breeder in many states. Regional declines are typically attributed to habitat loss due to large scale agriculture and extensive urbanization (Bosakowski et al. 1989b, Marti and Marks 1989, Bloom 1994). The protection and management of open habitats for foraging and adjoining dense tree stands for roosting and nesting would be of obvious benefit. As a secondary nest user, decreases in corvid and hawk populations have direct negative impact on the availability of suitable nest structures. Studies in Britain have documented the acceptance of manmade nesting structures by Long-eared Owls (Glue 1977, Garner 1982). Providing artificial nest structures may be of particular benefit to this species. At known winter roosts suitable nest structures could be placed not only in appropriate habitat, but also at locations where there is a high probability of the structures being detected by multiple individuals. Furthermore, due to its tolerance for the close proximity of conspecific nesters, the potential benefits of placing multiple structures within a limited area are greater for this species than for most other North American owl species.

Long-eared Owl *(Asio otus)*

Status: *State Threatened*

Chris Neri and Nova Mackentley



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	12	0.63%	12	0.62%
Probable	3	0.16%	7	0.36%
Confirmed	5	0.26%	4	0.21%
Total Breeding	20	1.05%	23	1.19%

Data presented by Township/Range

0 30 60 120 Miles

Short-eared Owl *(Asio flammeus)*

Joseph Youngman

Status: *State Endangered*



Bruce Bowman ©

Once seen flying low over open fields or wetlands, the unique flight and appearance of the Short-eared Owl are not soon forgotten. One of the most widespread owls in the world, its North American breeding range extends from northern Alaska and Canada south to California, Illinois, Indiana and Ohio. Individuals in the northern part of its range are short to medium distance migrants. It has been a rare breeder and an uncommon migrant in Michigan.

Distribution

In a heavily forested state like Michigan, suitable breeding areas for the Short-eared Owl are generally scarce. Extensive forest clearing throughout the state in the 1800s and early 1900s may have provided some increased breeding habitat, but more intensive modern farming methods and the re-growth of forests have since taken away any gains. Areas with extensive agricultural lands do provide habitat if they include significant pasturelands. Although rare in Michigan, the Short-eared Owl is found throughout the state during the breeding season from the lowest tier of counties north to Isle Royale. Breeding records from the late 1800s and early 1900s were recorded from Wayne, Oakland, Washtenaw and Calhoun Counties (Cook 1893, Barrows 1912, Wood 1951).

During the MBBA I period, breeding was confirmed in Chippewa County and probable breeding was recorded in Isabella, Gratiot and Lapeer. Between atlases there were midsummer reports of Short-eared Owl from Osceola, Chippewa, Menominee (Whaley 1993), Huron (Kielb 1996), Houghton (Byrne 2001), and Benzie Counties (Byrne 2002) and confirmed breeding records from Hillsdale County in 1996 (Reinoehl 1997) and Monroe in 2000 (McWhirter 2001). The Monroe County record was a report of a Short-eared Owl nest with warm eggs on 15 February at Pt. Mouillee SGA, a very early nest date after an unusually warm winter. In Chippewa County breeding/summering was noted in 2000 and 2001 (Corace 2007) with an adult seen carrying food both years (Greg Corace pers. comm.). MBBA II recorded Short-eared Owls in six townships statewide, down from 15 in MBBA I. This seems to indicate a real reduction in breeding in Michigan. However, due to the difficulties in detecting breeding Short-eared Owls and the sporadic, cyclical nature of its breeding, it seems quite possible that the true breeding status has not changed significantly. While the Short-eared is not a strictly nocturnal owl, it is easily overlooked unless special efforts are made to find it.

Breeding Biology

Usually wintering just south of Michigan or in the state itself, the Short-eared Owl is a fairly early migrant each spring. McPeek and Adams (1994) give the spring migration period as March and April. Binford (2006) gives a median spring arrival date for the Keweenaw Peninsula as 18 April. The Houghton County breeding record during the MBBA II period noted territorial displays on 26 March 2007 and an adult carrying food on 28 April 2007. Short-eared Owls nest and forage in open habitats such as fallow fields, open grassy wetlands and tundra. They nest on the ground and are one of few owls that build their own nest (Wiggins et al. 2006). The successful nesting in Hillsdale County in 1996 was set in an area of over 600 acres of fallow agricultural land (Reinoehl 1997).

Abundance and Population Trends

No significant population decrease is noted for this species across North America as a whole, though decreases are noted for several regions (Wiggins et al. 2006). Much of its habitat through the middle of North America has been relatively unaffected by the arrival of European civilization. The Short-eared Owl's status in Ontario is listed as "stable to increasing" (Gahbauer 2007), but the author mentions more intensive observational efforts in the owl's main breeding areas during their second atlas, which may have skewed the comparison. Wisconsin's breeding bird atlas from 1995 through 2000 had only 14 records (Evrard 2006). Like most owls, the Short-eared is poorly recorded in BBS surveys and even breeding bird atlas projects. Therefore its true breeding status and any minor trends are very difficult to determine.

Conservation Needs

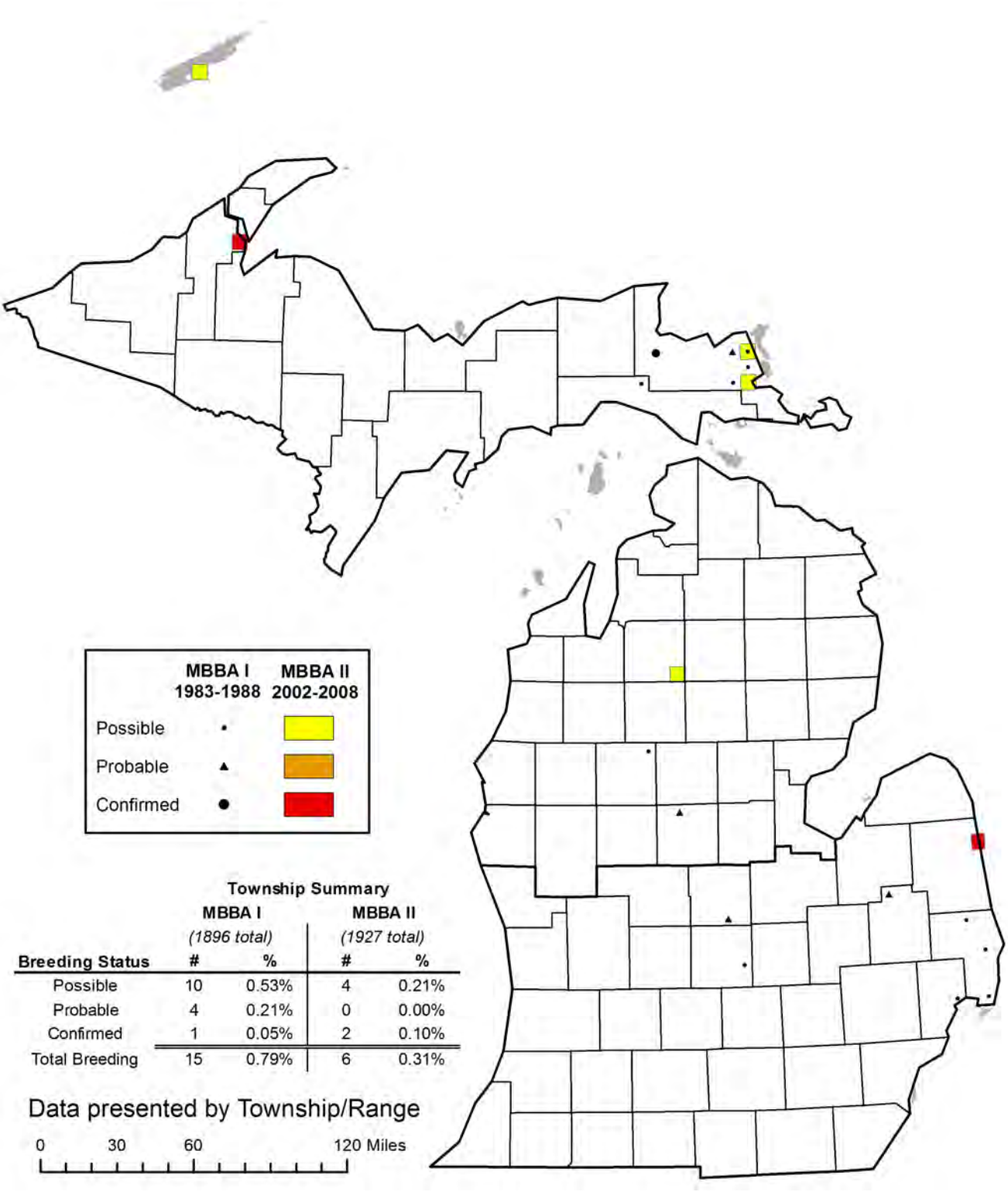
The peak of Michigan's value for this species was probably during the early 1900s when the conversion of forests to farmlands reached its peak. The continued loss of open grasslands, as they revert to forest or get swallowed by suburbs is without doubt hurting this species in Michigan. Especially in the UP and the northern LP, old fields are returning to forest. One area of opportunity is in the management of natural and agricultural grasslands statewide. Grassland creation and retention programs such

Short-eared Owl *(Asio flammeus)*

Joseph Youngman

Status: *State Endangered*

as the DNR Landowner Incentive Program, U.S. Farm Bill's Grassland Reserve Program and Conservation Reserve Program, USFWS's Partners for Fish and Wildlife and programs that support conservation of grassland/wetland complexes, such as the North American Wetland Conservation Act, may aid in sustaining quality habitat on public and private lands. The Short-eared Owl is on the state list of endangered species and primary conservation needs for the recovery of this species in Michigan include the provision of sufficient breeding habitat. Priority should be placed on conserving those grasslands where breeding has been documented and improving nearby marginal habitats.



Northern Saw-whet Owl *(Aegolius acadicus)*

Chris Neri & Nova Mackentley



Nova Mackentley ©

Thoughts of the Northern Saw-whet Owl often invoke memories of a winter day spent slowly walking through a pine stand, the frustration of investigating countless pinecones, and finally your heart racing as a pair of yellow eyes stare back at you from Michigan's smallest owl. The Northern Saw-whet Owl breeds from Nova Scotia to southern Alaska, extending south to the mountains of southern California, Arizona, and New Mexico in the west, and into the southern Appalachians of Tennessee and North Carolina in the east. Barrows (1912) wrote "doubtless more common than generally supposed". By 1889 a Saw-whet nest had been discovered in Michigan (Brownell 1891), another was described in 1893 (Morden 1893), and ten nest records were known by the end of the 1950's (Zimmerman and Van Tyne 1959). While nocturnal surveys and banding efforts have shed some light on the occurrence of this species, a true understanding of its status continues to be elusive. The detection of breeders is hindered by the species' nocturnal habits and relatively early breeding season. The fact that migration periods extend through the breeding season in Michigan further complicates efforts to determine breeding status.

Distribution

Significant movements of Saw-whet Owls have been documented by Whitefish Point Bird Observatory in spring, summer, and fall. Peak spring migration in the UP occurs from late March to late April, but movements can continue through June (Mackentley and Neri 2009 unpub. report). Four years of summer research at Whitefish Point have resulted in the banding of 202 adult and 978 juvenile Saw-whets in July and August (Neri and Mackentley 2009, unpub. report). The role of Michigan breeders in these summer movements remains unclear, but these results have reduced the validity of using juvenile Saw-whet sightings as a means to confirm breeding. Juveniles banded at Whitefish Point in summer have been recovered as far away as coastal Virginia during the fall migration of the same calendar year (Neri and Mackentley 2008b). Fall migration peaks during the first half of October and continues into November (King and Bagnall 2007, unpub. report). The winter status of this species remains poorly understood, with most reports being either chance observations or from known winter roost sites.

While reports during MBBA II were fairly widespread throughout the state, Saw-whets became increasingly rare and localized to the south. As in MBBA I, most MBBA II reports came from the UP where the number of possible breeders increased nearly five-fold, being recorded in 8.21% of townships. While MBBA II results from the NLP were consistent with those from MBBA I, the presence of four probable breeders in Oscoda County during MBBA II is noteworthy. With the exception of a cluster of reports from Lake, Mason, and Wexford Counties, Saw-whets were again poorly represented in the southern portion of the NLP. In the SLP reports dropped from 11 townships, including two probable and one confirmed, in MBBA I to just five possible township reports in MBBA II.

Regional breeding bird atlas results are consistent with those in Michigan. Atlas efforts in Ontario determined that the species breeds throughout the province. Organized nocturnal owl surveys found it reasonably well represented from Manitoulin Island to Sault Ste. Marie, but very localized in the western Bruce Peninsula to our east (Badzinski 2007). In Wisconsin it was most common in mixed forest uplands. Highest densities were reported in the northeast, and only two reports came from the southeast region of the state (Swengel 2006). To the south, one confirmed report came from northeast Ohio (Peterjohn and Rice 1991), and one probable report came from Indiana (Squires et al 1998).

Breeding Biology

While the Northern Saw-whet Owl has been found nesting in a variety of wooded habitats throughout its range, breeding densities appear highest in coniferous forests (Cannings 1993). These owls often prefer mixed woods with conifers providing dense cover for roosting, and deciduous trees with nest cavities. In Michigan they have been found nesting in habitats with poplar spp. (Parmelee and Johnson 1955), quaking aspen (Peczynski 1991), ash, and jack pine (pers. obs.). In Michigan nests have been found in cavities that were occupied the previous breeding season by Pileated Woodpecker (Parmelee and Johnson 1955), and Northern Flicker (pers. obs.).

Males may begin their advertising calls as early as late January and continue through May (Palmer 1987). Clutch initiation has been observed in early March in Wisconsin (Bielefeldt and Rosenfield 1993) and in New York (Bent, 1938). In Michigan, eggs have been reported on 12 May (Parmelee and Johnson 1955). Nests containing young have been recorded on 30 April in Clinton County (Curtis 1963), 5 May in Isabella County (Morden 1893), and during the second week of June in Chippewa and Luce Counties (pers. obs.). A family group was observed hunting together in Chippewa County from 3-9 August (Crockett 1962). A nestling Saw-whet rescued from the Sleeper Lake fire in

Northern Saw-whet Owl *(Aegolius acadicus)*

Chris Neri & Nova Mackentley

Luce County on 23 August, 2007 (MiBCI 2007) demonstrates the potential for a second brood. The capture of juvenile Saw-whets at identical stages of post-juvenile molt between late July (pers. obs.) and mid-September (Bagnall and King, pers. comm.) at Whitefish Point also suggests the potential for late breeding, although it is unclear whether or not the natal territories of these birds were located within Michigan.

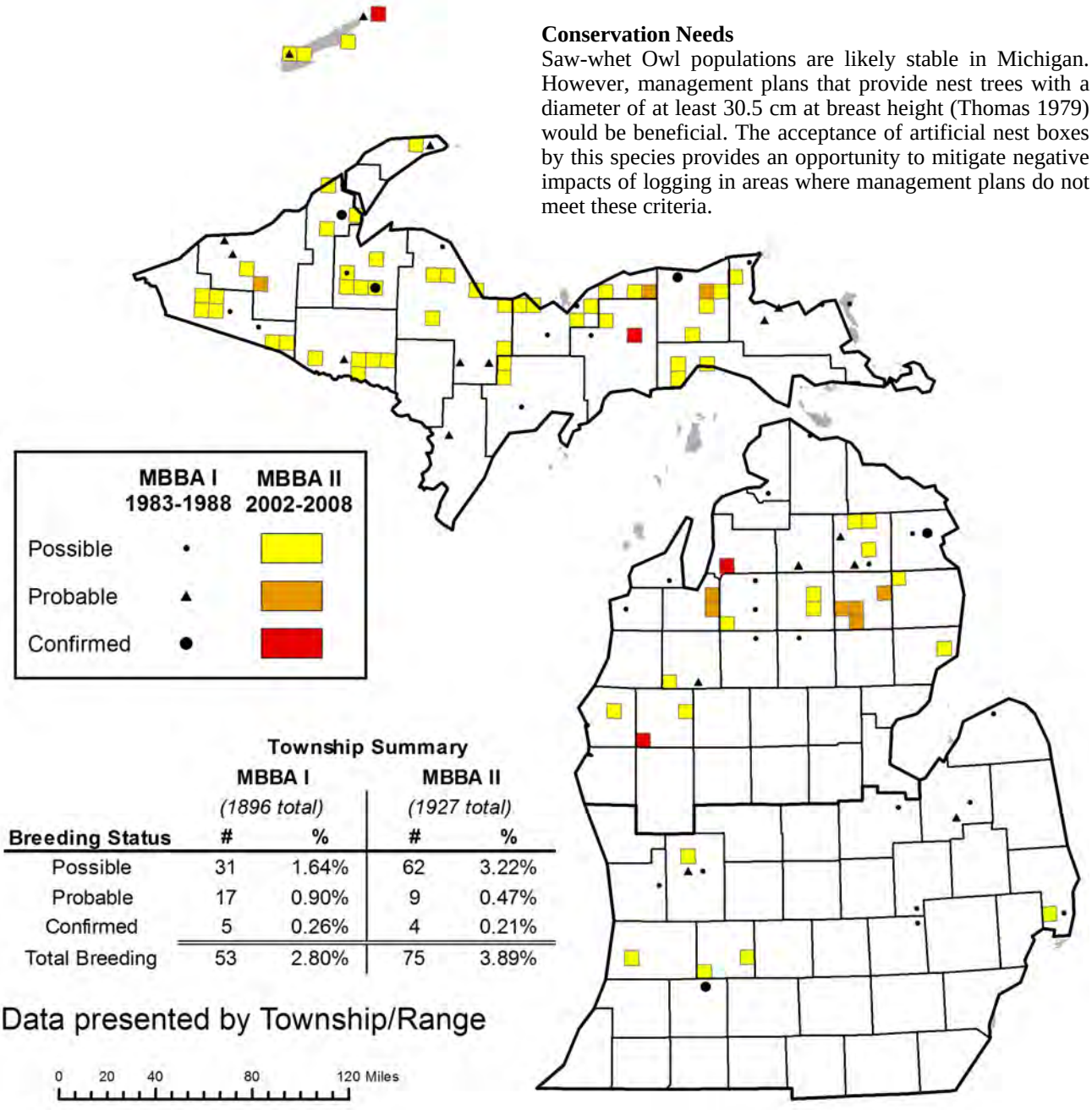
Abundance and Population Trends

As is the case throughout most of the species range, data in Michigan is not sufficient for confident population estimates. Estimates of the total North American population range from 200,000-600,000 (Del Hoyo et al. 1999) to 2,000,000 (PIF 2007), and it is considered stable enough to be considered a species of least concern (Del Hoyo et al. 1999).

Organized nocturnal surveys in Ontario have documented fluctuations within the Saw-whet breeding population from year to year. These fluctuations vary regionally, and are usually synchronous with the rise and fall of local prey populations (Badzinski 2009). The transition from the high to the low end of the breeding cycle can be a gradual or sudden change. From 2007-2008, the population dropped 78% in central Ontario, and 40% in northern Ontario (Allair and Badzinski 2009).

Conservation Needs

Saw-whet Owl populations are likely stable in Michigan. However, management plans that provide nest trees with a diameter of at least 30.5 cm at breast height (Thomas 1979) would be beneficial. The acceptance of artificial nest boxes by this species provides an opportunity to mitigate negative impacts of logging in areas where management plans do not meet these criteria.



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	#	%	#	%
Possible	31	1.64%	62	3.22%
Probable	17	0.90%	9	0.47%
Confirmed	5	0.26%	4	0.21%
Total Breeding	53	2.80%	75	3.89%

Common Nighthawk *(Chordeiles minor)* ***Sarah Coury***



Jerry Jourdan ©

At dusk and dawn over cities as well as open sections of the land, the Common Nighthawk can often be seen in its erratic, bat-like pursuit of insects on the wing. This member of the nightjar family is famous for the male's dramatic courtship displays in which it dives within two meters (6.6 feet) of the ground and abruptly turns, flexing his wings to produce a resounding boom as air rushes through his primary feathers. Common Nighthawks lay eggs directly onto bare, open surfaces such as farm fields, beaches, prairies, rock outcrops, parking lots, pine barrens, and burned or cleared patches of forest, and commonly will nest on the flat gravel rooftops of cities and towns (Poulin et al. 1996, Rasmussen 2006).

During the breeding season, this species can be found throughout Canada excepting the extreme north, in all 48 contiguous U.S. states, and patches of the interior and gulf coast of Mexico, continuing locally through Central America. Though its winter range is yet to be well studied, it is thought to extend across much of middle South America, giving the Common Nighthawk one of the longest migration routes of any North American bird (Poulin et al. 1996). During recent decades, numbers of this species have been steadily declining in Michigan and throughout its expansive breeding range. It is, however, still considered a locally common summer resident in the state and can be found in many areas of both peninsulas.

Distribution

Prior to the late 1890s when its numbers dropped significantly, probably because of overhunting during migration through southern states, the Common Nighthawk was thought to be fairly abundant and widespread in Michigan. By the middle of the twentieth century, the species had recovered its "common" state status (Eastman 1991). Though general declines of this species have been evident since the 1960s, at the time of MBBA I, it maintained a wide distribution in Michigan, with reports from almost every county.

Since then its distribution has contracted considerably, with many counties statewide reporting dwindling numbers. In eighteen of the LP counties where the bird was present during MBBA I, none were found during MBBA II. In the extensively suburban region of the southeast, Common Nighthawks seemed to have almost disappeared in seven counties which were former hotspots. A likely explanation is the major land use changes that have occurred in that area between atlas periods. In Oakland County from 1990 to 2000, for example, the Michigan DNR reported a 63% reduction in agricultural land, where the species may have previously nested, and an 84% increase in residential development (Oakes and Payne 2005). The Thumb and southern and central counties of the LP showed a sparse distribution of Common Nighthawks during MBBA I, which has continued to contract. Areas of abundance in both MBBA periods were those featuring jack-pine plains, such as the north-central NLP and scattered pockets across the UP, and around urban areas with a high density of flat gravel roofs, such as Wayne and Washtenaw counties in the southeastern LP. Higher proportions of the species within regions featuring these two habitat types were also noted in New York, Wisconsin, and Ontario atlas accounts (Medler 2008, Rasmussen 2006, Sandilands 2005).

Breeding Biology

In Michigan, Common Nighthawks arrive throughout May and breeding occurs primarily in June (Eastman 1991). Females invariably lay two eggs directly onto a bare surface with no added nesting material and incubate for 16-20 days (Poulin et al.1996). Males assume primary responsibility for feeding of the young via regurgitation during the 17-18 days before they fledge (Poulin et al. 1996). From late August through mid-September, Common Nighthawks form flocks and begin their fall migration (Eastman 1991).

Abundance and Population Trends

Breeding Bird Survey estimates for the Common Nighthawk in Michigan indicate a statistically insignificant population decline of 0.6% per year from 1990 to 2007 (Sauer et al. 2008). During MBBA II, Common Nighthawks were found in a total of 350 atlas blocks (4.9%), down from 881 (12.4%) during MBBA I. Of the 350 observations, 218 were possible, 121 were probable, and 11 – three from the Detroit area and the rest scattered widely across the state – were breeding confirmations. From MBBA I to MBBA II, observations declined from 219 to 136 in the UP, from 297 to 111 in the NLP, and from 365 to 103 in the SLP. Areas with the highest counts were Chippewa, Schoolcraft and Marquette counties and Isle Royale in the UP, Crawford and Oscoda counties in the NLP, and the SLP counties of Wayne and Washtenaw. The difficulties presented by efforts to obtain reliable data for this species include its elusiveness during daylight hours, absence of nesting material, camouflaged eggs, and inaccessibility to rooftop nesting sites, all of which may skew population trend results.

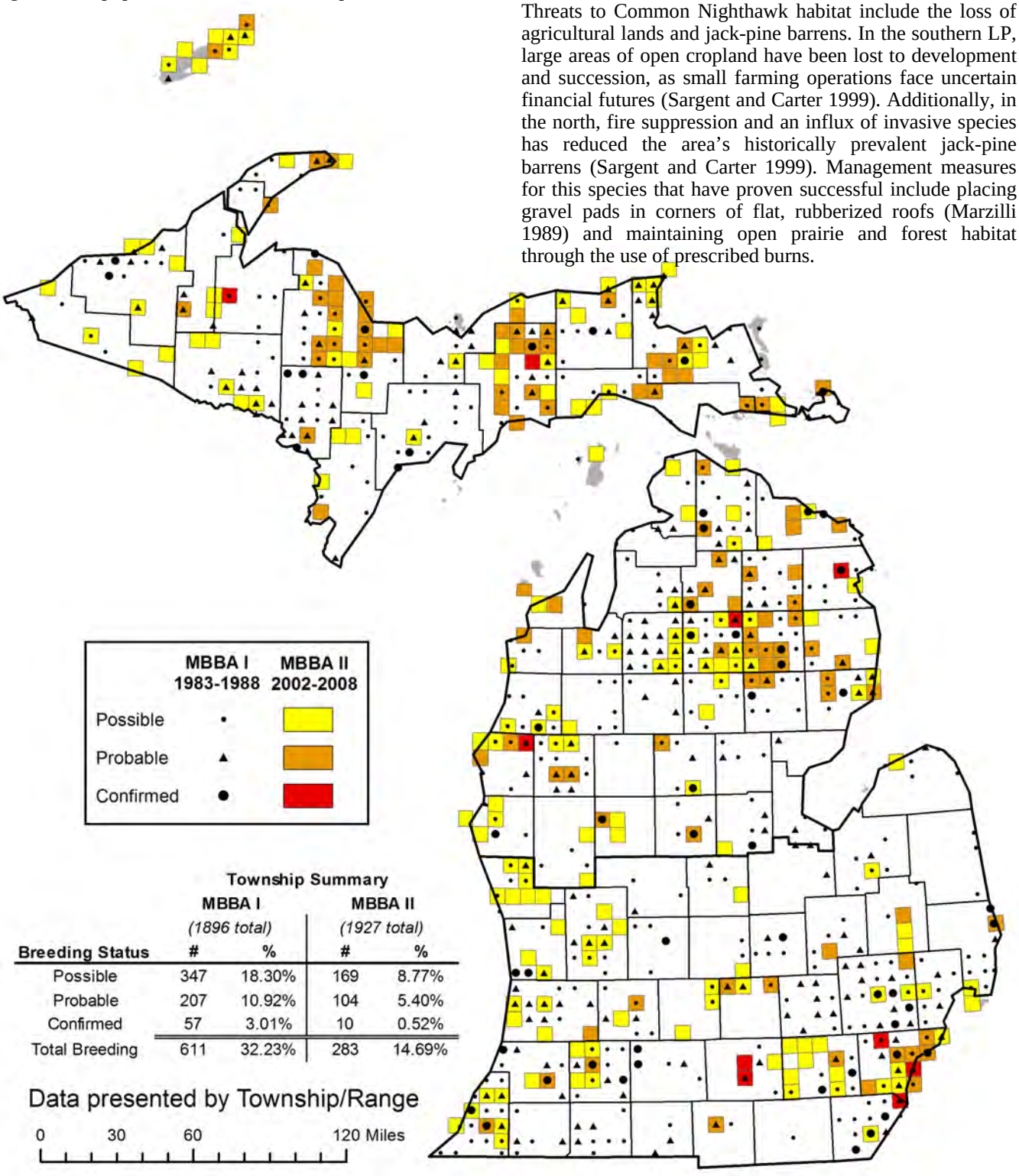
Common Nighthawk *(Chordeiles minor)*

Sarah Coury

Conservation Needs

Numerous factors may be contributing to the nationwide decline of Common Nighthawks. As with all ground nesting birds, this species is highly susceptible to predation, especially by domestic cats, and gulls and crows commonly predate urban rooftop nests (Medler 2008). Wedgewood (1991) noted a correlation between the drop in Common Nighthawk populations and the implementation of nonselective pesticide spraying programs for mosquitoes, as the bird's diet consists entirely of insects. Decreasing city populations are probably due to the ongoing transition from gravel to rubberized roofs, which are not used by the birds because of their failure to provide a camouflage surface for adults and eggs alike, as well as their tendency toward much hotter temperatures in the sun (Marzilli 1989).

Threats to Common Nighthawk habitat include the loss of agricultural lands and jack-pine barrens. In the southern LP, large areas of open cropland have been lost to development and succession, as small farming operations face uncertain financial futures (Sargent and Carter 1999). Additionally, in the north, fire suppression and an influx of invasive species has reduced the area's historically prevalent jack-pine barrens (Sargent and Carter 1999). Management measures for this species that have proven successful include placing gravel pads in corners of flat, rubberized roofs (Marzilli 1989) and maintaining open prairie and forest habitat through the use of prescribed burns.



Eastern Whip-poor-will *(Antrostomus vociferous)* ***Brian Johnson***



Darlene Friedman ©
Species sponsored by: Lyle Linsemier

Strictly nocturnal and cryptically plumaged, Whip-poor-wills are seldom encountered during daylight. Individuals roost motionlessly among ground litter or lengthwise on a tree branch, and they normally do not flush unless approached very closely. After dark, foraging via sally jaunts from perches and aerial hawking to some lesser extent, they silently capture moths, beetles, and other flying insects in their massive mouths (Cink 2002). Because their unusually large eyes vividly reflect artificial light, some individuals can be observed sitting along rural roads after dark, but most are detected only by their whistled song, for which the species receives its name. The eerie, emphatic melody is delivered in quick and tireless succession from trees and on the ground. Calling activity is greatest after dusk, before dawn, and during bright moonlight (Mills 1986).

Distribution

During the two Michigan Breeding Bird Atlases, Whip-poor-wills were found in 74 of the 83 Michigan counties: 73 during MBBA I, but only 60 during MBBA II. Data from MBBA II revealed a rather loose distribution generally comprising the Upper Peninsula and the northern and western LP. Somewhat higher concentrations occurred in the central UP and the jack pine plains of the north central LP. As with the first Atlas, the eastern SLP was sparsely populated. Results of MBBA II have indicated a serious reduction in the distribution of the Whip-poor-will over the last two decades. Despite dedicated surveys (Barton 2007), the number of townships reporting the species during MBBA II was only half that from MBBA I. Declines occurred in all three zones, but were greatest in the SLP, where it has become decidedly uncommon. Gains in some areas, such as Marquette County, probably reflected significant increases in local coverage. Based on earlier accounts of Michigan ornithology (Wood 1951, Zimmerman and Van Tyne 1959), these declines have been underway for the last several decades. Moreover, they match decreases widely noted elsewhere in eastern North America. In Ontario, Whip-poor-wills also exhibited a dramatic decrease and a substantial reduction in range during the 20-year span between their first and second Atlases (Mills 2007). The number of blocks with Whip-poor-wills decreased 57 percent in the 20 years between the first and second New York Breeding Bird Atlases (Medler 2008).

Breeding Biology

Whip-poor-wills inhabit dry, semi-shaded forests with moderate to scant understories and nearby openings. Such woodlands may be largely deciduous or coniferous, and may be young or mature, but dense structures and small forest remnants are typically avoided. Forest edges seem to be particularly suitable. Results from a Michigan study indicated that most observations were associated with clearcuts and other recently disturbed openings in undeveloped areas (Barton 2007). Whip-poor-wills do not construct nests; two eggs are laid on the ground where they remain quite concealed among leaf litter. The eggs are incubated by both sexes and hatch after 19 to 21 days (Cink 2002). The nearly invisible nestlings gradually disperse from the nest site, but they do not commence flying until about 20 days old (Cink 2002). Blending very well against the forest floor, incubating and brooding adults do not flush until nearly stepped on. Combining that with their nocturnal behavior and moderate to low densities, Whip-poor-will nesting observations are difficult to obtain. During MBBA I, only 15 of the 458 townships provided Confirmed breeding records and only one township provided a confirmation during MBBA II. Only three other species had lower confirmation rates.

The richest source of chronological information on Whip-poor-wills in Michigan currently comprises anecdotal records from the Michigan Bird Survey published in the periodicals Jack-Pine Warbler (MAS 1923-2011) and Michigan Birds and Natural History (MAS 1994-2011). Whip-poor-wills occasionally appear as early as the first or second week of April, but most individuals settle on territory during the last week of April and the first week of May. The lack of nesting records makes overall breeding chronology imprecise, but pairs can rear two broods per season (Cink 2002). Late summer and fall records largely consist of singing birds, which are much less vocal than they are in the spring. Based on this limited data, southward departure occurs during September, although a few individuals remain into early October.

Abundance and Population Trends

Among the most nocturnal of North American birds, the Whip-poor-will is poorly detected on BBS routes, which begin approximately half an hour before local sunrise. Since Whip-poor-wills normally start singing no earlier than 20 minutes after sunset and cease no later than 20 minutes before sunrise (pers. obs.), only the first couple BBS points on a route register vocal birds. Nevertheless, BBS data from across the species' range has demonstrated significant

annual declines of 2.1% since 1966 and 2.5% since 1983 (Sauer et al. 2008). Michigan trends are less reliable, but they are also negative.

Because they occupy large territories, Whip-poor-wills tend to occur in fairly low densities, but their powerful songs can carry over one mile on calm nights. Consequently, focused nocturnal censuses can provide much better measures of population status and trends. During one such project conducted across Michigan between 2005 and 2007, a total of 187 Whip-poor-wills were observed along 88 survey routes (Barton 2007). In 2007, the highest density was 13 birds along a ten mile transect. The annual United States Nightjar Survey (Center for Conservation Biology 2004), which consists of numerous roadside survey routes conducted by volunteers, provides similar data at the national level.

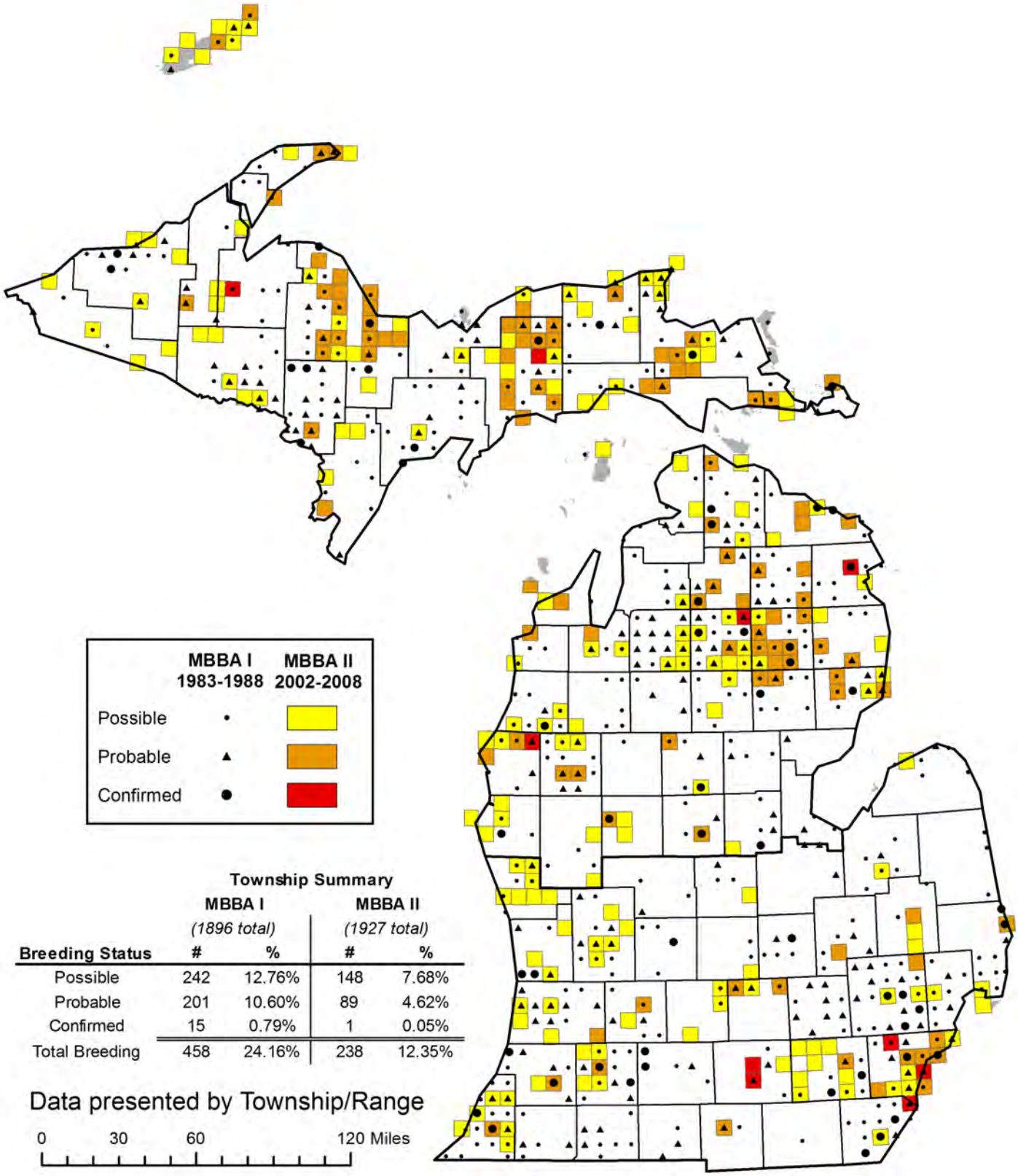
Conservation Needs

The primary culprits in the decline of Whip-poor-will are habitat loss and degradation. In Michigan, major range withdrawals have occurred where suburban sprawl has been profound, such as in southern Michigan. Losses of openings and semi-open understory structures due to succession and invading brush have seriously restricted usage in other areas. Bare understories due to forest maturation and rampant deer browsing have also eliminated nesting cover. Forest fragmentation not only reduces densities but also likely boosts nest depredations. Collisions with vehicles (Santner 1992) and the reduction of its forage base due to pesticide use (Eastman 1991) may have also contributed to local declines. Similar problems on the winter grounds likely exacerbate population losses in this species, but the relative impacts are unknown.

Legislation or programs designed to curtail suburban sprawl and consequent habitat conversion and fragmentation are clearly needed for Whip-poor-wills. With its current declines, this species may eventually disappear from much of Michigan's private lands. Forestry practices that promote sufficiently large tracts and which incorporate multiple seral stages within contiguous administrative units are critical for the conservation of this species. State Parks and various other public and private lands tend to foster continuous, climax forests, so mixed management schemes for multiple age classes would better accommodate Whip-poor-wills and other mid-successional species. Sustainable timber practices have created breeding sites for this species, but overharvest can have long term negative consequences. Controlled burns that reduce woody shrubs and curtail invasive vegetation can ameliorate understory structure.

Along with conservation efforts, accurate assessment of population through specialized surveys is essential. Surveys like the United States Nightjar survey (Center for Conservation Biology 2004), are designed to specifically detect nocturnal birds. Adoption of these methods long-term should provide a means of gauging our progress.

Eastern Whip-poor-will *(Antrostomus vociferous)* ***Brian Johnson***



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	242	12.76%	148	7.68%
Probable	201	10.60%	89	4.62%
Confirmed	15	0.79%	1	0.05%
Total Breeding	458	24.16%	238	12.35%

Data presented by Township/Range

0 30 60 120 Miles

Chimney Swift *(Chaetura pelagica)*

Richard A. Wolinski



Darlene Friedman ©

Species sponsored by: Ann & Jim Hancock

The Chimney Swift, with its distinctive flight call and short body with rapidly flapping, narrow wings, is conspicuous and familiar despite the fact that it is seldom seen at close range. Found throughout the United States east of the Rocky Mountains, they are in greatest abundance south of Michigan from Illinois and Ohio southward to northern Florida and the eastern seaboard. Several outlying breeding areas are found in Montana, California, and in Canada in the provinces of Manitoba and Saskatchewan (Cink and Collins 2002).

Distribution

Historical distribution in Michigan was reported by Gibbs (1879) for Kalamazoo Co. and statewide by Cook (1893) as widespread, including the UP, where it was found in similar numbers as in the rest of the state. Barrows (1912) and Wood (1951) found the species widely distributed across the state, although some accounts suggest larger numbers of birds are clustered around larger towns and cities.

MBBA I and MBBA II show that the species was recorded in lower numbers where human population density was low. These same areas tend to be tied to several land cover classes, such as farming for row crops or use as pasture, or large areas of second growth deciduous and coniferous forest. This is particularly evident for agricultural areas in Sanilac and Huron Counties in the Thumb of the LP and in portions of the NLP where cattle farming, mixed with logging, are major activities. A similar pattern appears to apply to significant areas in the eastern UP, in Mackinac, Chippewa, and Delta Counties, where observation of this species was particularly low compared to the remainder of the UP. The Chimney Swift is also present on Great Lakes islands, with records from most of the larger islands, including Isle Royale.

Confirmation of breeding in all blocks was lower in MBBA II than MBBA I. The greatest decrease in occupied townships, 47%, occurred in the UP, though decreases of 34%% in the NLP, and 5% in the SLP followed the pattern, averaging 24% across the state. These changes left three counties in the NLP without a documented occurrence of swifts where previously there were at least a few blocks with records.

Breeding Biology

Chimney Swifts nested in hollow trees in forested areas and possibly in caves before human settlement of North American. They have now become very closely tied to human structures for nesting, using their saliva to affix a small half-saucer nest to the inside of a structure that provides darkness and shelter (Cink and Collins 2002). Average clutch size in Ontario, based on 67 nests examined, was four (Peck and James 1983), with 19 May – 9 June the earliest dates eggs were noted in Ohio (Dexter 1969). Incubation lasts about 19 days, and young make their first flights at about 30 days of age (Cink and Collins 2002). Changes to nesting habitat, in terms of the number of nesting sites available in human supplied structures and natural sites, has probably taken place but has not been documented. The number of open wells and cisterns, silos, barns, and similar structures associated with the rural landscape have disappeared or decreased markedly since the early 1900s. Additionally, the number of chimneys available for use has declined (Carpenter 2006), perhaps even in urban areas that are under-surveyed by BBS routes but represent major population centers. It remains unclear as to how dependent this species is on natural substrates or woodpecker-created nest sites throughout the state. It may be that the availability of these sites is tied to tree age (younger stands versus old growth), suggesting that forestry practices may play a role (Cadman et al. 2007).

Abundance and Population Trends

The relative abundance of the Chimney Swift within the state, interpolated using BBS results in MBBA I, decreased from south to north within the LP and UP. The southern two tiers of counties had the largest numbers: 3-10 birds per route. Extending into mid-Michigan from these southern counties, as far north as the southernmost counties of the NLP, is an area with about one to three birds per route. The metropolitan area of Grand Rapids stands as an island within this area, with counts averaging three to six birds per route; a similar situation occurs near Big Rapids to the north. Likewise, the Detroit Metropolitan area in SE Michigan traditionally has the highest number of birds (up to 27 per route).

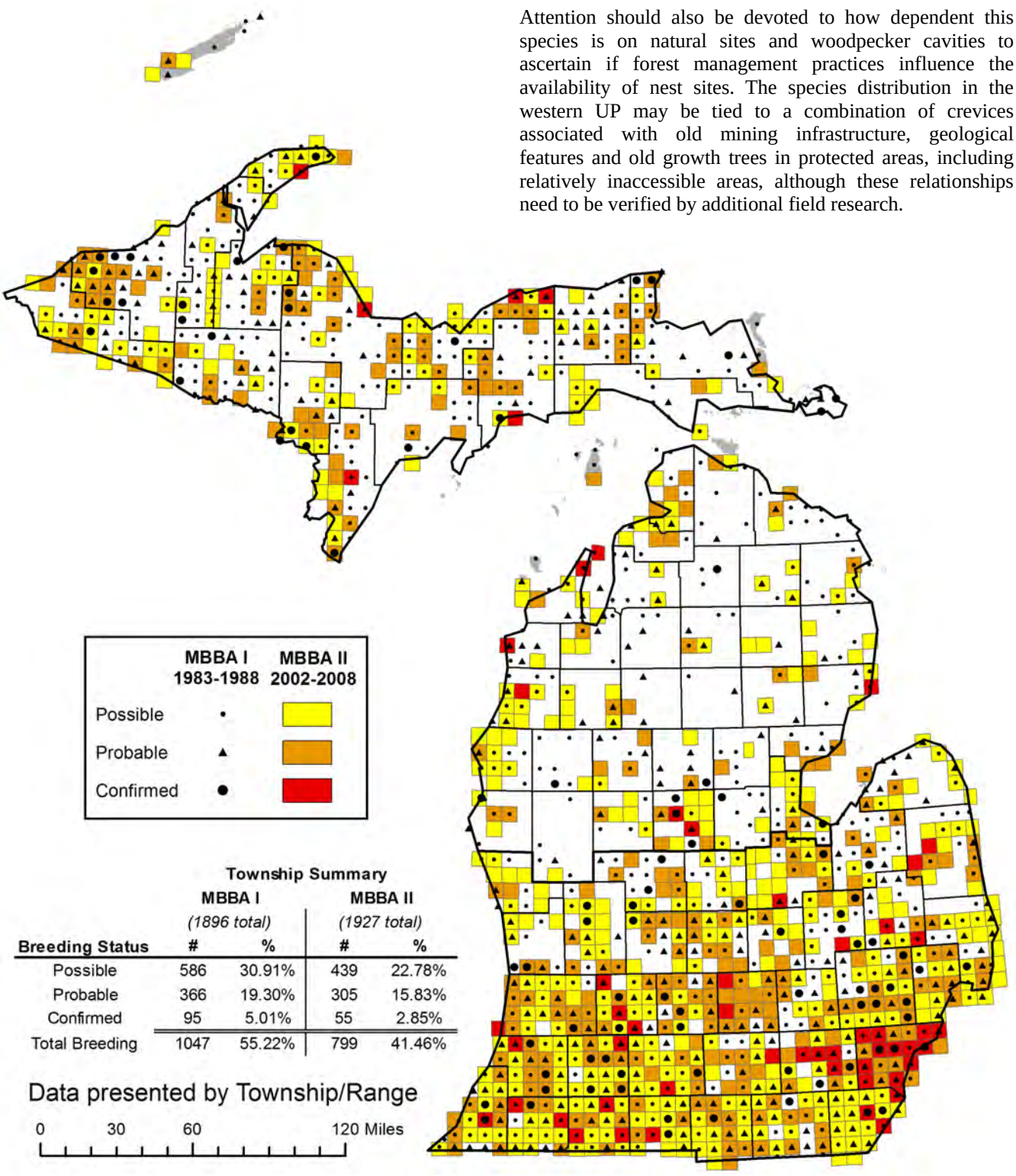
The Michigan BBS data show a long term decline in this species of about 1.5% per year, reflecting a significant decline of 2.4% annually for the U.S. as a whole from the 1980s onward (Cink and Collins 2002). This decrease stands in contrast to BBS data collected from 1966-1979 when a slight, but significant, increase was found in the eastern region, with some exceptions (Dexter 1991). It is interesting to note that the number of birds in parts of Ontonagon and Iron Counties were as high as areas in Southern Michigan and the Traverse City area during MBBA I.

Chimney Swift *(Chaetura pelagica)*

Conservation Needs

It appears that the swift population is still healthy, but declining. Based upon atlas results and BBS route data in Ontario, Chimney Swift and swallow species are showing rather significant decreases without a clear cause (Cadman et al. 2007, Heagy and McCracken 2004). It may be that if we are to maintain this species at historical levels, provision of nest sites may be a necessary conservation action. Artificial nest sites have been designed and are being put into place where Chimney Swift declines have been most noticeable (Cink and Collins 2002). The placement of artificial sites would require a great deal of education and coordination with landowners statewide in small villages and towns, as well as in larger cities.

Attention should also be devoted to how dependent this species is on natural sites and woodpecker cavities to ascertain if forest management practices influence the availability of nest sites. The species distribution in the western UP may be tied to a combination of crevices associated with old mining infrastructure, geological features and old growth trees in protected areas, including relatively inaccessible areas, although these relationships need to be verified by additional field research.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	586	30.91%	439	22.78%
Probable	366	19.30%	305	15.83%
Confirmed	95	5.01%	55	2.85%
Total Breeding	1047	55.22%	799	41.46%

Data presented by Township/Range

0 30 60 120 Miles

Ruby-throated Hummingbird *(Archilochus colubris)* ***Allen Chartier***



Allen Chartier ©

Species sponsored in memory of: Ginny Merlotti

Buzzing wings, strident sputtering calls, and a flash of green and red; virtually anyone can recognize our smallest bird, the Ruby-throated Hummingbird. Its combative demeanor and aerobatic flight has endeared it to thousands of homeowners who have placed feeders out for them in ever increasing numbers. This is the only breeding hummingbird species throughout eastern North America, ranging from the Canadian Maritimes south to central Florida and west to around the 100th meridian from east Texas to eastern North Dakota, and extending westward across southern Manitoba, Saskatchewan, and Alberta. They winter from southern Mexico through Central America to extreme northern Panama with many undertaking nonstop migratory flights across the Gulf of Mexico (Robinson et al. 1996).

Distribution

In the Great Lakes region, the Ruby-throated Hummingbird is widely distributed in all states. It is described as a common breeder in Wisconsin (Cutright et al. 2006), common in Illinois with more detections in the southern half of the state (Kleen et al. 2004), more common in the southern third of Indiana (Castrale et al. 1998), and most prevalent in southern and eastern Ohio (Peterjohn and Rice 1991). In Ontario, it is common throughout the southern portions of the province north to the north shore of Lake Superior, having expanded northward somewhat between their two atlas periods (Cadman et al. 1987, Cadman et al. 2007).

In Michigan, Ruby-throated Hummingbirds were considered a common breeding species in the LP but relatively rare in the UP by Wood (1951) and Zimmerman and Van Tyne (1957), whereas Payne (1983) considered it an uncommon transient and summer resident. Ruby-throated Hummingbirds have been recorded arriving as early as the first week in April (Reinoehl 2003), though males generally arrive in the first few days of May, followed by females a few days later. In the UP, spring migration can extend into early June (Binford 2006). Fall departure is generally before the first frost, typically in late September or early October, with adult males beginning migration in August and rarely lingering past Labor Day. Increasingly, Ruby-throated Hummingbirds have been recorded lingering into mid and late October (Wuepper 2006, Dombroski 2007, Byrne 2008) including as far north as Houghton County (Binford 2006). The latest records have included 26 November 2007 at Marquette (Dombroski 2008), 26 November 2009 in Allegan County (Chartier and Wuepper 2010.) and 1 December 2010 in Wayne County (pers. obs.).

The distribution of breeding Ruby-throated Hummingbirds is essentially unchanged with a statewide increase from nearly 28% of all blocks in MBBA I to nearly 32% in MBBA II. They were detected in nearly 24% of all UP blocks during MBBA II, compared with slightly more than 17% in MBBA I, which may reflect a true increase, or increased effort in the UP during MBBA II. Likewise, there was an increase in the southern LP from nearly 38% of blocks in MBBA I to more than 44% in MBBA II. The number of homeowners putting out hummingbird feeders has almost certainly increased significantly since MBBA I, which may account for this increase. The northern LP showed a slight decrease in blocks reporting the species from MBBA I to MBBA II.

Concentrations of breeding confirmations in Kalamazoo County are likely due to intensive field work there during the MBBA II period, and concentrations in Oakland, Washtenaw, and Jackson Counties are probably due to newly initiated banding studies there (A. Chartier unpub. data).

Breeding Biology

Ruby-throated Hummingbirds breed in a variety of forested and semi-open habitats including deciduous, mixed, and coniferous woodland, preferring edges and openings to forest interior, as well as rural, urban and residential areas, but not in prairies, fields or shrublands (Robinson et al. 1996, Sargent 1999). Their mating system is polygynous, with males mating with multiple females and forming no pair bond. Polyandry, with both males and females having multiple mates, may also be possible though this has not been studied (Robinson et al. 1996). So the atlas definition that an observed "pair" indicates probable breeding (Kalamazoo Nature Center 2004) does fit well with the biology of this species, although the presence of males and females during the breeding season likely does indicate breeding. Of the 422 reports of probable breeding, 49% were based on the presence of a pair, which, if based on observations of a single male, could underestimate the number of breeding females present.

Courtship displays of the males are spectacular and easily observed; most often the U-shaped flight, and 25% of probable breeding reports were based on courtship being observed. However, this aggressive U-shaped display is only the initial phase of courtship, and has been observed being performed to other males, other species, and even inanimate objects (Robinson et al. 1996; Sargent 1999; pers.

obs.). Receptive females will respond to the "U" display by moving to a dense tree or shrub, where the male follows and initiates a "shuttle" display, flying rapidly left-to-right about a foot or so with loudly whirring wings and rapid chipping notes, followed by copulation. The two then separate, with the male quickly seeking other females to court (Robinson et al. 1996, Sargent 1999).

Hummingbird nests are difficult to find, and only 79 blocks reported nests (43% of all confirmed reports) during the MBBA II period. Although the Ruby-throated Hummingbird has not yet been proven to regularly raise a second brood in Michigan, there is some evidence that this at least occasionally may occur (Schipper 2005). Dates of females carrying eggs, based on in-hand observations, may provide some evidence that double broods could be fairly frequent (A. Chartier unpub. data). Harriman (2006) stated that observations of fledged young between 10 June and 15 September suggested that the species is double-brooded in Wisconsin. In Michigan, fledging has not been confirmed in recent years before mid-July and juveniles, especially males, are known to linger into October (Chartier unpub. data), thus more concrete evidence should be provided to confirm two broods at our latitudes.

Abundance and Population Trends

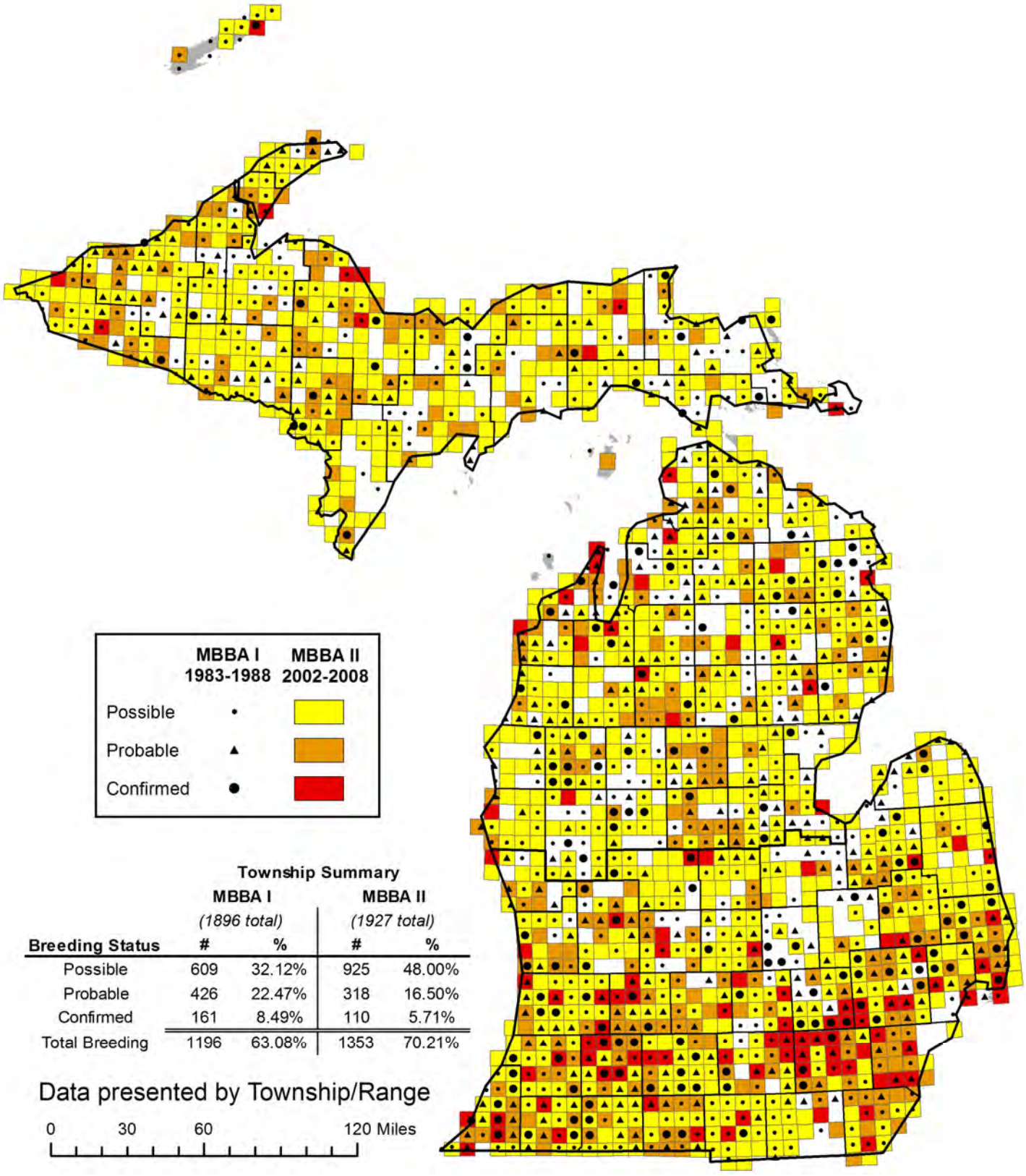
The estimated number of Ruby-throated Hummingbirds detected in MBBA II was between 4,252 and 10,492 "pairs" statewide, based on one pair found in 1,452 blocks, two to ten pairs in 804 blocks, and 10-50 pairs in 20 blocks. This is likely a significant underestimate for the state. As with breeding confirmations, the highest number of individuals was concentrated in the southwestern LP and portions of the southeastern LP, in addition to several isolated locales throughout the NLP and UP. Large numbers of Ruby-throated Hummingbirds can be found at many more UP sites than are suggested by MBBA II data (pers. obs.). The PIF estimate of the North American population of Ruby-throated Hummingbird is 7,000,000, and the estimate for Michigan is 200,000 (PIF 2007). The BBS trend data from 1966-2008 (Sauer et al. 2008) shows a statistically significant annual increase in Ruby-throated Hummingbirds of 4.98% for Michigan and 5.00% for USFWS Region 3. Ruby-throated Hummingbirds are not easily detected on BBS routes, with a mean of 0.38 individuals detected on 53 Michigan routes and a mean of 0.58 individuals detected on 372 routes in Conservation Region 3.

Conservation Needs

The Ruby-throated Hummingbird is not considered threatened in any part of its range, and populations in Michigan currently appear stable, although more study is needed. Little is known about breeding density, number of broods, and annual productivity of Ruby-throated Hummingbirds in Michigan. Welter (1935) described two simultaneously occupied nests in Rowan County, Kentucky, that were less than 69 meters apart, and two simultaneously occupied nests only 50 meters apart were found in Monroe County, Michigan (Chartier 2008). The Ruby-throated Hummingbird is able to co-exist with humans in urban, suburban, and rural areas, nesting in low densities in these habitats (pers. obs.). They are most numerous in and near woodlands with edges and openings, and so could potentially be impacted by large-scale deforestation. Pesticide use in gardens planted to attract hummingbirds would likely have a negative impact on local populations.

Ruby-throated Hummingbird *(Archilochus colubris)*

Allen Chartier



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	609	32.12%	925	48.00%
Probable	426	22.47%	318	16.50%
Confirmed	161	8.49%	110	5.71%
Total Breeding	1196	63.08%	1353	70.21%

Data presented by Township/Range

0 30 60 120 Miles

Belted Kingfisher *(Megaceryle alcyon)*

Michael J. Hamas



Matt Hysell ©

Species sponsored by: Michael McGraw

The Belted Kingfisher is widely distributed throughout most of North America where it is a denizen of diverse aquatic habitats, both freshwater and marine. Owing to its solitary and rather reclusive behavior, the Belted Kingfisher remains an obscure species that has not been adequately studied in much of its range. In Michigan, kingfishers are familiar breeding residents in both the LP and UP where they typically nest along shorelines of lakes, rivers, and streams. Easily identified by its distinct mechanical rattle or characteristic hovering flight, the Belted Kingfisher is truly a "king of fishers" plunging head first into water and emerging with prey in its bill. While kingfishers are technically landbirds, their diet consists of mostly aquatic animals, identifying them as ideal organisms for investigating the effects of environmental contaminants.

Distribution

First documented in Michigan by Kneeland (1857), kingfishers were subsequently regarded as "universally distributed," although nowhere abundant in the state (Barrows 1912). Wood (1951) noted that kingfishers were common summer residents in the LP and UP. Kingfishers have continued to be widely distributed throughout Michigan exhibiting evidence of breeding in every county of the state during both MBBA I and MBBA II.

Breeding Biology

Although a few kingfishers may spend the winter in Michigan, migrants begin arriving in April. Males generally arrive before females and establish territories in suitable habitat where excavation of a subterranean nesting burrow is undertaken by the pair during courtship (Hamas 1994). Finding kingfishers during the breeding season can require some effort because the birds are likely to be limited by the availability of suitable nesting habitat which is not always in riparian habitat. During egg laying and incubation (May-June), activity near the burrow is limited, and the presence of kingfishers may be overlooked, especially if the nest is some distance from water. Consequently, documentation of confirmed breeding may be diminished. Active burrows are easily identified by furrows that are formed by the feet of adults as they enter or leave the nest. After hatching, both adults can be seen or heard making recurring trips to the burrow with fish for nearly four weeks before the young fledge. With few exceptions, a single brood is raised annually (Hamas 1994).

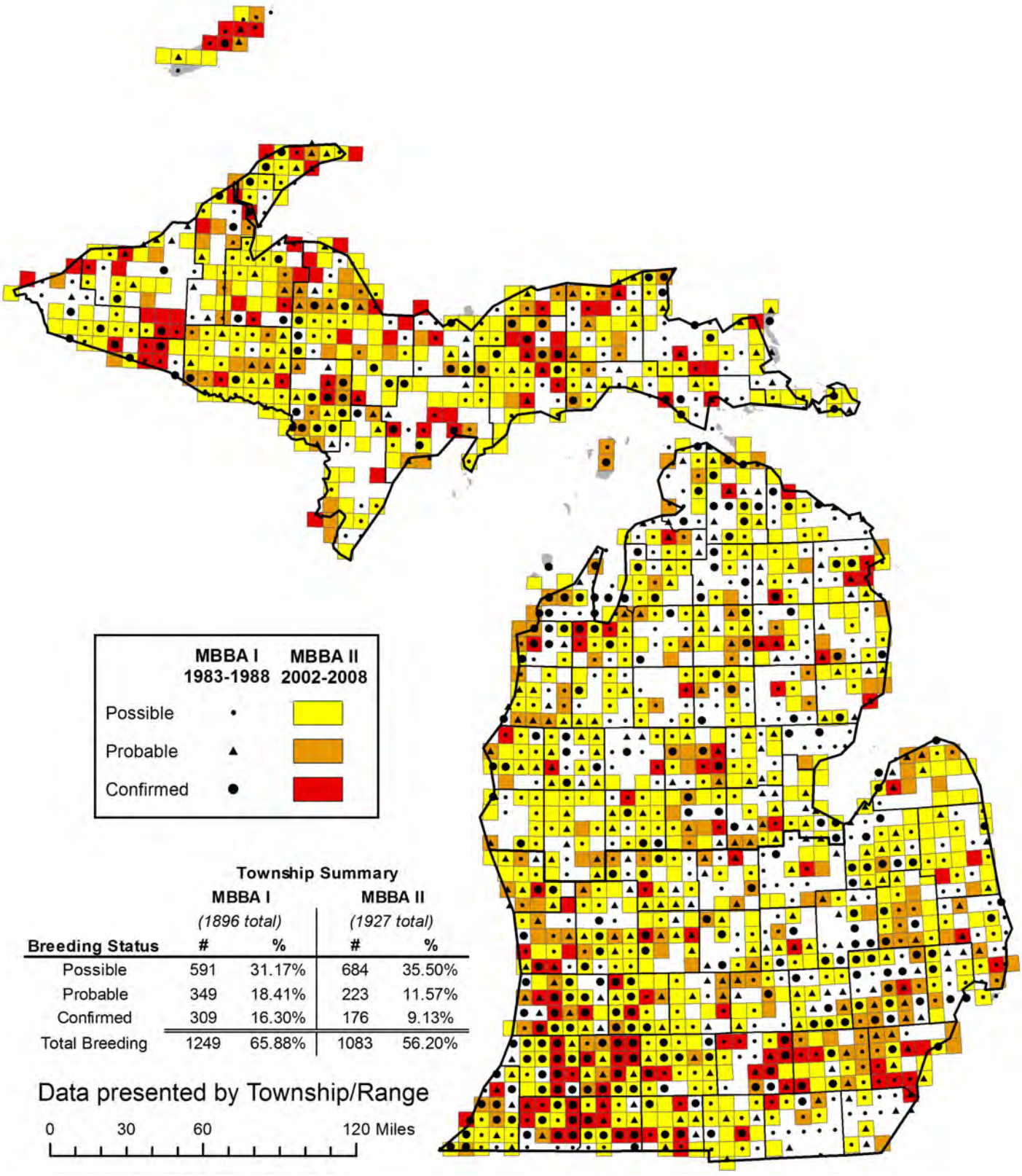
Abundance and Population Trends

Partners in Flight estimates the global population of Belted Kingfishers at 2,200,000 birds (PIF 2007). While little is known of primary sources of mortality for kingfishers, shoreline development could disproportionately affect the resilience of riparian populations despite high nestling survival (Kelly et al. 2009). In the UP, confirmed breeding and overall percent breeding evidence for kingfishers remained nearly the same in MBBA I and MBBA II, but in lower Michigan, percent breeding dropped substantially, particularly in the SLP. Observations of confirmed breeding in the SLP during MBBA II were less than 50% of confirmed breeding in the SLP during MBBA I. Similarly, in neighboring Ontario, the probability of observing kingfishers also decreased in the second atlas throughout most of the province (Archer and Timmermans 2007). BBS trend data indicate a significant annual decline since 1968 in Ontario and in Canada as a whole (Downes et al. 2005).

Conservation Needs

While the Belted Kingfisher has not been included on the watch lists of birds identified by the National Audubon Society or the American Bird Conservancy, the species' long-term decline in Michigan (Sauer et al. 2008) and in neighboring Ontario (Archer and Timmermans 2007) suggests that breeding populations need additional monitoring. Ontario Partners in Flight (2005) has identified threats and management issues as well as conservation actions that may assist in restoring historic kingfisher populations. The same considerations would likely apply to Michigan, particularly in the SLP where land use and development have increased dramatically during the past decade (USEPA 2008). Recent research on kingfishers has focused on foraging ecology, factors associated with nesting habitat, and responses to environmental contaminants (Kelly et al. 2009).

Belted Kingfisher *(Megaceryle alcyon)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	591	31.17%	684	35.50%
Probable	349	18.41%	223	11.57%
Confirmed	309	16.30%	176	9.13%
Total Breeding	1249	65.88%	1083	56.20%

Data presented by Township/Range

0 30 60 120 Miles

Red-headed Woodpecker *(Melanerpes erythrocephalus)*

Raymond J. Adams, Jr. & Torrey Wenger



Joan Tisdale ©

A favorite of birders, wildlife artists, photographers and formerly "a popular target for sportsmen" (Smith et al. 2000), this conspicuous woodpecker is characteristic of open woodland. There is no mistaking a medium-sized bird with a brilliant crimson head contrasting with dramatic white undersides and a black back, tail, and upper wings offset by bright white secondaries. The Red-headed Woodpecker occupies most of Michigan as a breeder, although it is still uncommon in the Upper Peninsula. It also is an uncommon to rare winter resident depending on the size of the annual mast crop produced by beech and oaks. Its range extends from the Great Plains east to parts of New England and from extreme southern Canada to the Gulf coast. In most winters, it migrates south and east from the northern and western portion of its range (Smith et al. 2000).

Distribution

Recorded by Sager (1839) and Sprague (1870) early in Michigan's history, Gibbs (1879) considered it a common summer and irregular winter resident. Extensive lumbering throughout the latter half of the 19th century had opened up vast areas of suitable habitat throughout Michigan's northern forests. During much of the early twentieth century the Red-headed Woodpecker was a common summer resident in the LP but had begun to decline in the UP and become more irregular in winter (Van Tyne 1938, Wood 1951).

By the 1950s, other factors began to influence its distribution. The loss of large numbers of American elm to Dutch elm disease likely led to a decrease in snags available for nest sites. At the same time, the expanding use of DDT greatly depleted the insects available for food. DDT itself had a direct impact as it caused a decrease in egg viability (Wallace et al. 1961).

By 1983, observers had already begun to detect changes in distribution. From 1983 through 1988, MBBA I observers recorded the Red-headed Woodpecker in 47% of the state's townships (12.3% in the UP, 51.5% in the NLP, and nearly 75% in the SLP). It was widely distributed in southwestern Michigan, Livingston and Oakland counties in the southeast, and Tuscola County in the Thumb, but absent in much of the rest of the Thumb, the Saginaw Bay area, and large regions of the northern LP. The only concentrations in the UP were eastern Chippewa county and Delta and Dickinson counties in the central UP.

Results from MBBA II paint a bleak picture in the UP, where only scattered pairs remain. The NLP also experienced a substantial reduction in birds with concentrations now restricted to Iosco, Grand Traverse, Clare, Isabella, Lake and Newaygo counties. Southeast Michigan likewise experienced a dramatic decline in distribution. During MBBA II, the Red-headed Woodpecker was only recorded in 21.1% of the townships in the state.

Elsewhere it was found in about 41% of the townships in Wisconsin with concentrations in the south, west and northeast (Hansen and Mueller 2007). In Ontario, its range has retracted south and west within the province (Woodliffe 2007).

Breeding Biology

The Red-headed Woodpecker is relatively easy to survey as well as identify. During much of the breeding season it is quite vocal and flies readily to the nest cavity when feeding young. In the summer, it frequently flycatches from the tops of large trees in open countryside. The diverse repertoire of calls that range from "*tchur-tchur"* to a shrill "*charr-charr"* during a chase and a "*queearr"* breeding season call are a give-away (Smith et al. 2000).

Because this woodpecker does overwinter, the timing of its return in spring is not as easy to pinpoint. The tendency of Red-headed Woodpeckers to migrate at night during the spring (Smith et al. 2000) further complicates efforts to characterize its arrival date. Based on seasonal survey records published annually in Michigan Birds and Natural History (MAS 1994-2011), it appears that birds return to the SLP in late April and early May. Further north the birds are back on territory mid- to late May. A primary cavity nester, this species may compete for suitable dead snags with Red-bellied Woodpeckers and European Starlings, among others (Ingold 1989). The four to seven white eggs that require 14 days to hatch (Hansen and Mueller, 2006), may be found from mid-May through late June in Michigan. Re-nesting is common after first nest failure, and second broods also occur. After the young are weaned, individuals wander looking for food. Fall migration is thought to be mostly diurnal from early September through early October.

Red-headed Woodpecker *(Melanerpes erythrocephalus)*

Abundance and Population Trends

Many authors have commented on the population fluctuations of the Red-headed Woodpecker. In the 1950s near Kalamazoo, this woodpecker was widespread along the river bottoms, road sides, lake shores, and in open woods wherever clumps of dead trees were present. Data from local BBS routes (Sauer et al. 2008) indicated a stable population in the early 1970s. By 1980, those same surveys indicated the Red-headed had already declined 40% and by the mid-1990s, it had declined over 90%. Today, the Michigan population is estimated at roughly 8000 pairs (PIF 2007). Atlas workers reported at least 1743 pairs in the MBBA I and at least 870 pairs in MBBA II.

BBS data for Michigan indicate an increasing trend for the Red-headed Woodpecker from 1966 through 1979 followed by a significant negative trend of 1.32% per year from 1983 through 2007 (Sauer et al. 2008). Because this species is a short-distance migrant that remains in the US in winter, CBC data are also relevant to document its population trends. Since 1980 the CBC results show a corresponding decline nationally and in Michigan.

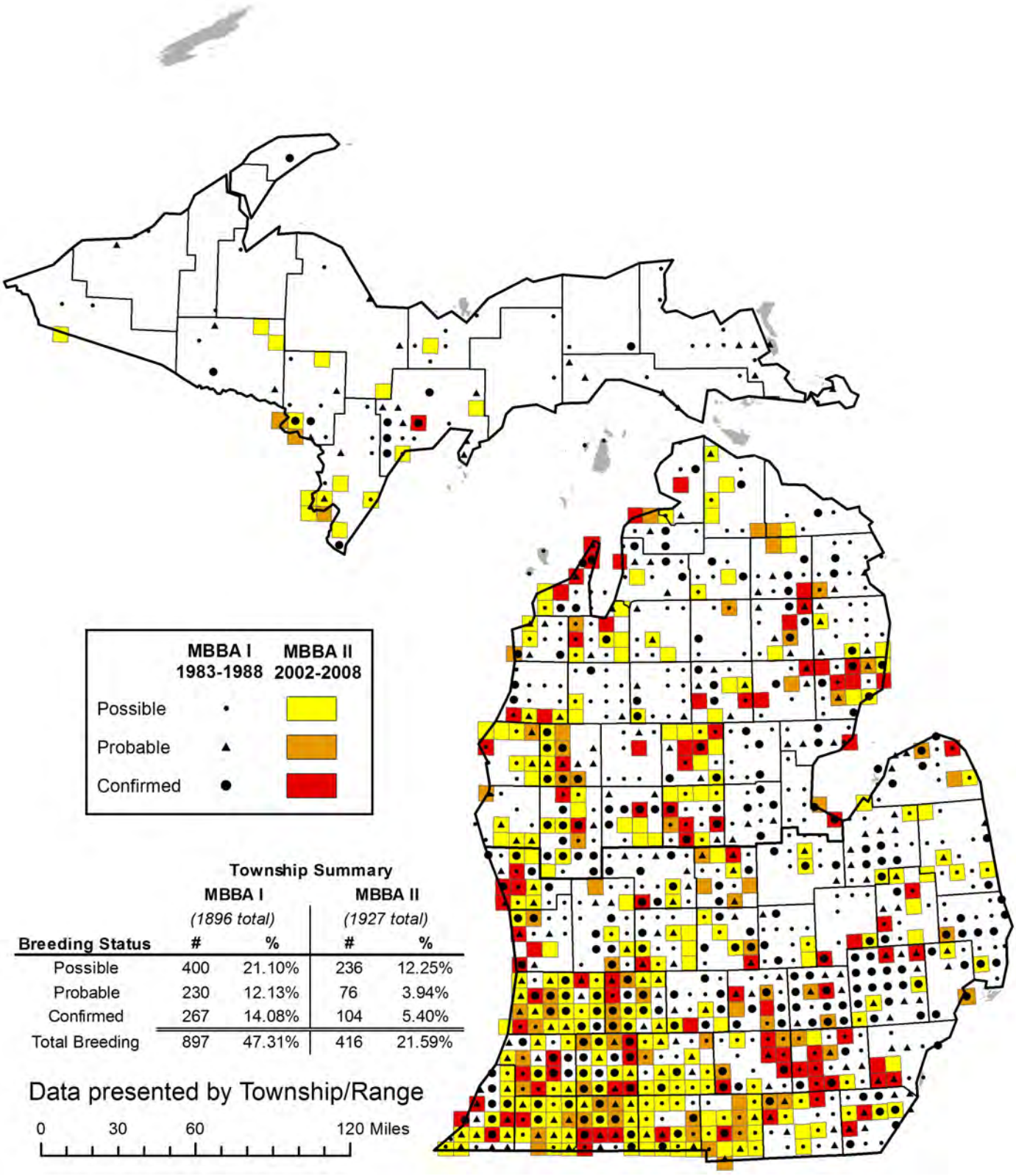
In Ontario, the Red-headed Woodpecker population declined precipitously between their first and second atlases (Woodliffe 2007). In New York, Red-headed Woodpeckers were reported in 76% fewer blocks during the second breeding bird atlas (McGowan 2008). Wisconsin which conducted its only atlas from 1995 through 2000 found this species in 41% of its quads (Hansen et al. 2006). Wisconsin BBS data from 1966 to 2002 indicate a 5 % decline per year (Sauer et al. 2008).

Probable causes of population fluctuations include a reduction in potential nesting snags, competition for nest sites, habitat loss, land-use changes, changes in agricultural practices, fire suppression and an increase in firewood harvest (Hansen et al. 2006). Vehicle collisions and the elimination of tree-lined fencerows have been a notable problem in southern Michigan.

Conservation Needs

In Michigan, this species is a bird of open wooded habitat with plentiful dead snags, especially savanna, wooded fence lines, roadsides, open managed oak forests, and riparian forest. This species may benefit from an increase of snags as a result of the Emerald Ash Borer. Protecting dead snags, restoring oak savanna, leaving treed fence lines, increasing the size of forest fragments, increasing forest snags, encouraging oak forest, and the appropriate use of fire would benefit the Red-headed Woodpecker.

Red-headed Woodpecker *(Melanerpes erythrocephalus)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	400	21.10%	236	12.25%
Probable	230	12.13%	76	3.94%
Confirmed	267	14.08%	104	5.40%
Total Breeding	897	47.31%	416	21.59%

Data presented by Township/Range

0 30 60 120 Miles

Red-bellied Woodpecker *(Melanerpes carolinus)*

Raymond J. Adams, Jr. & Torrey Wenger



Jerry Jourdan ©

The Red-bellied Woodpecker doesn't seem to garner the admiration received by the related Red-headed Woodpecker. In fact, people often mistakenly identify the Red-bellied as the Red-headed. The pronounced red crown on the Red-bellied along with the fact the red on the belly is muted and hard to see, frequently causes confusion for the novice. Because this common permanent resident is comfortable around people and readily feeds on suet, sunflower seeds, cracked corn, peanuts and peanut butter at bird feeders, most birders in Michigan's LP have become very familiar with it. The Red-bellied Woodpecker has only recently reached the UP, immigrating northward from Wisconsin into Menominee, Dickinson and Iron (K. Kahl pers. comm.) counties. This woodpecker is at the northern limits of its range in Michigan, with a continental distribution extending from the plains east to the Atlantic Coast and from the Gulf Coast north into the Great Lake states and southern Ontario.

Distribution

The Red-bellied Woodpecker has been present in the state from at least the late 1830s (Sager 1839). Gibbs (1879) considered it an abundant resident, while Cook considered it "common, though rare, except in wooded fields (1893)". Barrows (1912) described it as "more frequently met with in the southern half of the state" and "rather more abundant on the west side …" often including the term migrant when referring to its status. Van Tyne (1938) called it an "uncommon local resident north to Saginaw and (formerly) Lake County". Clearly, sometime between the late 1800s and 1950 its range contracted. Wood (1951) described it as an "uncommon and local resident north to Ionia County". Habitat loss must certainly have been a factor as this time period saw vast deforestation from the middle of the LP north. Below average winter temperatures in the late 1800s and the extensive drought in the 1930s may also have been factors.

Zimmerman and Van Tyne (1959) felt it may have been increasing and expanding its range in the late 1950s. By the 1980s, results from MBBA I showed a significantly expanded breeding distribution with the Red-bellied Woodpecker found in over 34% of the townships. It was well-distributed south of a line extending from the north end of Saginaw Bay across to Mason County and north into Manistee, Benzie and Grand Traverse counties. Elsewhere north of the line, this woodpecker was uncommon and local. There were seven UP records in MBBA I. The species was less common and local around much of Saginaw Bay, the Detroit metropolitan area and the eastern half of the thumb, areas where extensive woodland was less common.

Today, data from MBBA II show that the Red-bellied Woodpecker is widely distributed throughout the southern LP, including the Detroit metropolitan area. It likely occurs in every township from the north end of Saginaw Bay across to Mason County and south into Indiana and Ohio. It also ranges across most of the northern LP especially the lakeshore counties, with few birds reported from Kalkaska, Otsego, Montmorency, Cheboygan and Presque Isle Counties. It is present in 45 townships in the UP extending northward from Wisconsin into the central UP. Overall, it can be found in approximately 53% of the townships in the state. The probability of finding it in a township increased over 60% from MBBA I.

Breeding Biology

The Red-bellied Woodpecker is typically single brooded in Michigan, with nest building commencing in late April and extending through May farther north. Egg dates range from late April into June with hatching of young beginning in mid-May and continuing into August. Shackelford et al. (2000) provide clutch data indicating an average of slightly over four eggs, which require 12-14 days to hatch. Young remain in the nest about three weeks. Cavity nesting species such as this are easily confirmed during nest building when they are quite vocal and again when feeding young at the nest or recently fledged young.

Abundance and Population Trends

Woodpeckers are much more problematic to survey than songbirds. Most woodpeckers are easily surveyed early in the breeding season. Only a small percentage of the surveys were conducted from late March and late April when Red-bellied Woodpecker territorial development is more pronounced. Since Atlas block surveys, point counts, and Breeding Bird Surveys usually are conducted from late May through June when the Red-bellied Woodpecker is less vocal, this species is likely more common than survey results suggest.

From 1966 to 2007, Sauer et al. (2008) show that the Red-bellied Woodpecker has significantly increased 5.4% per

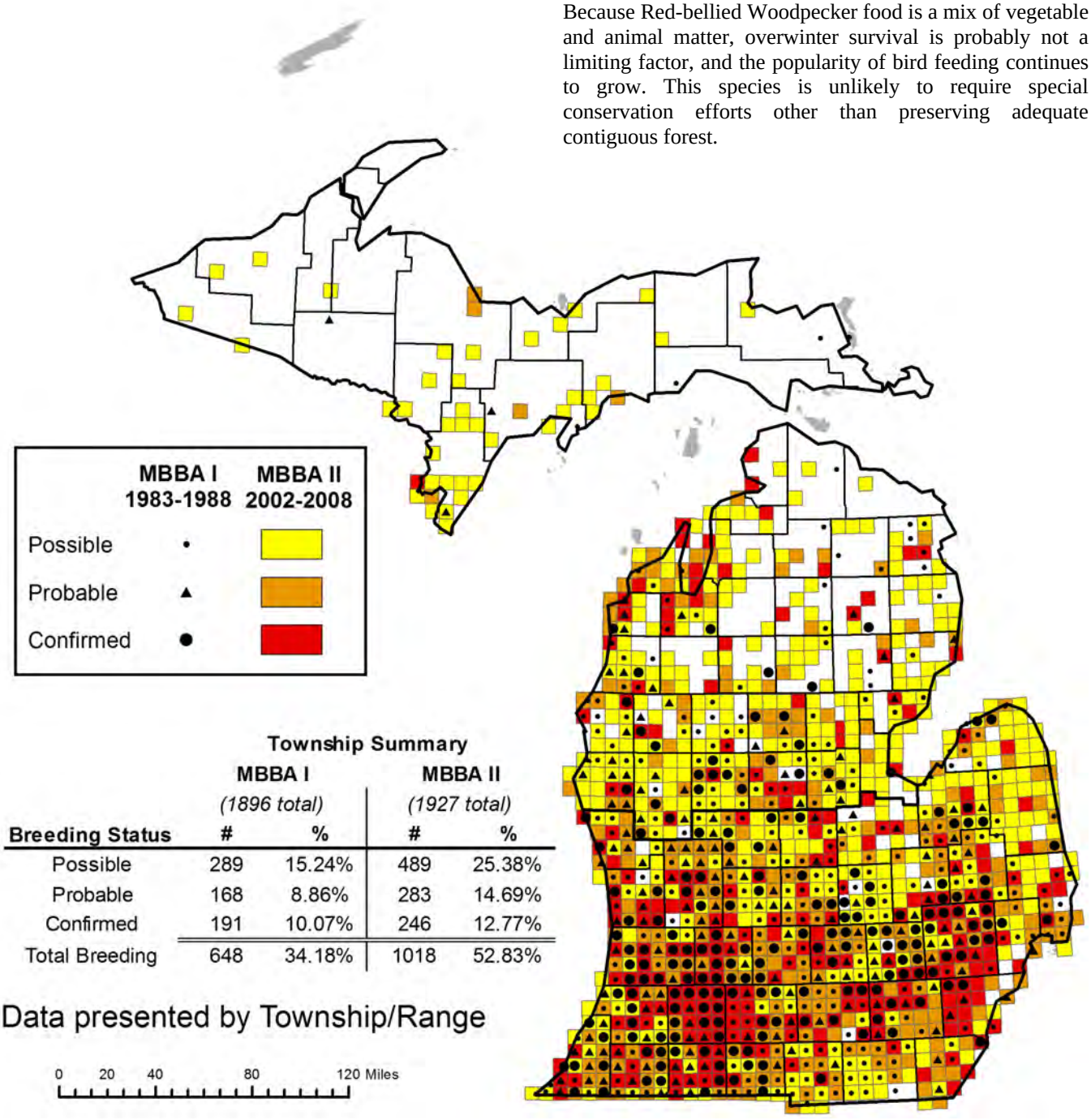
Red-bellied Woodpecker *(Melanerpes carolinus)*

year in the state based on BBS data. From the beginning of MBBA I (1983) through 2007, the trend is a positive 4.93 %. The trend in USFWS Region 3 for the same time period is a positive 2.15 %. Even in those areas of Michigan where the Red-bellied Woodpecker has long been established, the population continues to increase. Kalamazoo County BBS data indicate an increase from 1970 to 2006 of nearly 100%. These results show a clear trend that may be associated with the warming climate, increase in forest, and quite possibly the increase in bird feeding. Nationally, this woodpecker has experienced an increase on CBC counts since about 1950.

The PIF Michigan Landbird Population Estimate (PIF 2007) for this woodpecker is 79,000 birds or roughly 39,500 pairs. The number of pairs reported during MBBA II was at least 5,054, or approximately 13% of the estimated population.

Conservation Needs

The recent expansion in the state and the upward population trend suggest climate change and forest maturation will continue to allow this species to prosper in Michigan. Because Red-bellied Woodpecker food is a mix of vegetable and animal matter, overwinter survival is probably not a limiting factor, and the popularity of bird feeding continues to grow. This species is unlikely to require special conservation efforts other than preserving adequate contiguous forest.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	289	15.24%	489	25.38%
Probable	168	8.86%	283	14.69%
Confirmed	191	10.07%	246	12.77%
Total Breeding	648	34.18%	1018	52.83%

Data presented by Township/Range

Yellow-bellied Sapsucker *(Sphyrapicus varius)* ***Greg Cleary***



Willie McHale ©

The persistent begging calls of the chicks make this woodpecker's nest relatively easy to find. Wait a couple of minutes, and an adult will arrive and unwittingly lead the observer directly to the nest hole. The sapsucker's neat rows of tiny holes drilled in trees are another good clue to its proximity. In the summer, the Yellow-bellied Sapsucker is found throughout the northern two-thirds of Michigan, where it is at the southern edge of its range. The sapsucker breeds in a band across southern Canada from eastern Alaska to Nova Scotia, occurring south of the border in the Upper Great Lakes region, the northeastern U.S., and locally in higher elevations of the Appalachians as far south as Tennessee. The sapsucker is the most migratory of eastern woodpeckers; there is virtually no overlap between its summer and winter ranges.

Distribution

The Yellow-bellied Sapsucker is a common and widespread breeder in mixed and hardwood forests in the UP and northern LP, though its numbers drop off abruptly south of Saginaw Bay. In the UP, the sapsucker was recorded in 74% of townships, up from 63% in MBBA I. For reasons that are unclear, it remained relatively scarce in the Keweenaw Peninsula and was absent from parts of the far west. In the far east, it was again absent from much of the agricultural land south of Sault Ste. Marie. During MBBA I, the sapsucker was less common near Lake Michigan—a pattern that was still evident but much less pronounced during MBBA II.

In the northern LP, the sapsucker was observed in 65% of townships, up from 46% in MBBA I. It remained widespread throughout the region and made significant gains in the counties that border Lake Michigan. Historically, this species was much more frequent in the southern LP than it is today, with records of regular nesting from the late 1800s, before large-scale clearing of the forests there (McPeek and Adams 1994). By the time of MBBA I, however, it had long been absent as a regular breeder in the south. Since then, it has not reestablished itself in southern Michigan in significant numbers, as it was present in only 5.1% of townships during MBBA II, up from 3.6% in MBBA I. This gain may be attributed to a single population cluster in the thumb area that was documented in MBBA I and expanded considerably by the time of MBBA II.

Sapsuckers breed in hardwood and mixed forests. In Michigan, breeding habitat typically includes aspen, birch, maple, or spruce (McPeek and Adams 1994). Some studies have suggested a preference for early successional habitats (Eberhardt 1994), while others suggest that the sapsucker does just as well in mature forests (Sutherland et al. 2007). Based on this author's observations, sapsuckers appear equally at home in both mature and early-successional forest types in Michigan, with a distinct preference for mature aspens as nest trees.

Breeding Biology

Although a few Yellow-bellied Sapsuckers overwinter in the SLP, most of the Michigan breeders arrive in the state as soon as the sap begins flowing—as early as late March in the south and in April farther north. Nesting begins in early May and continues through June and into July (McPeek and Adams 1994). During the course of atlas work in the UP, nests with begging young were frequently encountered during the second half of June and the first half of July, and as late as 20 July in Iron County (pers. obs.).

Abundance and Population Trends

The Partners in Flight estimate of Michigan's population of Yellow-bellied Sapsucker is 190,000, which represents 2.1 percent of the species' total population (PIF 2007). Breeding Bird Survey data show a significant increase for this species in Michigan between the first and second Atlas periods (Sauer et. al. 2008). An upward trend was also noted in the Ottawa Breeding Bird Census in the western UP from 1992-2008 (U.S. Forest Service, unpublished data).

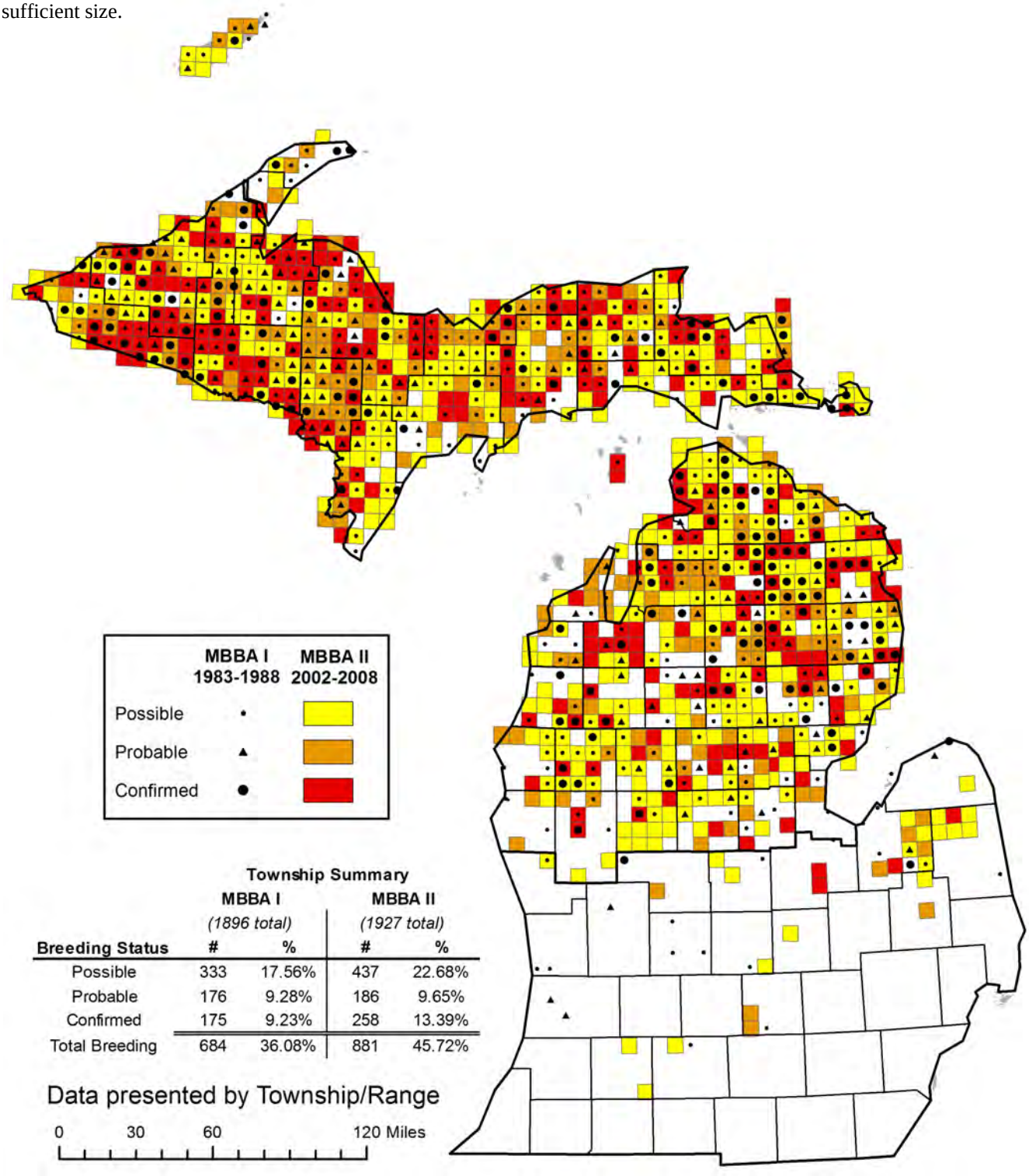
The most recent Ontario Breeding Bird Atlas, which concluded in 2005, indicated a minor increase in this species' distribution overall during the past two decades, with larger increases in the southern portions of its Ontario range, possibly due to former agricultural areas being overtaken by young forest (Sutherland et al. 2007).

In Wisconsin, the sapsucker's status is very similar to its status in Michigan. The Wisconsin Breeding Bird Atlas found the species to be common and increasing in the northern part of the state, a trend that is backed up by BBS data and may be attributed to forestry practices that favor aspen, birch, and maple. However, it remains scarce in the south, where it was historically much more numerous. The exception is an isolated population in southwestern Wisconsin, along the Mississippi and Wisconsin River valleys (Cutright et al. 2006). Although these river valleys are wider and deeper than any in southern Michigan, it is reasonable to expect that if the sapsucker does eventually make a comeback in southern Michigan, it may begin in the larger river valleys, which tend to be more heavily forested than the surrounding countryside.

Yellow-bellied Sapsucker *(Sphyrapicus varius)*

Conservation Needs

Because the Yellow-bellied Sapsucker can adapt to a wide variety of forest types, its status in Michigan appears to be secure for the time being. Its scarcity in agricultural areas suggests that rows of trees among fields are not sufficient breeding habitat; therefore, the preservation of larger tracts of forest is most likely to benefit this species. Similarly, it may also benefit from forest regrowth in abandoned agricultural fields, if the resulting forested areas are of sufficient size.



Downy Woodpecker *(Picoides pubescens)*

Emma Pitcher & Anna Kornoelje



Jerry Jourdan ©

The Downy Woodpecker, smallest North American member of a large family, is a familiar permanent resident throughout Michigan wherever forests, woodlands, orchards, parks, and backyard suet feeders are to be found. These bright black-and-white birds are known by rapid, bounding flight, peek call notes, and musical rattle calls. Males are identified by a small red nape bar. As mainly insectivorous birds, Downy Woodpeckers are one of our most beneficial species (Jackson and Ouellet 2002). A sturdy beak, extra-long barbed tongue, and sticky saliva enable them to capture insect foods deep in the holes they excavate. Sexual differences in feeding locations appear to be determined by male dominance (Kilham 1970).

Distribution

The Downy Woodpecker breeds throughout wooded areas in North America with small, or no, populations in far north, desert, or mountainous areas. For example, in Ontario there is an overall tendency of decrease in the numbers of Downy Woodpeckers with increasing latitude (Bavrlic 2007). It breeds in all states neighboring Michigan. While Downy Woodpeckers do not migrate, there is evidence that the birds, particularly females, will travel long distances (Browning 1995, Jackson and Ouellet 2002).

MBBA I reported that Downy Woodpeckers were familiar breeders in mesic deciduous forest or wherever needs for food and nesting privacy can be met. Downy Woodpeckers prefer deciduous woodlands that include small trees with a low canopy (Jackson and Ouellet 2002). Almost all tree species are acceptable, although fewer birds are found in coniferous forests except when associated with deciduous understory. Available fruits are eaten, including poison ivy berries (McAtee 1947). Goldenrod galls are drilled for larvae (Jackson and Ouellet 2002, E. Pitcher pers. obs.). In winter, Downy Woodpeckers may join traveling flocks of chickadees, titmice, and nuthatches where they are able to spend less time watching out for predators and more time on foraging (Sullivan 1984).

MBBA I reported nesting activity in 83% of surveyed townships statewide. This can be compared to MBBA II which reported nesting activity in 80.6% townships statewide. In both atlases, the SLP had the greatest concentrations of nesting activity followed by the NLP. The UP had the lowest concentration of nesting activity for both MBBA I and MBBA II.

Breeding Biology

Drumming brings the two sexes together in early spring (Stark et al. 1998). Either sex selects the nest site, which is generally excavated in trees infected by fungal rot (Conner et al. 1976). For weather protection, trunk cavities are often excavated just below an overhanging branch. Behavioral evidence of nest site decision includes leisurely preening, drumming duets, courtship flights, and joint defense of the nest area against competition (Kilham 1974). Both sexes spend about 16 days excavating the characteristic round entrance holes and 20.3-30.5 centimeter deep cavities. Copulation occurs any time of day and is most frequent during egg-laying (Jackson and Ouellet 2002). Both sexes develop brood patches and participate in 12 days of incubation of three to eight eggs (Short 1982). Young are brooded 18-22 days (Short 1982). Males brood young at night and take the lead in nest sanitation (Jackson and Ouellet 2002). Young may be dependent on parents for three weeks after fledging (Jackson and Ouellet 2002).

Abundance and Population Trends

Historically, Downy Woodpecker population trends are similar in all states neighboring Michigan. Small, round nest holes, three to nine meters above the ground, can be easily missed by observers unless nestlings are at their brief noisy stage when their rasping calls are easy to detect. Parents are very silent during incubation and brooding periods.

Downy Woodpecker populations are estimated at 300,000 individuals in Michigan and 13,000,000 individuals nationwide (PIF 2007). BBS trends show no significant change in populations in Michigan between the first and second atlas efforts (Sauer et al. 2008). Further, USFWS Region 3, defined as the Midwest, also reported no significant population changes during the same time period (Sauer et al. 2008). Similarly, there was no significant change in the probability of observation of Downy Woodpeckers in Ontario (Bavrlic 2007). This corresponds with a lack of change in populations in New York (McGowan 2008).

Conservation Needs

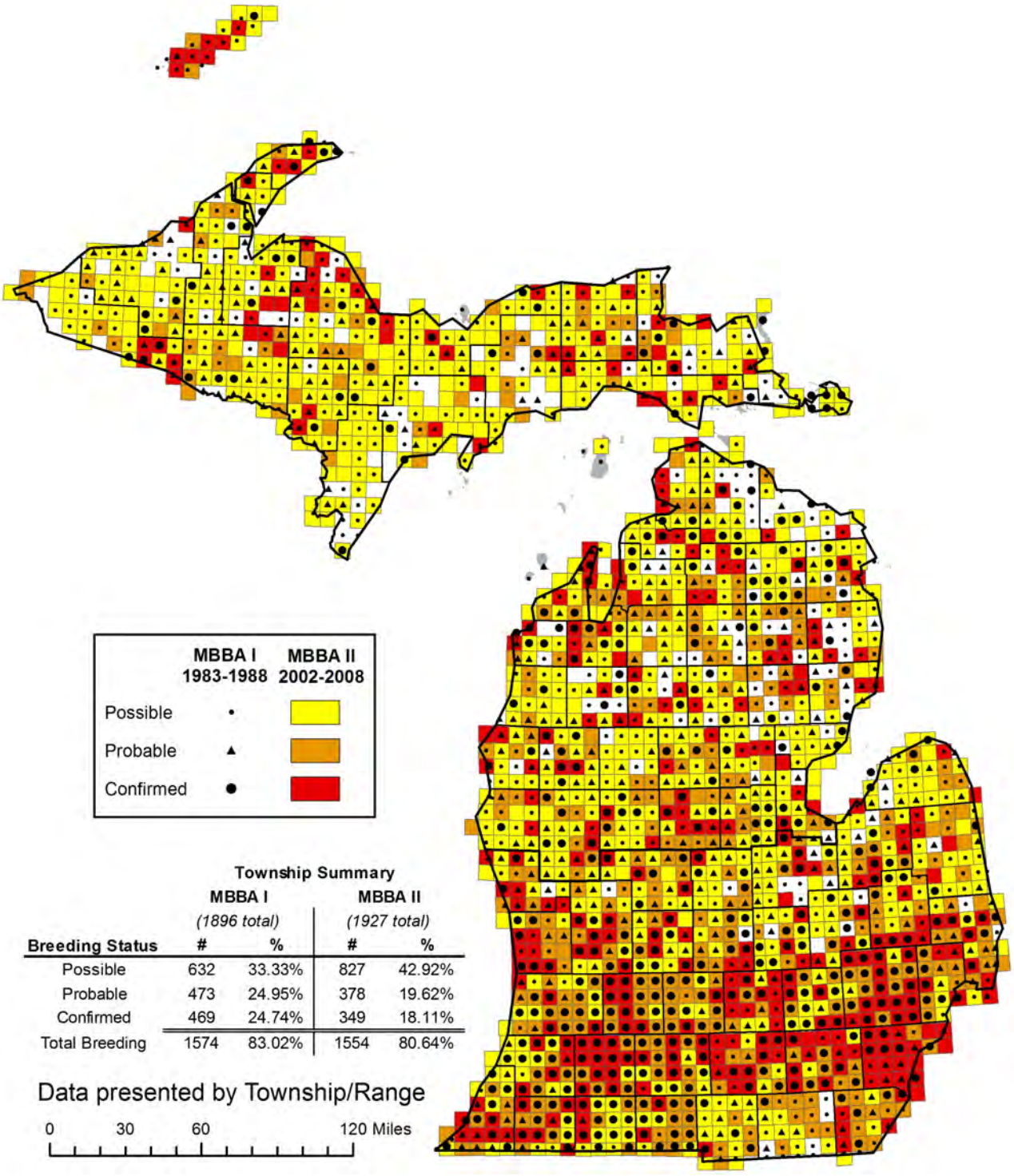
To mitigate potential detrimental effects of timber harvest, deciduous trees in varying sizes and states of decay should be retained in forest stands. Also, uncut filter strips along

Downy Woodpecker *(Picoides pubescens)*

Emma Pitcher & Anna Kornoelje

streams and roads appear to be of value as woodpecker nesting habitat (Conner et al. 1975). In fragmented forests, Downy Woodpecker survival is highest in large woodlots (Doherty and Grubb 2002). Agricultural pesticide and irrigation practices, tree planting in forests, cities, and towns, and shifts in diet items caused by climate change may all affect populations.

Jackson and Ouellet (2002) point out the need for solid quantitative data on such items as clutch size, reproductive success, renesting rates, and dispersal distances of young from natal site to site of first breeding.



Hairy Woodpecker *(Picoides villosus)*

Emma Pitcher & Anna Kornoelje



Al Menk ©

The Hairy Woodpecker is a familiar mottled black-and-white resident of woodlands all across North and Central America. This woodpecker is just slightly larger than its look-alike, the Downy Woodpecker, and, like the smaller bird, the male has a small red patch on the back of his head. Although this woodpecker is one of the most geographically variable species, the Hairy Woodpecker can also be identified by its bill which is larger and heavier than the Downy's. Compared with the Downy, its call is louder. The Hairy has a characteristic straight, graceful, bounding flight and uses its tail as a prop when excavating its nest hole.

Hairy Woodpeckers are easy to observe at feeders, although away from feeders, they may be somewhat shy (Jackson et al. 2002). Hairy Woodpeckers glean arthropods from the surface and just beneath the bark on trunks or dead branches, climbing easily with short, strong legs (Conner et al. 1975). The unique two toes in front and two toes in back foot arrangement of all woodpeckers enables them to cling firmly to tree bark while excavating a roost or nest hole or hunting food.

Distribution

The Hairy Woodpecker prefers extensive, mature forest habitats, where arthropods are its principal diet item, making it a valuable resident of forests. It will also nest in wooded suburban areas and mature wooded riparian corridors (Jackson et al. 2002). Further, research shows that Hairy Woodpecker population densities increase between one and five years after the occurrence of forest fires (Hobson and Shieck 1999, Saab et al. 2007). Fruits, seeds, and pine cone seeds are choice food items, as well as sunflower seeds and suet at feeders (Jackson et al. 2002).

The small, round nest entrance holes may be as high as 18 meters above ground and can be easily missed in a dim forest (Eaton 1914, Bull 1974). The adult's familiar drumming is steady, more rapid, and with longer pauses between bursts than the drumming of Downy Woodpeckers (Jackson et al. 2002). The Hairy Woodpecker's drumming and vocalizations are silenced during the nesting season. However, young birds may be very noisy for several days toward the end of the nesting period. Breeding decreases in areas dominated by agriculture and in urban and suburban centers but increases in response to the presence of large mature shade trees in cemeteries, parks, and residential areas.

In Michigan, Hairy Woodpecker populations are well distributed, with larger numbers in more heavily forested areas. During MBBA I, reports of nesting activity were highest in the NLP, followed by the SLP, and then the UP. This can be contrasted with findings from the MBBA II, where nesting activity was highest in the UP, followed by the NLP and then the SLP. As was found in New York, the continuing maturation of forests in Michigan may account for the slight shift in Hairy Woodpecker distribution (McGowan 2008).

Breeding Biology

Some Hairy Woodpeckers remain paired year round, although the breeding season begins in March and extends through July. Tree species chosen for nesting depend on availability of large trees or branches with heart rot (Conner and Adkisson 1976). Nest trees average 30 cm in diameter and 9 meters in height (Pitcher 1991). The male or female may choose the site. Excavation begins two to three weeks before egg laying. Deep cavities, varying from 20.3-40.6 cm, create a warm, protected environment for three to seven eggs (Eaton 1914, McNair 1987). Both parents have incubation patches, incubate eggs for 12-15 days, and brood young for at least six of their 28-30 days in the nest (Lawrence 1967, Kilham 1968, Kilham 1979). Young may remain with a specific parent for up to four weeks after fledging (Jackson et al. 2002).

Abundance and Population Trends

The Hairy Woodpecker is estimated to number around 7,500,000 individuals in North America with around 100,000 individuals in Michigan (PIF 2007). Hairy Woodpecker populations appear to be stable in Michigan. BBS trends from 1983 to 2007 show no significant population changes (Sauer et al. 2008). Regionally, the second Ontario atlas documented a 2.1% increase in probability of observation while a small but significant increase in population was seen in New York (Bavrlic 2007, McGowan 2008).

Hairy Woodpecker *(Picoides villosus)*

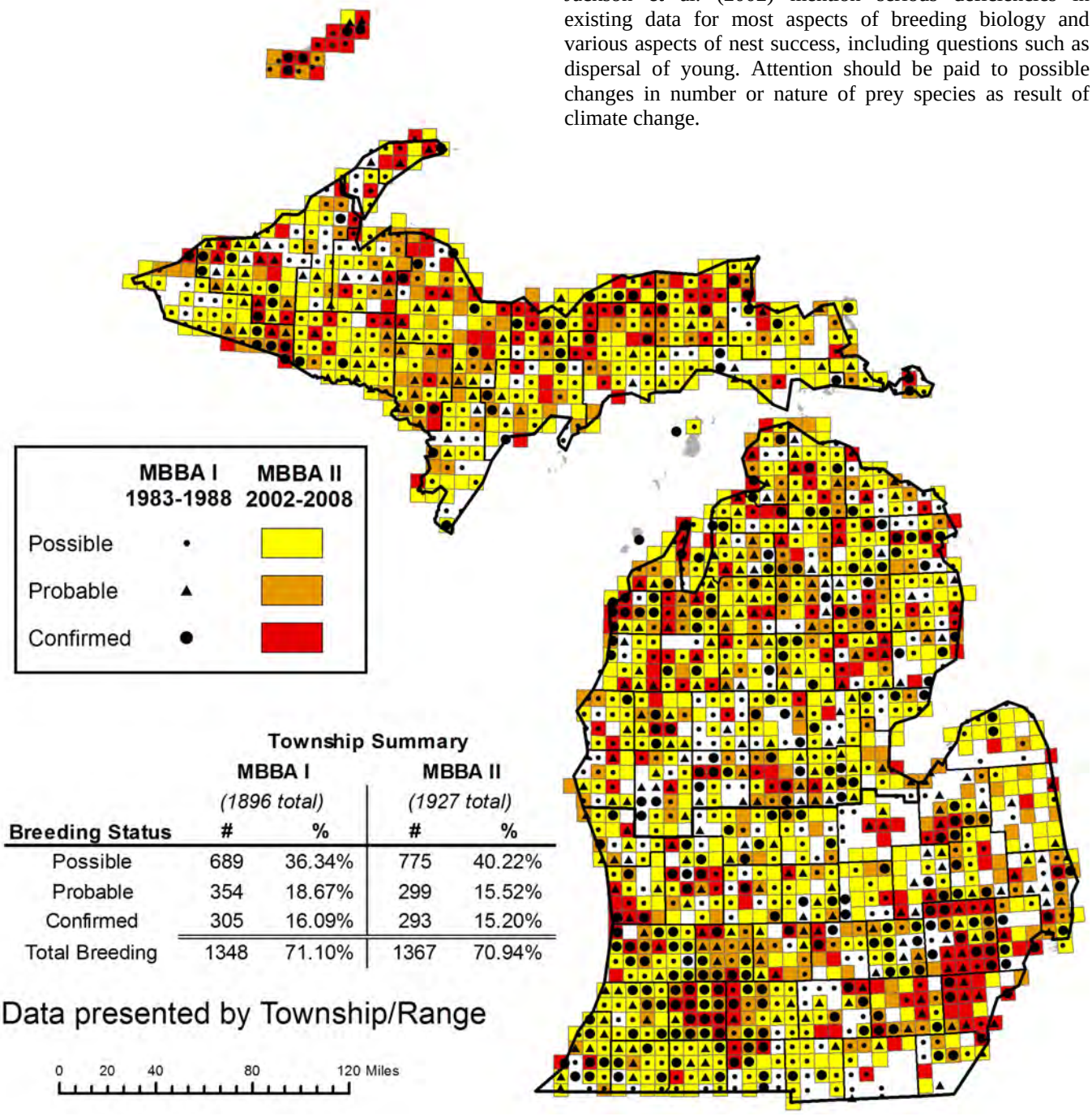
Emma Pitcher & Anna Kornoelje

Conservation Needs

Hairy Woodpeckers are neither threatened nor endangered. To mitigate potential detrimental effects of timber harvest, deciduous trees ranging from 10 to >30 cm in diameter and in varying states of decay should be retained in forest stands.

Uncut filter strips along streams and roads appear to be of value as woodpecker nesting habitat (Conner et al. 1975). It may not be possible to stop or slow down the incursion of summer homeowners constructing roads and homes in wooded areas surrounding Michigan's small lakes but preservation of older, larger trees and snags is recommended to provide suitable nesting areas for woodpeckers (Dickson et al. 1983). Woodpecker damage to structures is sometimes considered a nuisance by homeowners. A recent study shows that strands of foil tape placed around houses and outbuildings can prevent woodpecker damage (Harding 2007).

Jackson et al. (2002) mention serious deficiencies in existing data for most aspects of breeding biology and various aspects of nest success, including questions such as dispersal of young. Attention should be paid to possible changes in number or nature of prey species as result of climate change.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	689	36.34%	775	40.22%
Probable	354	18.67%	299	15.52%
Confirmed	305	16.09%	293	15.20%
Total Breeding	1348	71.10%	1367	70.94%

Data presented by Township/Range

0 20 40 80 120 Miles

Black-backed Woodpecker *(Picoides arcticus)*

Joseph Youngman

Status: *Special Concern (MNFI)*



Sean Fitzgerald ©

The rarest of the regularly breeding woodpeckers in Michigan, the Black-backed is restricted to conifer dominated forests in the UP and the northern LP. Along with its close relative, the American Three-toed Woodpecker, the Black-backed Woodpecker is a fire specialist (Dixon and Saab 2000). Its densest breeding in Michigan occurs in the early years after forest fires or insect outbreaks, but clearly a low level population survives in the conifer forests of upper Michigan even during decades between significant fires. The Black-backed is strictly a North American species and its range extends from southern Alaska eastward across Canada to the Atlantic. Its range dips down into the U.S. in New England, the upper Midwest and in the northern ends of the Rockies and Cascades in the west.

Distribution

In the early 1900s, the Black-backed Woodpecker was very rarely seen in the southern LP during fall and winter during irruption years, but all recent sightings and all breeding records are north of a line from Ludington to Bay City. It is occasionally found in mixed forests but all breeding records come from predominantly conifer forests. The Black-backed Woodpecker is most common in the UP. The large area of pine forests in the north central LP is the farthest south that it breeds in Michigan. The first recorded nest for Michigan was found east of Munising in Schoolcraft County in 1941 (Wood 1951). During both atlas periods, many more confirmations were recorded in the UP than the LP. In the MBBA II period, the Black-backed was reported from 68 townships in the UP and three from the LP. These numbers closely mirror the numbers from MBBA I: 62 in the UP and seven in the LP.

Breeding Biology

Nest cavity excavation begins as early as late March and young are fledged in June and July (pers. obs.). Both sexes help in excavation of the nest as well as incubating eggs and attending hatched young (Dixon and Saab 2000). While a low level population remains in the UP and NLP during non-fire times, it is just after forest fires that Black-backed Woodpeckers flourish. A large fire in 1988 near Rapid River, Delta County hosted up to 29 birds and nesting occurred in 1989 and 1990 (Evers 1991). A 1,000 acre fire in mostly jack pine forest in Baraga County in early April of 2007 led to two years of prolific nesting. As many as 48 individuals were seen and nesting was recorded in 2007 and 2008. In 2008, 20 Black-backed Woodpecker nests were found within a 231 acre study area within the burn area, including one 46 acre stand that contained six successful nests (J. Youngman, unpub. data). In early August 2007, an 18,000+ acre fire occurred near and southeast of Sleeper Lake, Luce County, likely started by a lightning strike. The burned area received little coverage in 2008, the last year of data collection for the atlas, with only a single confirmed nest found (M. Willard). Additional efforts after the atlas period found several additional nests in 2009 (J. Youngman, Z. Gayk, S. Haas, unpub. data).

Abundance and Population Trends

The Wisconsin atlas project recorded the Black-backed Woodpecker in 3.18% of its survey blocks and showed a geographic distribution that was similar to Michigan's (Cutright et al. 2006). Ontario's atlas showed no significant change in the abundance of Black-backed Woodpecker (Cadman et al. 2007). The occurrence of Black-backed Woodpeckers in Michigan during the MBBA II period is probably quite representative of the overall nature of this species' breeding habits. There was evidence of low level populations across much of upper Michigan and in one location, in one year, there was a super-abundance. The Black-backed Woodpeckers nesting on the Baraga Plains in Baraga County in 2008 were among the densest ever reported for that species (Dixon and Saab 2000). But that super-abundance was a temporary phenomenon related to the forest fire that Black-backs have evolved to exploit. Such small scale, short-term (two to four year) breeding hotspots have probably always occurred in Michigan. Black-backed Woodpeckers have always been an uncommon to rare species, inhabiting their rather small niche in the ecology of Michigan's forests and they seem ready to continue to do so. In both atlases the Black-backed Woodpecker was found in about 3.5% of townships statewide.

Conservation Needs

The Black-backed Woodpecker is designated as a species of Special Concern by the Michigan Natural Features Inventory. Extensive, fully mature jack pine stands, in which some trees are beginning to die, benefit the Black-

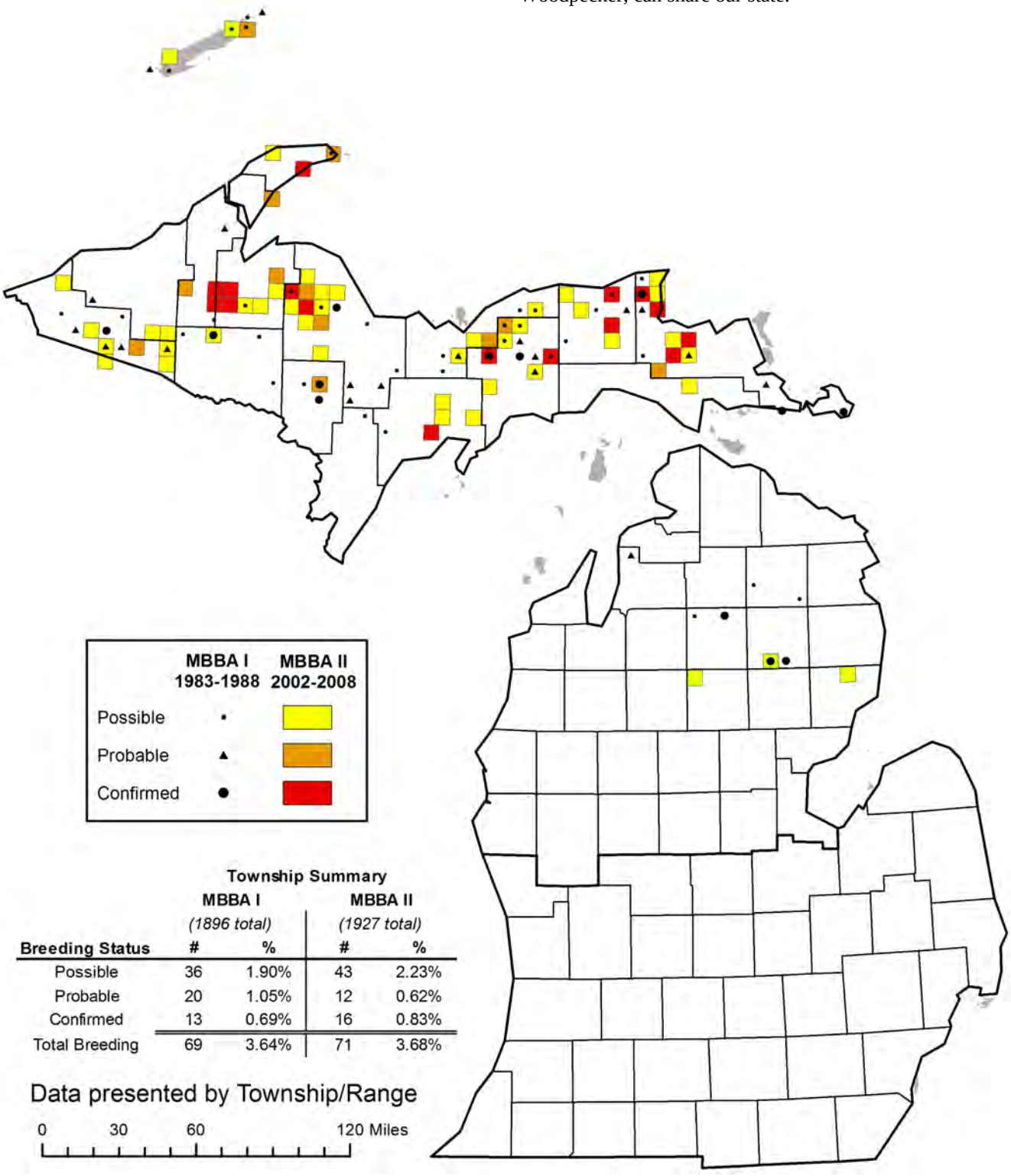
Black-backed Woodpecker *(Picoides arcticus)*

Joseph Youngman

Status: *Special Concern (MNFI)*

backed Woodpecker. After a burn, local breeding populations increase significantly (Dixon and Saab 2000). Certain timber harvest practices, especially salvage cuts after a burn and clearcuts, reduce the available habitat for this species.

Increasing the acreage set aside in old growth, even in such non-typical types as jack pine, could help stabilize the Black-backed Woodpecker population in Michigan. Both private and public landowners should be encouraged to leave significant percentages of burned forests un-salvaged so all fire loving species, including the Black-backed Woodpecker, can share our state.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	36	1.90%	43	2.23%
Probable	20	1.05%	12	0.62%
Confirmed	13	0.69%	16	0.83%
Total Breeding	69	3.64%	71	3.68%

Data presented by Township/Range

0 30 60 120 Miles

Northern Flicker *(Colaptes auratus)*

Julie A. Craves



Al Menk ©

Northern Flickers are conspicuous and charismatic woodpeckers found across North America. Their range extends from the tree line in the north, through the U.S., and into parts of Central America and the West Indies (Wiebe and Moore 2008). Flickers are resident over much of this area, although many individuals in the northern part of the range move south in winter. Northern Flickers are strongly associated with open woodlands, forest edges, and savannas. They feed on the ground, and, while beetle larvae and some fruits comprise a portion of their diets, Northern Flickers specialize in feeding on ants. Bird artist John James Audubon noted that flickers were sometimes offered as food in markets on the east coast but that he "look[ed] upon the flesh as very disagreeable, it having a strong flavour of ants" (Audubon 1840-1844).

The Northern Flicker is a polytypic species – there are two distinct color forms, the western "Red-shafted" and eastern "Yellow-shafted." These forms are most easily distinguished by the dominant color of the shafts and undersides of the wing and tail feathers. The forms interbreed in a stable zone in the Great Plains, where the birds have an intermediate golden or orange feather color (Wiebe and Bortolotti 2002, Wiebe and Moore 2008). Michigan birds are of the Yellow-shafted form. There are no records of Red-shafted or hybrid Northern Flickers recorded from Michigan. There have been 33 records of flicker "intergrades," which have mixed yellow and reddish feathers, thought by some to be a recurring mutation or ancestral trait rather than evidence of hybridization (Craves 2002, W. S. Moore, pers. comm.).

Distribution

The status of Northern Flickers as abundant throughout Michigan dates back to the turn of the Twentieth Century (Barrows 1912). Flickers are still found in nearly every corner of the state; there were fewer than 10 townships in which flickers were not found in at least one of the Atlas periods. Flickers were recorded in over 80% of the townships in each region of Michigan, although they appeared to be slightly more concentrated in the SLP. Likewise, they are well represented throughout the neighboring states and showed little change in distribution in Ontario between their two Atlas periods (Bavrlic 2007).

Breeding Biology

Northern Flickers excavate their own nest cavities, but usually do so in softened wood, most often in the trunks or large limbs of dead trees (Wiebe and Moore 2008). Average nest cavity height in this region is approximately 7 meters (23 feet) (Wiebe and Moore 2008), and there is strong year-to-year fidelity to nest trees (Bavrlic 2007). This species will also use natural cavities, holes excavated by other species, and nest boxes (Bavrlic 2007, Wiebe and Moore 2008).

Abundance and Population Trends

Although one of our most common woodpeckers – and indeed one of the most familiar birds on the continent – flickers have been undergoing population declines across almost their entire range. BBS trends over the first 40 years of the survey showed statistically significant declines and no significant increases in the majority of states or provinces (Wiebe and Moore 2008).

This decline was mentioned in MBBA I. Since then, BBS trends show that Northern Flickers have had significant declines of 2.9% annually in the Midwest (USFWS Region 3) and 1.7% in Michigan. While flickers were found in almost the identical percentage of townships in each Atlas, the number of confirmations was substantially lower in MBBA II. The greatest decline in the percentage of townships in which flickers were confirmed was in the SLP.

Northern Flickers are considered a "keystone" species. Since they are often the most abundant primary cavity excavator, many other birds and mammals depend on their nest holes (Martin et al. 2004). Because of their importance over such a broad geographic area, the long-term, significant declines of Northern Flickers are considered alarming (Wiebe and Moore 2008).

Conservation Needs

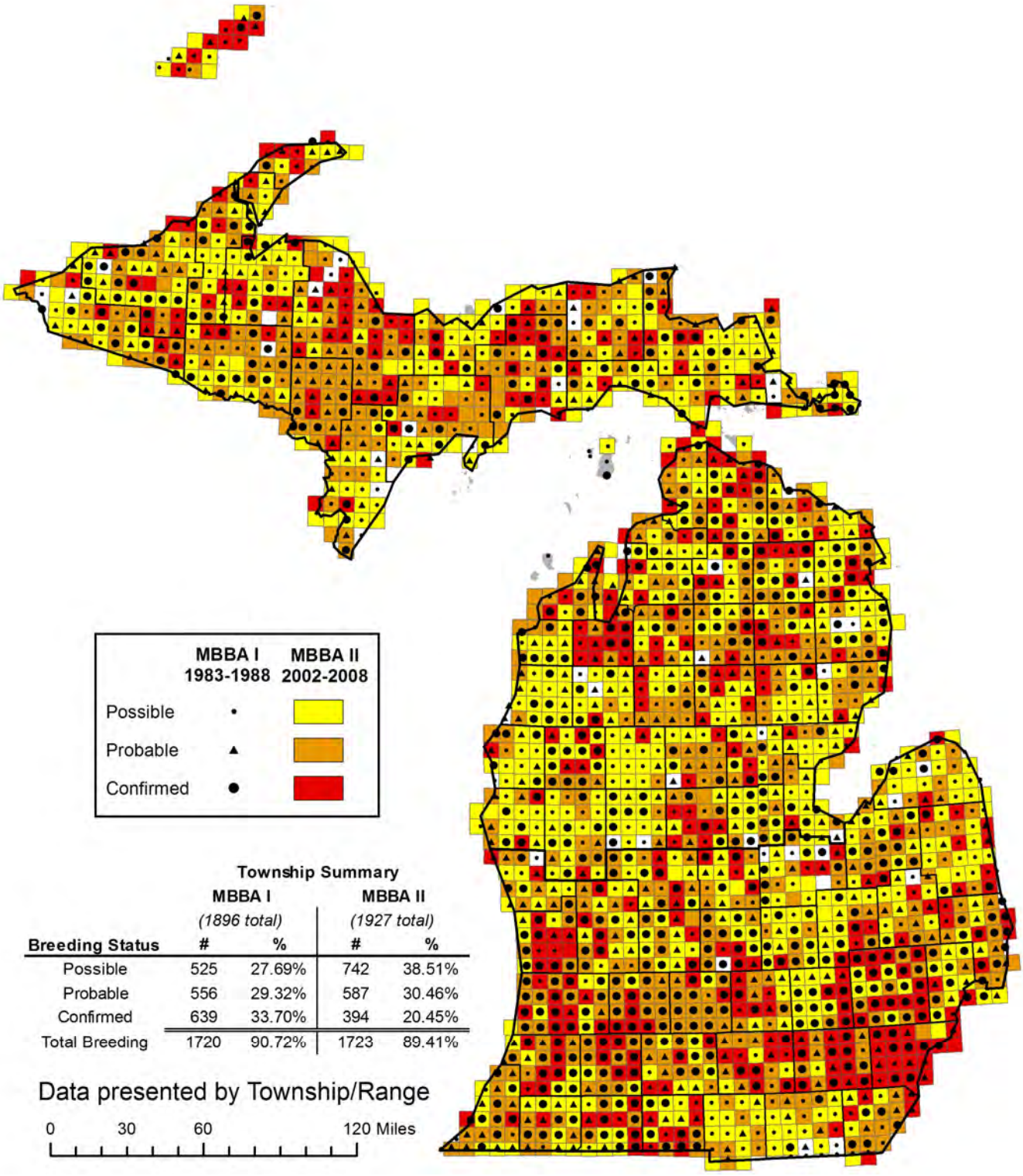
Because Northern Flickers remain so common, they have received little conservation attention despite wide awareness of population declines. The only conservation plan which includes Northern Flicker is the Michigan Partners in Flight plan, in which it is listed as a species of high regional concern in the SLP (Rosenberg 2004).

A number of authors have lamented the lack of clear reasons for Northern Flicker population declines. Three factors have most often been highlighted. One is competition for nest sites from European Starlings. Although starling competition can reduce flicker nesting success, there have been no rigorous studies on the impact on overall reproductive success or population size (Wiebe and Moore 2008).

Second, increased pesticide use may directly harm Northern Flickers, have secondary effects that lower survivorship or reproductive success, or reduce prey availability. Flickers

are selective in their foraging locations, strongly favoring sites with a lack of tall vegetation, lots of bare ground, and a high density of small anthills (Elchuk and Wiebe 2002). Golf courses, expanses of suburban turf grass, and some agricultural areas are all prime foraging areas that may experience high levels of pesticide application.

A final factor is a reduction in the number of nest sites due to habitat loss and snag management that calls for removal of dead trees. Conserving forested habitat without a snag preservation policy will probably be inadequate to address flicker declines. Retention of large snags, especially with some degree of decay, is essential and will involve informing landowners about the importance of snags and how to manage them safely (Blewett and Marzluff 2005).



Pileated Woodpecker *(Dryocopus pileatus)*

Brenda S. Keith



Jim Ridley ©

Species sponsored by: John Baumgartner
And also by: Todd Alfes, Sandy Roethler, & Scott

The Pileated Woodpecker is the largest woodpecker found in Michigan and probably all of North America (the possibly extinct Ivory-billed Woodpecker is larger). A crow-sized bird with a loud flicker-like call and distinctive drumming, it is often heard before it is seen. Sighting of this magnificent bird with its black body, large white patches on the underwing, and red crest has left a lasting impression on many a birder. The Pileated Woodpecker is a permanent resident across southern Canada, the Midwest, and the East, and along the Pacific Coast and the northern Rockies (Bull and Jackson 1995).

Distribution

Once considered to be abundant throughout Michigan, the Pileated Woodpecker population experienced a sharp decline during the mid-1880s due to wide spread deforestation. The status in 1893 was "very rare" (Brewer 1991). They were also shot for food and for sport during the early 20th century. Some Native Americans hunted them for a variety of reasons (Bull and Jackson 1995). MBBA I results showed the population was increasing, especially in the UP, NLP and the west side of the SLP. Very few encounters were made on the east side of the SLP due to intense development of that area (Ebbers 1991). The results from MBBA II showed an even greater increase in the population, especially in the SLP.

The MBBA I habitat survey shows that Pileated Woodpeckers prefer mesic mixed or deciduous forests close to a water source. Pileated Woodpeckers prefer large tracts of mixed coniferous-deciduous mature forest – 100 acres or more. In recent years many sightings have shown that the species will establish territories in smaller – 10 to 30 acre woodlots, suburban parks and old cemeteries, wherever large diameter live or standing dead trees are available. These trees are important for the large nest cavities that the Pileated Woodpecker excavates. They are also dependent on other trees where they search for ants, grubs and beetles.

Breeding Biology

Pairs remain on territory year-round although they may wander while looking for food during the winter. Courtship begins in February and lasts through March with nest building taking place in April to May. Both sexes excavate the nest hole with the male doing most of the work. Egg-laying begins once the cavity is complete and typically four white eggs are laid with an incubation period of 14 to 18 days. Incubation is shared by both adults during the day and solely by the male at night (Bull and Jackson 1995). The young fledge in June to mid-July and remain with the adults until fall.

Abundance and Population Trends

There was a significant increase in the percentage of townships where Pileated Woodpeckers were found during MBBA II compared to the data from MBBA I. In the UP, 71% of the townships reported encounters in MBBA II compared to 55% in MBBA I. The SLP shows the largest increase with 35% of the townships reporting sightings versus only 12% during MBBA I. Likely these increases are due to maturation of woodlots and where forests have reclaimed abandoned farmlands.

BBS trends for the Upper Midwest (USFWS Region 3) show a steady increase, with estimates from 1983-2007 showing an increase of 3.89% throughout the Midwest and a 5.96% increase in Michigan's population.

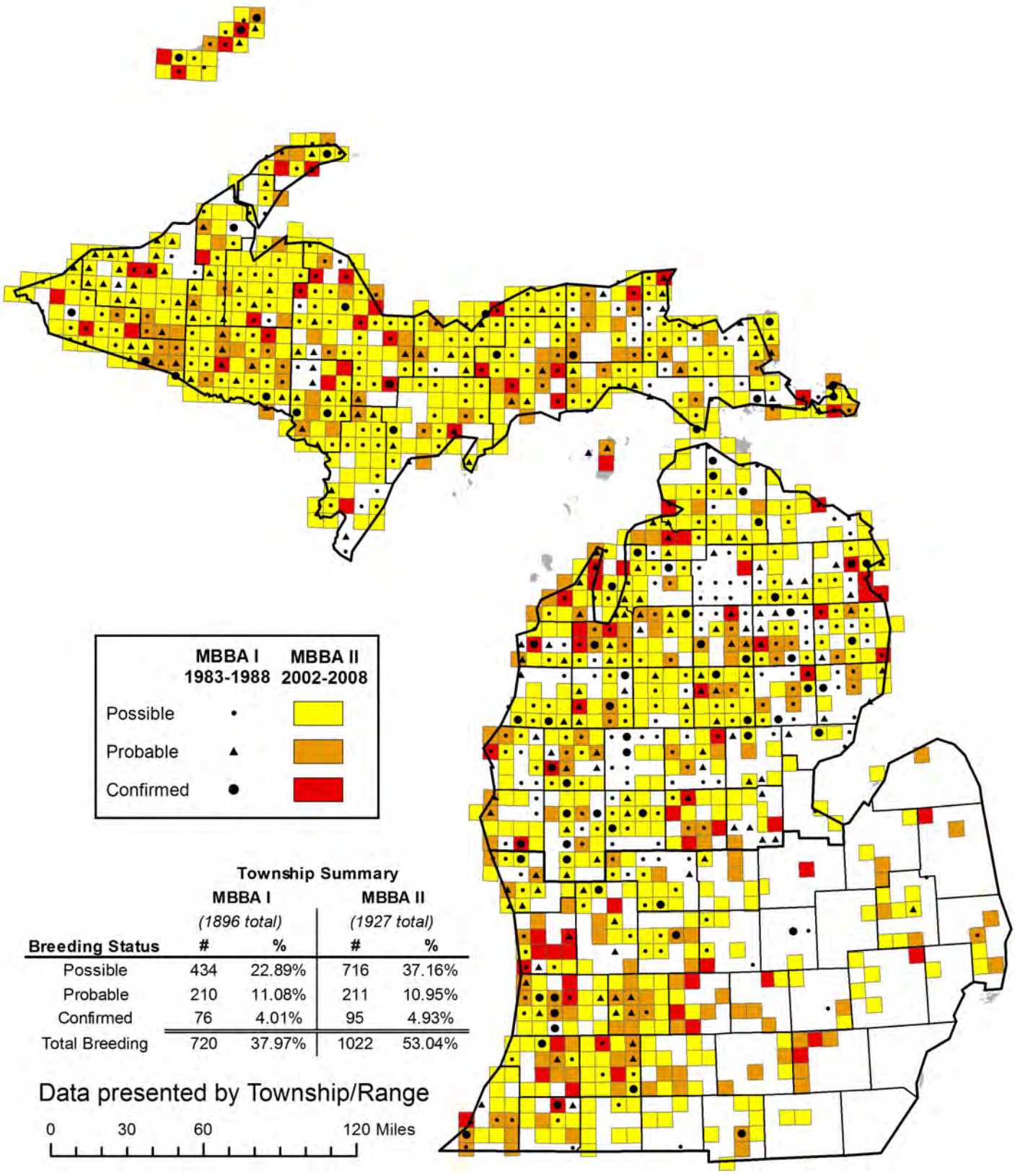
Conservation Needs

This large woodpecker plays an important role in controlling many damaging tree insects, particularly beetles (Young 2003). It has been suggested that the Pileated Woodpecker serves as a keystone species because its large nest cavities provide homes for many other species and its foraging excavations into sapwood and heartwood enable other birds to find invertebrate prey that would not have been available to them (Aubrey and Raley 2002). As long as forest managers and private land owners leave a percentage of large diameter trees, this species should be able to maintain its population and be around for many more generations to enjoy.

Climate change models for this species show a possible increase in the population for all of the LP and a decrease in the UP (Matthews et al. 2007).

Pileated Woodpecker *(Dryocopus pileatus)*

Brenda S. Keith



Olive-sided Flycatcher *(Contopus cooperi)*

David Evers



Jerry Jourdan ©

If not for its emphatic three-note whistle, branded as *"quick-three-beers,"* fewer Olive-sided Flycatchers would be detected. This large flycatcher occurs in conifer forests of the boreal forest and taiga, including the Upper Great Lakes, Adirondack Mountains, and northern New England, south through the western mountains into the Baja Peninsula (Altman and Sallabanks 2000). It has largely disappeared from southern and mid Appalachian Mountain areas, and its status is generally one that has exhibited continual declines for the past several decades. While it is known to overwinter from southern Mexico to Belize (Russell 1964), its primary wintering range is from Panama south through the Peruvian Andes Mountains and generally east through Venezuela and Columbia, and casually found in neighboring Bolivia, the Guianas, Trinidad, and Brazil (Altman and Sallabanks 2000). In Michigan, it breeds primarily in the UP and a disjunct area in the NLP.

Distribution

The far-ringing song of the Olive-sided Flycatcher and its tendency to perch high on prominent perches enhances detection rates of singing territorial males, however documenting breeding confirmations is challenging. Pre-Atlas confirmed breeding is known from two northern LP counties (Cheboygan and Emmet) and two UP counties (Chippewa and Schoolcraft) (Zimmerman and Van Tyne 1959, Pettingill 1974). Barrows (1912) stated that "there can be no doubt whatever that the bird breeds wherever found between the middle of June and last of July." If true, MBBA I records document breeding evidence in each UP county and in the LP, primarily in the northeastern part. During MBBA II, it had a similar but contracted distribution. Confirmed breeding in both MBBA I and MBBA II was documented for Gogebic, Houghton, Keweenaw, Luce, Marquette, and Schoolcraft counties in the UP, and Crawford and Oscoda counties in the LP. Based on probable and confirmed breeding observations in the UP during both Atlas periods, there are currently three primary centers of breeding activity – western Chippewa-Luce-Schoolcraft counties, western Marquette-Baraga counties, and Crawford-Oscoda counties. There have been shifts in summer observations between the Atlas periods; it has now disappeared from several counties.

The Olive-sided Flycatcher is closely associated with a variety of conifer communities that include spruce, tamarack and pine. Preferred habitats include tamarack-black spruce peatlands, beaver floodings with an abundance of snags, spruce-lined ponds and lakes, edge habitats adjacent to sedge meadows and other wet openings, and dry coniferous forests, such as jack pine plains. Clearcuts, burned areas, and other disturbances that create openings in pines are regularly used in the LP and occasionally in the UP. Prominent snags are important perching sites used for monitoring territorial boundaries and detecting available prey.

Breeding Biology

Males are one of the latest arriving neotropical migrants to the breeding territory (late May to early June) and depart starting in early August. During their short breeding season, annual productivity is one of the lowest for North American songbirds. Although renesting occurs, the average clutch of three eggs is limiting. Because of their late arrival to breeding areas and nest initiation not likely until mid-June (Peck and James 1987), the breeding cycle is later than most Neotropical migrants, and fledged young are not apparent until early August. It uses a passive sit and wait approach for locating flying insects and then captures prey in mid-air. Hymenoptera (e.g., bees, wasps, and flying ants) are preferred in some localities, while in others coleopeterans (e.g., beetles) are a primary prey (Altman and Sallabanks 2000).

Abundance and Population Trends

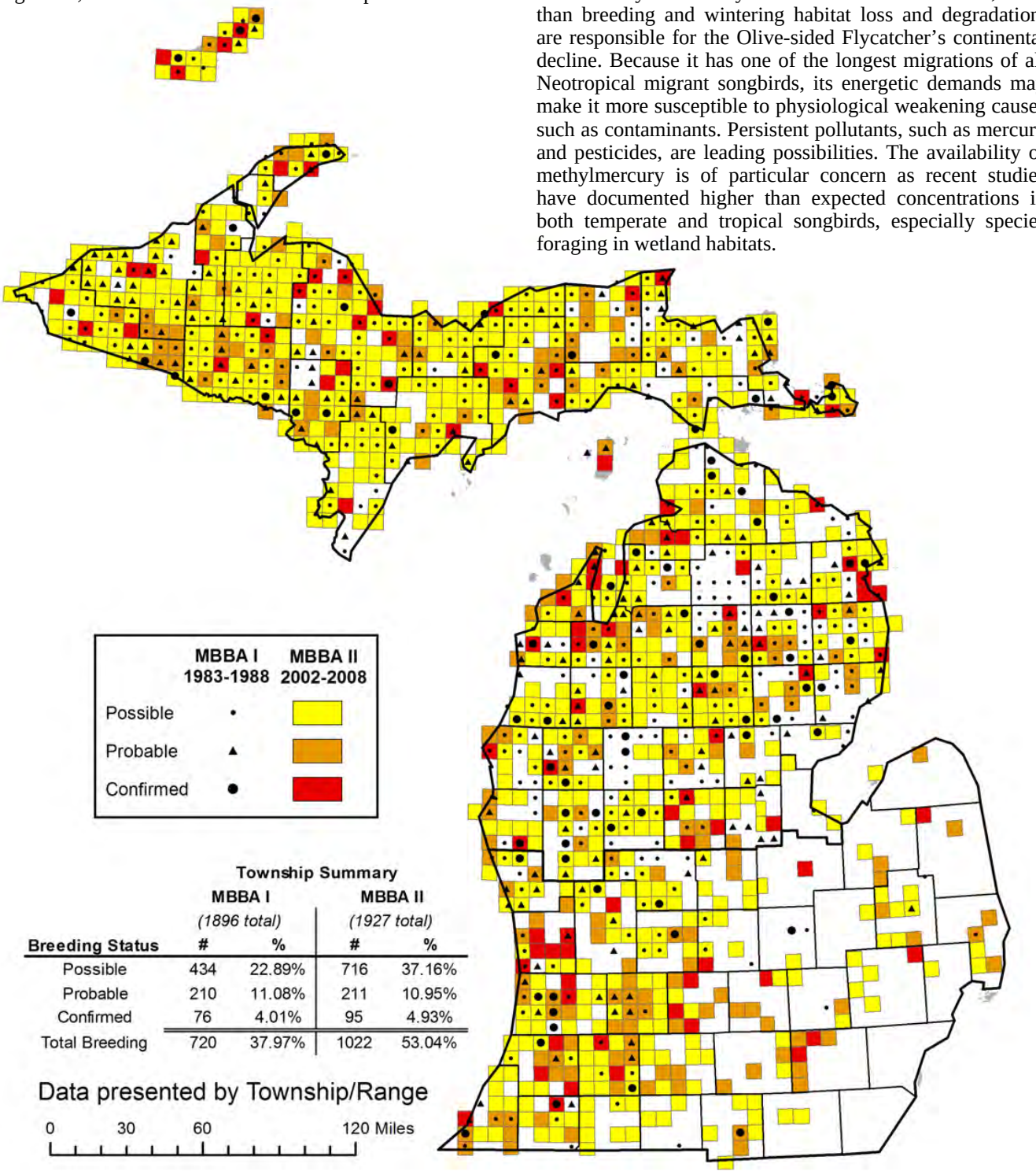
The Olive-sided Flycatcher is at risk across much of its breeding range. The Committee on the Status of Endangered Wildlife in Canada designated it as threatened nationally based on a 79.0% population decline since 1968 (COSEWIC 2010). In Ontario, a core part of its breeding range, declines averaged 9.5% annually from 1960 to 2006 compared to an overall Canadian average of 4.0% over the same time period. Since 1981, it has declined 13.9% per year on BBS Routes in Ontario (Cheskey 2007). While the Olive-sided Flycatcher continues to sing from most of the UP counties, its detection within townships declined 23.0% from MBBA I (n=157) to MBBA II (n=121). A disjunct population in the northern LP declined 68.5% between atlas periods (only 18 townships had this flycatcher in MBBA II). Over the past few decades, the range-wide decline of this species includes many examples of disjunct and peripheral southern populations becoming extirpated; it appears that the breeding population in the northern LP may soon be added to this list.

Olive-sided Flycatcher *(Contopus cooperi)*

David Evers

Conservation Needs

Reasons for the continuous and prolonged population decline of the Olive-sided Flycatcher are not definitive. The disappearance of this species in its breeding range is particularly perplexing because apparently sufficient habitat that contains structurally diverse canopy layers is regularly created through certain logging practices, fires, and activities from the American beaver. While these habitats are usually ephemeral and may not reflect historical magnitude, available habitat is not occupied at former densities. It is well established that selective overstory removal, selective marketable tree cutting, and small clearcuts that create a mosaic of open and closed forest can increase the number of occupied territories. However, dependence on postfire habitat may be a key component of suitable breeding habitat (Altman and Sallabanks 2000). Without fire, harvested forests may serve as ecological traps – preliminary evidence indicates this is the case in some areas of the western U.S., but how universal this is requires further study. It is likely that environmental stressors, other than breeding and wintering habitat loss and degradation, are responsible for the Olive-sided Flycatcher's continental decline. Because it has one of the longest migrations of all Neotropical migrant songbirds, its energetic demands may make it more susceptible to physiological weakening causes such as contaminants. Persistent pollutants, such as mercury and pesticides, are leading possibilities. The availability of methylmercury is of particular concern as recent studies have documented higher than expected concentrations in both temperate and tropical songbirds, especially species foraging in wetland habitats.



Eastern Wood-Pewee *(Contopus virens)*

Ben Pinkowski



Darlene Friedman ©

The Eastern Wood-Pewee is a common Michigan woodland nester with a frequent, conspicuous song and characteristic flycatcher feeding behavior that contrasts with its drab and inconspicuous plumage. The Wood-Pewees arrive quite predictably in mid-May, later than most migrants, and remain into September and often linger into October, with males singing beyond the late August and early September departure dates of other insectivorous passerines. These habits have prompted many to proclaim the Eastern Wood-Pewee as the state's most common and widespread flycatcher. Nevertheless, this species spends much of its time in woodlands and forest edges, where it builds an inconspicuous nest up to 20 m above the ground covered with lichens, making it appear very much like a knot on the top of the supporting branch. These facts plus the species' inconspicuous plumage make it difficult for field study, prompting McCarty (1996) and others to state that much of the pewee's reproductive biology is undocumented and remains largely unknown.

Distribution

The Eastern Wood-Pewee breeds from the Gulf Coast and central Florida, north to the southern parts of eastern Canada (southern Manitoba to the east coast). The species is most commonly distributed in mature deciduous woodlands, is less frequent in mixed forests, and is uncommon in pure coniferous woods. Its appearance is almost identical to that of the Western Wood-Pewee, though very different songs are thought to isolate these two flycatchers and prevent hybridization in a narrow area of the Great Plains where both occur (McCarty 1996).

Partners in Flight continental estimates place the number of Eastern Wood-Pewees at 6.0 million (PIF 2007), slightly less than the abundance of other larger flycatchers. Evidently this species is much less numerous than most smaller *Empidonax* species, especially the more ubiquitous Willow, Yellow-bellied, and Alder Flycatchers (but not the Acadian Flycatcher).

Breeding Biology

In Michigan, Eastern Wood-Pewee nests are initiated in late May and early or mid-June, with late nests observed into August. Egg-laying generally begins in early June, and both parents feed the young. The average clutch size is three eggs, although two to four eggs are not unusual. Only the female reportedly incubates and broods, though the two adults are quite alike in plumage. McCarty (1996) reports a high hatch rate (97%) for 25 Cornell nest record cards, and in an analysis of 404 nests, he found no evidence of more than one nesting peak within a given season, causing him to dismiss reports of double broods as unfounded.

Since the Eastern Wood-Pewee's diet in spring and summer consists almost exclusively of animal matter (chiefly insects including flies, beetles, wasps, ants, and moths), the species is vulnerable to unusual cold spells that occur in late May or early June. Fortunately, these are infrequent but could be detrimental to returning migrants (early) or immature nestlings (later). A more serious peril would be woodland insecticide programs that eliminate principal food sources. Probably few predators pose a serious threat to the species, and though cowbird parasitism does occur with some regularity, it does not appear to be a serious problem.

Abundance and Population Trends

The Eastern Wood-Pewee historically was common in mature but dry deciduous woodlands throughout the state, and 81 percent of the MBBA I habitat reports were so identified. Elsewhere in nearby states, the Eastern Wood-Pewee appears to be declining steadily over the last several decades, if only slightly. In New York, for example, McGowan (2008) and others report a 2.1% BBS decline per year since the 1960s, with nearly double that in the Adirondacks (3.7%). This may be occurring because of events on the birds' wintering grounds in South America (Baird 1990). Closer to Michigan, examination of several references revealed no such dramatic drops in Ohio or Indiana numbers and in Ontario, there appear to be local declines in both Atlas and BBS data, though the trend throughout the province on the whole is not significant (Cadman et al. 1987, Peterjohn and Rice 1991, Castrale et al. 1998, Cadman et al. 2007). Like Michigan, Wisconsin populations appear more stable (Robbins 1991).

Michigan BBS Eastern Wood-Pewee numbers show almost no noticeable change in the years following MBBA I. However, USFWS Region 3 regression data show a slight but steady and statistically significant decline, reflecting the aforementioned decline reported in some neighboring states. MBBA II township sightings for the three Michigan regions were nearly identical to those reported in MBBA I, differing at most by a single percentage point throughout the UP, NLP, and SLP. Among the block summaries, a slight increase was noted in the MBBA II total percentages (28% vs. 31%), but both the NLP and SLP experienced general declines in all categories in MBBA II compared with

Eastern Wood-Pewee *(Contopus virens)*

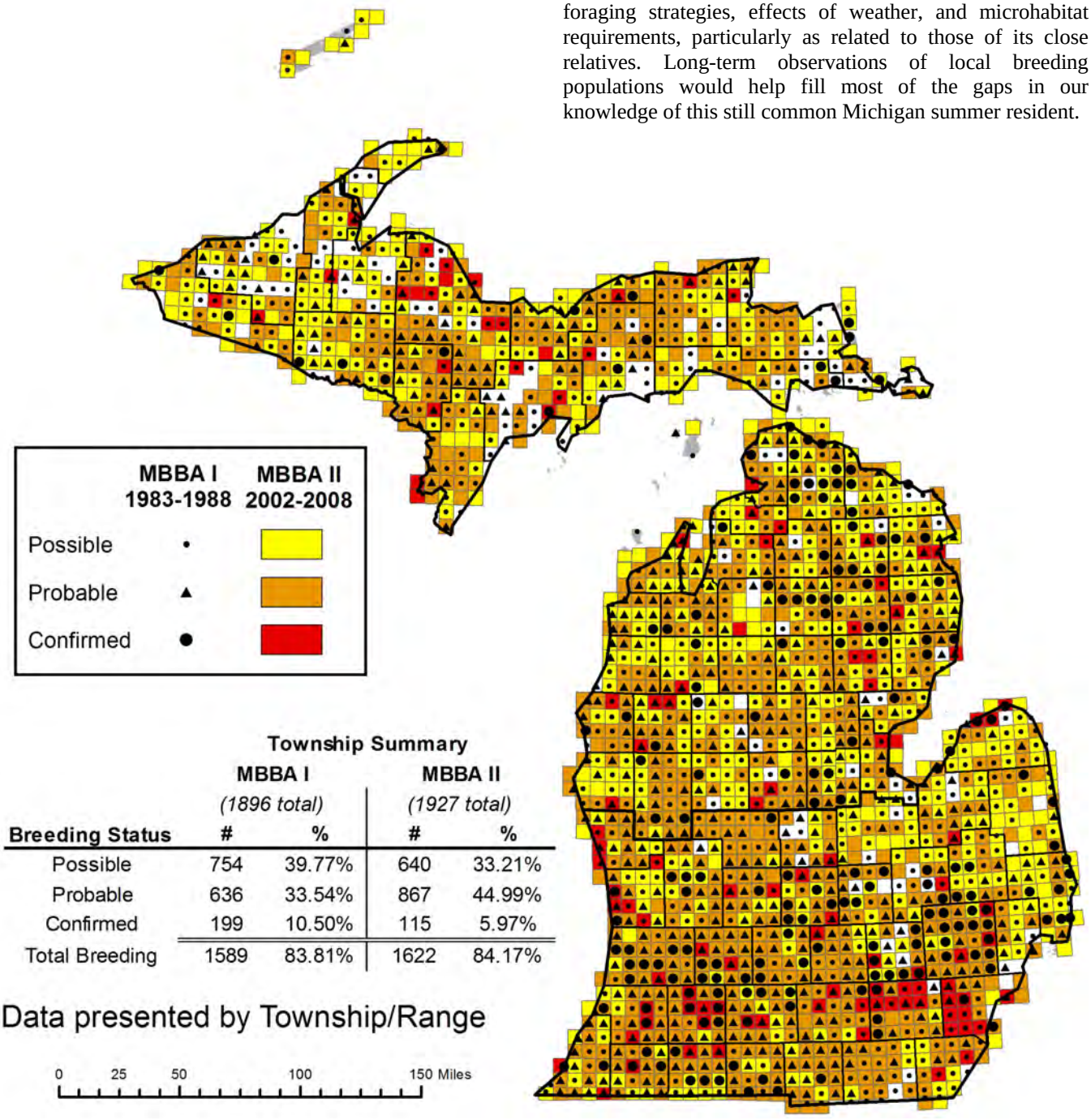
Ben Pinkowski

MBBA I. Overall distribution throughout the state is amazingly uniform, with only a slight edge in confirmed sightings in the SLP.

Conservation Needs

Nationwide reports of slowly decreasing Eastern Wood-Pewee numbers are not new and were demonstrated for 1970 to 1979 by Robbins et al. (1986). As concluded in that study, the concern was not so much because of the magnitude of decreases, but because of a steady drop in numbers over the years. Most conservationists would argue that the Eastern Wood-Pewee population in Michigan warrants no special conservation measures at this time.

Like others, McCarty (1996) claimed a significant decline occurring on the Eastern Wood-Pewee breeding grounds over the past years, and he attributed this to heavy browsing of forests by white-tailed deer. This claim may be largely speculative, and more study is clearly needed (Decalesta 1994), suggesting that the biggest conservation need is for more extensive studies to document Eastern Wood-Pewee breeding and especially wintering habits, including diet, foraging strategies, effects of weather, and microhabitat requirements, particularly as related to those of its close relatives. Long-term observations of local breeding populations would help fill most of the gaps in our knowledge of this still common Michigan summer resident.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	754	39.77%	640	33.21%
Probable	636	33.54%	867	44.99%
Confirmed	199	10.50%	115	5.97%
Total Breeding	1589	83.81%	1622	84.17%

Data presented by Township/Range

0 25 50 100 150 Miles

Yellow-bellied Flycatcher *(Empidonax flaviventris)* ***Zach Gayk***



John Van Orman ©

Inconspicuous in both habits and appearance, this resident of dense coniferous forest bog breeds in a continuous belt coinciding with much of North America's boreal forest. Ranging from central Yukon Territory and British Columbia in the west, to Newfoundland and Nova Scotia in the east, this flycatcher extends into the U.S. in northern Minnesota, Wisconsin, and Michigan, and northern New England. In winter, the Yellow-bellied Flycatcher can be found in a narrow band across the Gulf-Caribbean slope of central Mexico, southeast to southern Mexico, the Yucatan Peninsula, and throughout coastal regions of Central America to western Panama. In its Michigan range, it is an uncommon (locally common) but widespread breeder in the UP and a rare breeder in the LP.

Distribution

The Michigan distribution of Yellow-bellied Flycatcher has likely remained the same since Barrows (1912) first classified it as a breeder in the northern LP and UP, and Walkinshaw and Henry (1957) described the first nest in 1956. In the MBBA I, Yellow-bellied Flycatcher was recorded as at least possibly breeding from 19% of UP townships and a single township of the NLP. In MBBA II, Yellow-bellied Flycatcher was recorded as at least possibly breeding from 30.9% of UP townships and 1.85% of NLP townships. Statewide, this corresponds to a 70% increase in atlas township detections. At the county level, patterns of distribution have remained similar between the two atlases, with an increase in township detections in Keweenaw and Houghton Counties, particularly from Isle Royale. In the LP, township detections have increased from one possible record from North Manitou Island (Leelanau County) in MBBA I to records from 6 counties in MBBA II—including a confirmation from Oscoda County and probable from Benzie, and Emmet counties. This increase in the number of townships in which Yellow-bellied Flycatcher was observed is likely due to greater awareness of *Empidonax* flycatcher identification and habits, and increased observer coverage of the remote bogs it inhabits rather than an actual range expansion. This conclusion is based on the fact that the bogs, and wet conifer forest it requires are an uncommon habitat type within the unfavorable, ubiquitous deciduous matrix of much of Michigan (excluding parts of the eastern UP). Additionally the wet conifer forest community required has hardly increased in area since MBBA I.

In Keweenaw County, where Yellow-bellied Flycatcher is particularly common, occupied habitat (in decreasing preference) is composed of dense, moist black spruce forest within bogs; thick white cedar-white spruce forest with a dark understory; and tag alder wetland with scattered black spruce (Binford 2006). Present in nearly all these locales is a microhabitat consisting of damp, deeply shaded Sphagnum moss, often covered by ferns and sedges, and usually near small, dark depressions in the ground such as those created by rotting logs disappearing into the moss. The size of a habitat patch necessary for breeding Yellow-bellied Flycatcher is apparently small (at least in Keweenaw County), as evidenced by repeated observations of pairs in one or two acre patches of white cedar forest surrounded by extensive deciduous forest; this however may have been sub-optimal habitat as breeding was not confirmed (pers. obs.). A survey of Bete Grise Preserve (Keweenaw County) detected 25 Yellow-bellied Flycatchers along two transects of approximately one mile bisecting black spruce forest ridges alternating with lowland poor fen. Ninety–two percent of Yellow-bellied Flycatchers recorded in the transects were present in the black spruce forest component, with the remaining eight percent recorded in moist wetland of alder and scattered 10-20 ft black spruce; both habitat types had extensive Sphagnum moss (Gayk 2008). In the LP, a colony of four singing males was present in a moist black spruce bog with ground cover of Sphagnum moss at Wilderness State Park, Emmet County, (L. Dombroski pers. comm.).

Breeding Biology

Pair formation occurs from late May through mid-June, with nest building beginning from late May through late June, depending on latitude (Gross and Lowther 2001). The nest is typically placed in a depression on or near the forest floor such as under upturned tree roots, at the base of a fern clump or sedge tussock, or at the base of a mossy rock ledge. A partially finished nest at Lake Bailey Preserve (Keweenaw County) was found on 7 June 2006 at the base of a large (approx. 6 ft by 2 ft), partially decomposed cedar log surrounded by damp Sphagnum moss (Gayk 2006). A Baraga County nest under construction was observed on 20 and 21 June 1956. Breeding progress dates for the completed nest were: 25 June, one egg; 6 July, four eggs; 24 July, four nestlings. Tufts of drooping woodland sedge were noted underneath the nest (Binford 2006).

Abundance and Population Trends

PIF Landbird Population Estimates Database gives the global Yellow-bellied Flycatcher population at 6,000,000 individuals, of which Michigan's estimated 11,000 comprise

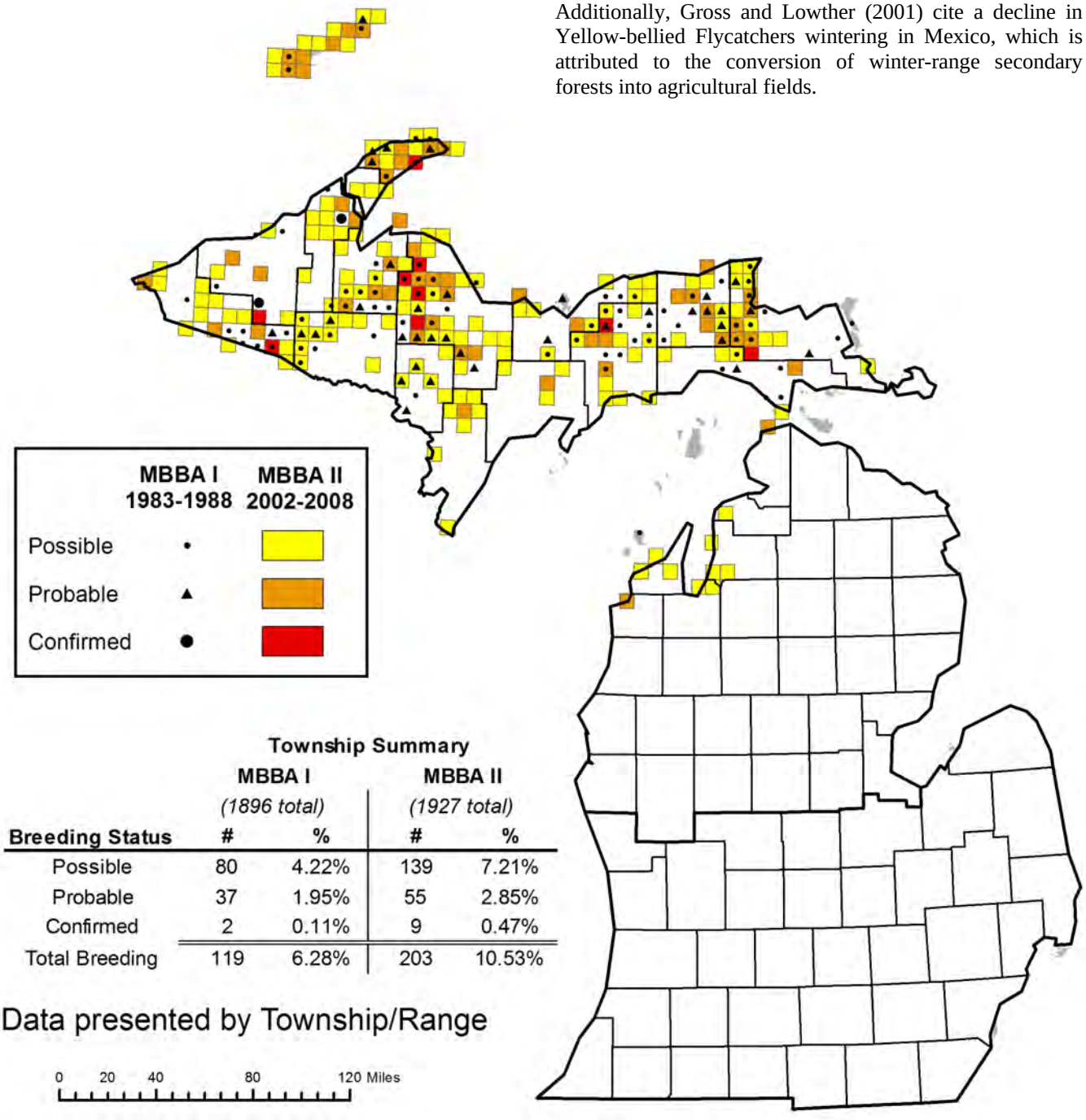
Yellow-bellied Flycatcher *(Empidonax flaviventris)*

Zach Gayk

only 0.2% (PIF 2007). In MBBA I there were 118 township detections in the UP and one township detection in the LP. In MBBA II, township detections were 180 and 17 in the UP and LP, respectively. While this data indicates a moderate range increase in both of Michigan's peninsulas, this is probably due to an increased range of observation by atlas workers rather than a significant range or abundance expansion in Yellow-bellied Flycatcher. This data is encouraging in that Yellow-bellied Flycatcher is either remaining fairly constant in abundance or increasing slightly in Michigan.

Conservation Needs

While less dependent on boreal forests than species like Olive-sided Flycatcher, Yellow-bellied Flycatcher is most abundant in lowland boreal forests, which are slow in regrowth after being cut. Considering the low proportion (7.3%) of Michigan's land area occupied by boreal type forests (Dickman and Leefers 2003), timber harvest in this habitat type will likely have a significant impact on the Yellow-bellied Flycatcher in Michigan. The establishment of Important Bird Areas and reserves in northern Michigan is crucial to the maintenance of boreal bird species, including Yellow-bellied Flycatcher, which all depend upon the same habitat as boreal specialists in Michigan. Additionally, Gross and Lowther (2001) cite a decline in Yellow-bellied Flycatchers wintering in Mexico, which is attributed to the conversion of winter-range secondary forests into agricultural fields.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	80	4.22%	139	7.21%
Probable	37	1.95%	55	2.85%
Confirmed	2	0.11%	9	0.47%
Total Breeding	119	6.28%	203	10.53%

Data presented by Township/Range

0 20 40 80 120 Miles

Acadian Flycatcher *(Empidonax virescens)* ***Lathe Claflin***



Darlene Friedman ©

This widespread, summer resident of southern Michigan is easily found in its deep woodland habitat by its loud, explosive *"PEET-sha"* call. Its nest is unique: a fragile, haphazard cup which invariably has long tendrils of dried grasses or fibrous material hanging below. It is fairly common in more mature bottomland deciduous forests or in mesic deciduous forests near streams or shallow ponds (Whitehead and Taylor 2002). In parts of its range it nests in hardwood-hemlock or white pine forests. The Acadian Flycatcher is widespread in the eastern U.S. to the Great Plains states with its northern limit defined by a line running east-west through mid-Michigan and its southern limit by the north edge of the Gulf Coast. In winter it resides on the Caribbean slopes of Nicaragua and Costa Rica, in Panama, and in the northwest edge of South America.

Distribution

The Acadian Flycatcher was probably abundant throughout the SLP prior to deforestation in the latter half of the 19th century. Even shortly after, it was a rather common inhabitant over much of southern Michigan in wetter deciduous forest of five to six ha or more and not hard to find if one penetrated the deeper woods (Barrows 1912, Wood 1951). By the time of Michigan's first Atlas the species was restricted much more to the western and southern counties of the SLP. Here, some evidence of breeding was recorded in the majority of the townships. Elsewhere in the northern and eastern counties breeding evidence for the Acadian Flycatcher was much less common, being reported in zero to eight townships per county. Only seven townships in four counties in the southernmost portion of the NLP reported Acadian Flycatchers.

Twenty years later the distribution of this species in Michigan has changed little. Total numbers of townships in the SLP reporting breeding evidence increased marginally from 35.2% to 39.6%, but it is unclear if this is significant. The species is still concentrated in the south and west, and is almost absent in the east and north to Saginaw Bay. There has been a modest increase (from 22 to 37 townships) in the Washtenaw, Livingston, Oakland, and Lapeer County corridor where some large forested landscapes exist in the Waterloo and Pinckney Recreation Areas in the western two counties, and smaller woodlots with large trees in portions of developed areas of the eastern two. Another area of apparent expansion is the NLP where the number of reporting townships has increased from seven in four counties to 24 in 11 counties. Half of these came from counties bordering the SLP and the rest were widely scattered. It is unknown if these reports from the NLP are the result of more intensive surveys, a response to climatic warming trends, or some other factor.

Breeding Biology

Acadian Flycatchers begin their nesting season shortly after their arrival in mid to late May. The nest site, usually selected by the female, is typically in the fork of a small tree or shrub about 6-20 feet above the ground. The nest is a loose affair, often with long grassy tendrils hanging below. The species is usually single brooded, but occasionally double brooding occurs. A breeding pair will show aggression against cowbirds visiting the nest site, which probably accounts for the lower rate of parasitism than that of other associated bird species. Breeding site fidelity is high in both males and females (Whitehead and Taylor 2002).

Abundance and Population Trends

BBS trend data suggest that while the Acadian Flycatcher is doing well in the southern half of the U.S., it is declining at the northern limit of its range (Sauer et al. 2008). BBS data for Michigan, however, show no significant trends because the sample size is too small. This is perhaps not surprising because Acadian Flycatchers are a forest-interior species, and BBS routes tend not to extend into forested landscapes. Data from the two Michigan atlases suggest that the abundance of Acadian Flycatchers appears to have increased in the last 20 years. This number has increased from 60 to 74, or 23%. Most of this increase occurred in the southeast quadrant of the SLP and in the Washtenaw, Livingston, Oakland, Lapeer County corridor mentioned above. New York and Ontario, which are also at the northern limit of this flycatcher's range and have also recently completed their second BBA, have also shown modest increases in the last 20 years (McGowan and Corwin 2008, Cadman et al. 2007). The Ontario counts have been aided greatly by directed efforts of The Acadian Flycatcher/Hooded Warbler Recovery Team, so their numbers are probably the most reliable.

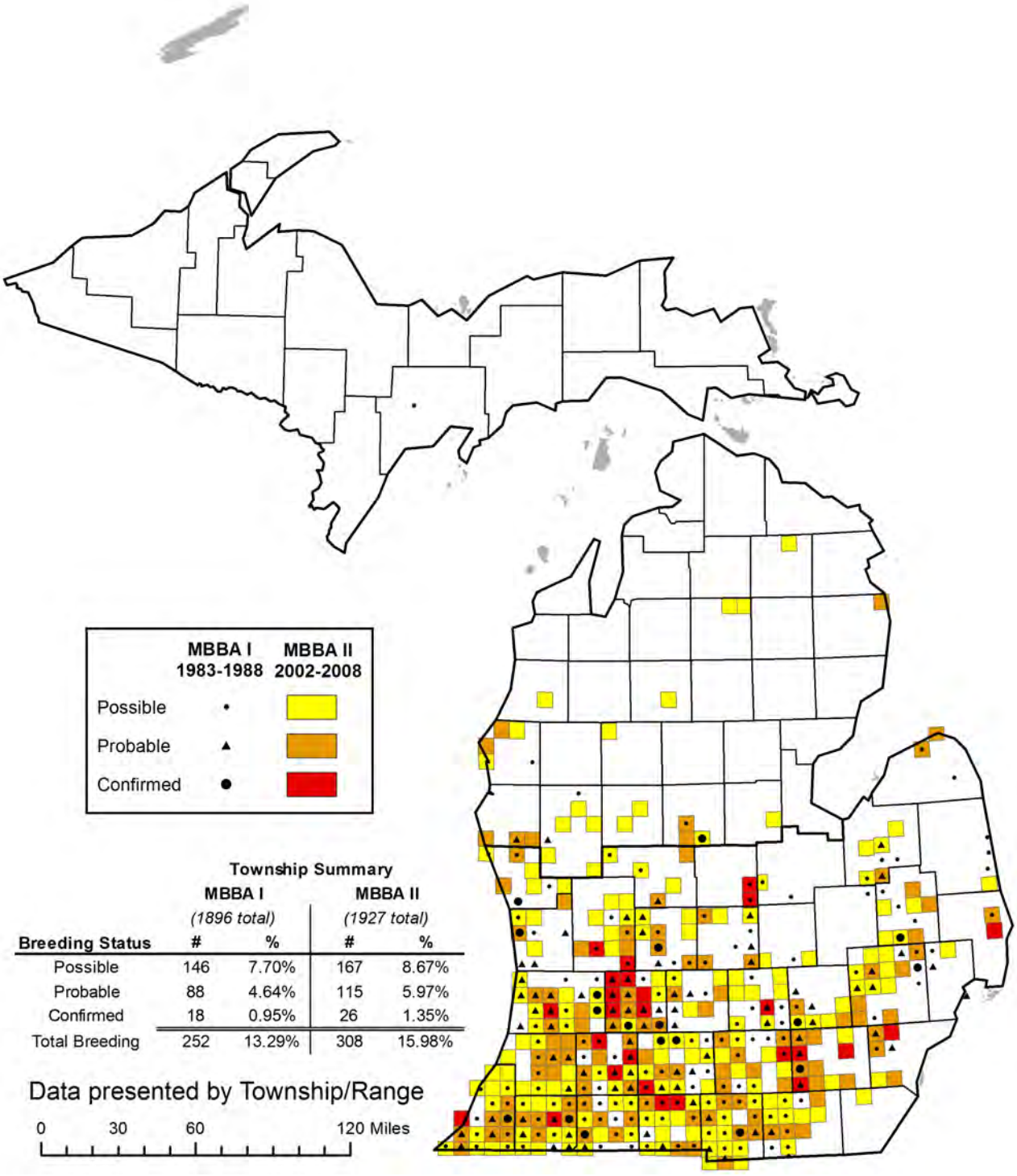
Conservation Needs

The Acadian Flycatcher is an area sensitive forest interior species that does best in forested tracts >10,000 ha with minimal disturbance to the interior (Thompson et al. 1996, Fauth and Cabe 2005). They are vulnerable to forest management practices that remove understory trees (i.e. nesting sites) (Rodewald and Smith 1998) and create open canopies to which Brown-headed Cowbirds and nest predators are attracted (Moorman and Guynn 2001, Heltzel and Leberg 2006, Wallendorf et al. 2007). They can accept logging practices that remove single trees (Annand and Thompson 1997). They can be found in smaller woodlots of

Acadian Flycatcher *(Empidonax virescens)*

Lathe Claflin

24-35 ha (Robbins et al. 1989) and in urban areas with forested tracts such as Oakland and Lapeer County. However it has been shown that in such areas nest survival, renesting after predation, and site fidelity in subsequent years are all lower (Bakermans and Rodewald 2006, Rodewald and Shustach 2008). Hence, reproductive productivity in these fragmented habitats is so low that the birds are reproducing below replacement rates, i.e., they are 'sink' populations. Thus, the best management practice for this species is to identify and then maintain large forested tracts with as little disturbance as possible.



Alder Flycatcher *(Empidonax alnorum)*

Robert B. Payne



Elizabeth Rogers ©

Alder Flycatchers breed from Pacific Northwestern Canada and Alaska across southern Canada east to Newfoundland, south to the northern Great Plains and in the Appalachians south to western Virginia and North Carolina. Identification of these birds has been an issue. Alder Flycatcher and Willow Flycatcher were known collectively as "Traill's Flycatcher" for many years. Field studies of song and nest structure revealed the two are distinct species (Stein 1958, 1963). The two species are each others' closest relatives; they do not differ as much in morphology as some other species-pairs of *Empidonax* flycatcher (Winker 1994, Johnson and Cicero 2002). Alder Flycatchers have a slightly shorter bill and shorter wing on average and the primary projection is longer (sometimes a good field mark) than in Willow Flycatchers (Dunn and Alderfer 2006). Calls and songs of the two flycatchers are distinct. The song of the Alder Flycatcher is a rousing "*knee-DEEP!*" or "*fee-BEE-o*". In contrast, Willow Flycatchers give two song themes in irregular alternation, "*FITZ-bew!*" and "*FEE-BEOO!*" To confirm the identity of a singing bird, note its body movements as the bird sings: the Alder Flycatcher tosses its head back further when it gives the second note than when it gives the first note, as if to emphasize the accent on the second note. The Willow Flycatcher tosses its head back more for the first note (in "*FITZ-bew!*") or the same distance for the first and second notes (in "*feeBEOO!*"). The call of the Alder Flycatcher is an emphatic "*pip*" or "*pit*", in contrast to the liquid "*whit*" of the Willow Flycatcher. The songs are innate and develop normally even in birds that were reared in captivity away from adult Alder Flycatchers and have heard the recorded songs of Willow Flycatchers (Kroodsma 1984; Lovell and Lein 2004a, 2004b, 2005). The two species nest within 100 m of each other in shrubby wetlands, swamps and marshes in Livingston and Jackson counties, and they have done so for many years in Jackson County where Fargo (1928) found both of their distinctive forms of nests.

Distribution

Alder Flycatchers are summer residents in Michigan throughout the state and are more common in the NLP than in the SLP. They occur in shrubby wetlands and wet thickets of alders and willows in the northern part of the state; they also occur in recently clear-cut and re-growing shrubby areas. Outside the breeding season they are long-distance Neotropical migrants that winter south of Willow Flycatchers, in South America (eastern Peru, eastern Ecuador, and eastern Bolivia). Although they do not sing in winter, their winter range has been worked out in part by birds responding to a playback of their breeding songs in the tropics (Gorski 1971, Lowther 1999).

Breeding Biology

In Michigan the birds first arrive about 20 May and remain on their territories through July and sometimes into August. In southern Ontario they arrive from late May through 10 June and occur on their breeding grounds until they leave in migration, which at Long Point on the north shore of Lake Erie occurs from mid-July through mid-September, a few days later than for Willow Flycatchers (Hussell 1991). They are vocal through the mornings during their first weeks in Michigan, but later in June and July they sing mainly at dawn and are found by their distinctive call notes. The nests are well concealed, often built in shrubs growing in knee-deep water and muck. The nest is a bulky cup placed less than a meter above ground or water and placed in an upright fork of a bush. The structure is compact with the nest material of grass leaves and culms tightly woven or matted together, built and lined with little or no cottony material and then only where the nest touches a supporting branch, and the underside with coarse grass streamers trailing below (Fargo 1928; Stein 1958, 1963). In northern Michigan, nests are begun in the Keweenaw Peninsula from the middle of June into late July and by mid-August a nest had fledging young (Binford 2006). In southern Michigan, the nests are begun from late May through June and mid-July. The later observations may be re-nestings of birds that failed in an earlier nesting attempt. Both parents rear the young and feed them many kinds of flying insects.

Abundance and Population Trends

Alder Flycatchers breed throughout the UP and Isle Royale, are widespread in the NLP, and are scattered through most counties of the SLP. During MBBA I, Alder Flycatchers were detected in 24% of the SLP, 43% of the NLP and 53% of the UP townships sampled. In MBBA II, the proportions were 26%, 49% and 72% a notable increase in the distribution of observations in the UP where the number of confirmed breeding records has increased from MBBA I to MBBA II. Alder and Willow Flycatchers occur together through the SLP and the NLP. Because Alder and Willow Flycatchers formerly were not distinguished as distinct species through most of the past century, no long-term trends within the species have been determined. Within the Breeding Bird Survey period 1983 to 2007, the number of Alder Flycatchers surveyed in Michigan has increased from less than 1 bird per route to more than 2 birds; throughout its range in North America, the species has undergone a slight but not significant increase in numbers (Sauer et al.

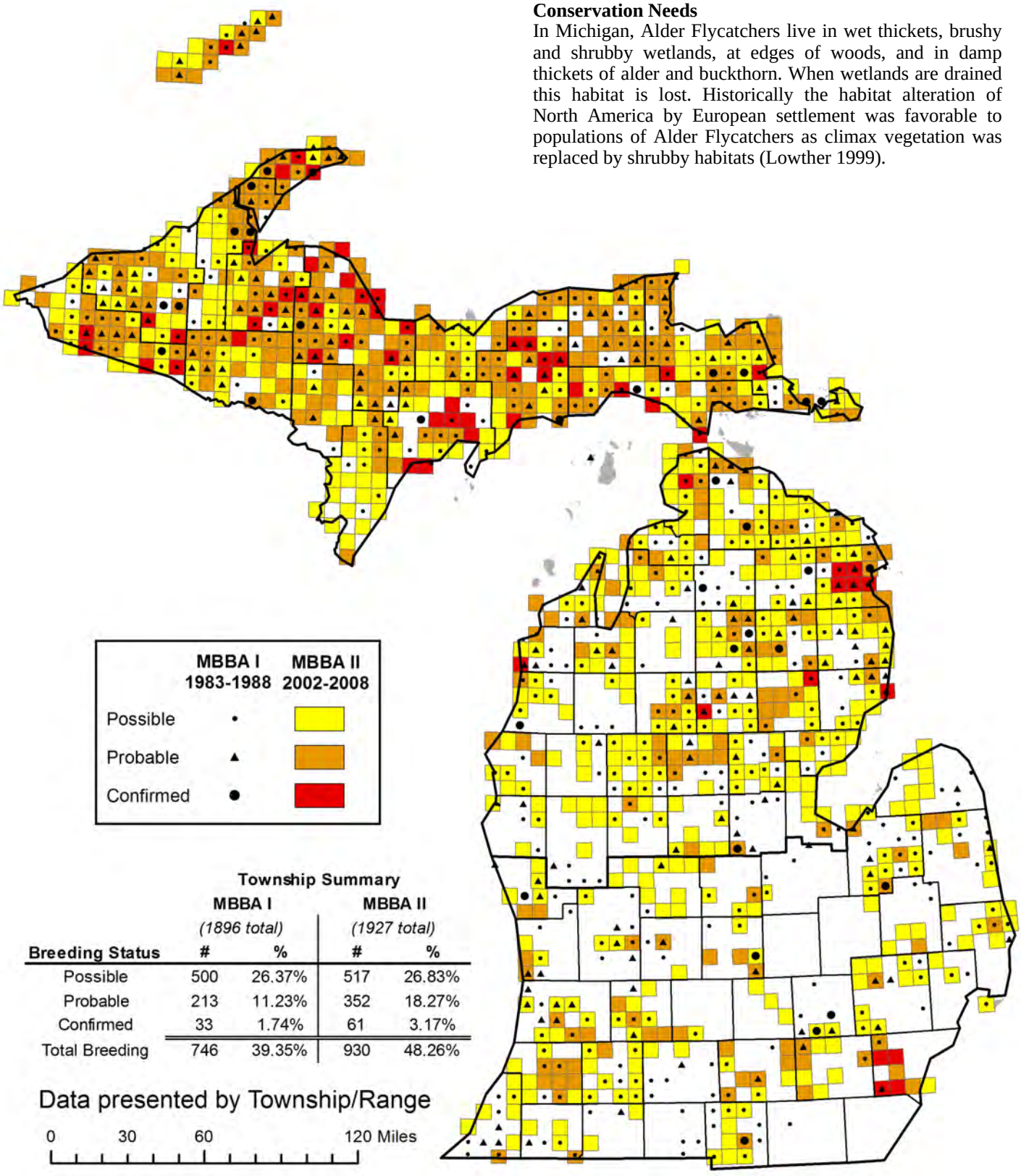
Alder Flycatcher *(Empidonax alnorum)*

Robert B. Payne

2008). Alder Flycatchers have increased in numbers observed in Ontario (by 26%, where the highest densities of birds occur in young forests with shrubby regeneration), in the Appalachian Mountains and the Atlantic Northern Forest, and their numbers have remained about the same in New England and the Mid Atlantic Coast region (Cadman et al. 2007, McGowan and Corwin 2008).

Conservation Needs

In Michigan, Alder Flycatchers live in wet thickets, brushy and shrubby wetlands, at edges of woods, and in damp thickets of alder and buckthorn. When wetlands are drained this habitat is lost. Historically the habitat alteration of North America by European settlement was favorable to populations of Alder Flycatchers as climax vegetation was replaced by shrubby habitats (Lowther 1999).



Willow Flycatcher *(Empidonax traillii)*

Robert B. Payne



Jerry Jourdan ©

Willow Flycatchers are widespread in late spring and summer in northeastern North America and in much of the northern plains and in the west. The species was known in earlier records in Michigan as "Alder Flycatcher" and "Traill's Flycatcher" (Barrows 1912, Wood 1951), and the early records did not distinguish between two distinct species, Willow Flycatcher and Alder Flycatcher. Only about 80-90% of birds of the two species can be distinguished in morphology, but their behavior is distinct. Willow Flycatchers give two song themes in irregular alternation, "*FITZ-bew!*" and "*FEE-BEOO!*" As they sing, Willow Flycatchers toss back their heads further for the first note (in "*FITZ-bew!*") or the same distance for the first and second notes (in "*FEE-BEOO!*"). The second song theme is sometimes mistaken for the "*knee-DEEP!*" single song theme of Alder Flycatchers. The call of the Willow Flycatcher is a liquid "*whit*" (Stein 1958, 1963). Willow Flycatchers are long-distance migrants and winter in the Pacific lowlands in southwestern Mexico, in the Caribbean and Pacific lowlands of Central America, and in northern Colombia. They do not sing in winter; their winter range in the Neotropics has been determined in part by their response to a playback of their songs in Central America (Gorski 1969, Sedgwick 2000).

Distribution

Willow Flycatchers are common summer residents in southern Michigan and are sparsely distributed in northern Michigan. In Michigan, they are generally more southern than Alder Flycatchers but the two species overlap in their breeding range throughout the SLP and NLP. Willow Flycatchers live in a variety of habitats of upland brush and lowland swamps, in overgrown uplands, dry marsh with unplowed brushy grassy fields, old pasture land and thickets, shrubs along the edges of streams, and wet thickets of willow, alder, and buckthorn. In southern Michigan most birds arrive from 7 to 17 May. The birds remain on their breeding grounds from May through August and some birds are seen there in early September (Walkinshaw 1966).

Breeding Biology

In Michigan, as many as 45 nesting pairs of Willow Flycatchers have been observed locally in 100 ha in a breeding population (Berger 1957). The average territory size in southern Michigan is 0.84 ha. Birds build their nests from early though late June; some active nests are found into mid-July and young are fledged as late as the first half of August. The late nests are of birds that failed an earlier breeding attempt and no second nesting attempts were found after birds had successfully reared an earlier brood (Walkinshaw 1966). Their nests are often built in shrubs and small trees of dogwood, hawthorn, rose, honeysuckle, alder, and willows. Nests are open cups of grass and large amounts of cotton-like material or shredded fiber and feathers, much like nests of Yellow Warblers and American Goldfinch; nests are compact on the underside and without a trailing streamer, and in this way they differ from nests of the Alder Flycatcher. The eggs usually differ from eggs of Alder Flycatcher and are a deeper buff color with larger and more diffuse spots (Fargo 1928; Stein 1958, 1963). The nests often are brood-parasitized by Brown-headed Cowbirds (Berger and Parmelee 1952, Berger 1957, 1967, Walkinshaw 1966). Adult flycatchers return to the same area from year to year: 41% of adult males banded in one year were seen again in the next year, all on their old territory, and one bird returned each year into its fifth year. Only 23% of females returned to their old territory; the missing numbers were likely both birds that did not survive and birds that returned and settled in a new area. A few young flycatchers return to their natal area in a later breeding season: two were found at a distance 500 and 1600 m from the territory where they were born (Walkinshaw 1966).

Abundance and Population Trends

The atlas surveys show that Willow Flycatchers are widespread in the SLP, scattered in the NLP, and sparsely distributed in the UP. Prior to the 1960s, the Willow Flycatcher and Alder Flycatcher were not recognized as two distinct species so it is not possible to compare the distribution of the two in the early 1900s. In the past few decades there has been no clear evidence of an expansion of the range of Willow Flycatcher into northern Michigan. In the northernmost NLP locality (Dingman's Marsh, Cheboygan County) where Willow Flycatcher was reported in both MBBA I and MBBA II, their songs were tape recorded in the 1970s. In the UP, nearly all of the few reports of Willow Flycatcher are in the southernmost areas. In northern Wisconsin, they have been reported in three counties bordering the UP (Cutright et al. 2006), although not in the counties bordering Gogebic Co. where Willow Flycatchers were mapped in MBBA I and MBBA II. In Ontario they occur in abundance as far north as the southern Georgian Bay region, about the same latitude as in the NLP of Michigan, and on Manitoulin Island in Lake Huron east of the UP, and their distribution has moved northward onto the Southern Shield region (Cadman et al. 2007). In Michigan during MBBA I, the proportion of surveyed townships where the flycatchers were detected was 80% in the SLP, 27% in the NLP, and 3% in the UP; in MBBA II their numbers were nearly the same (77%, 21% and 3%). In

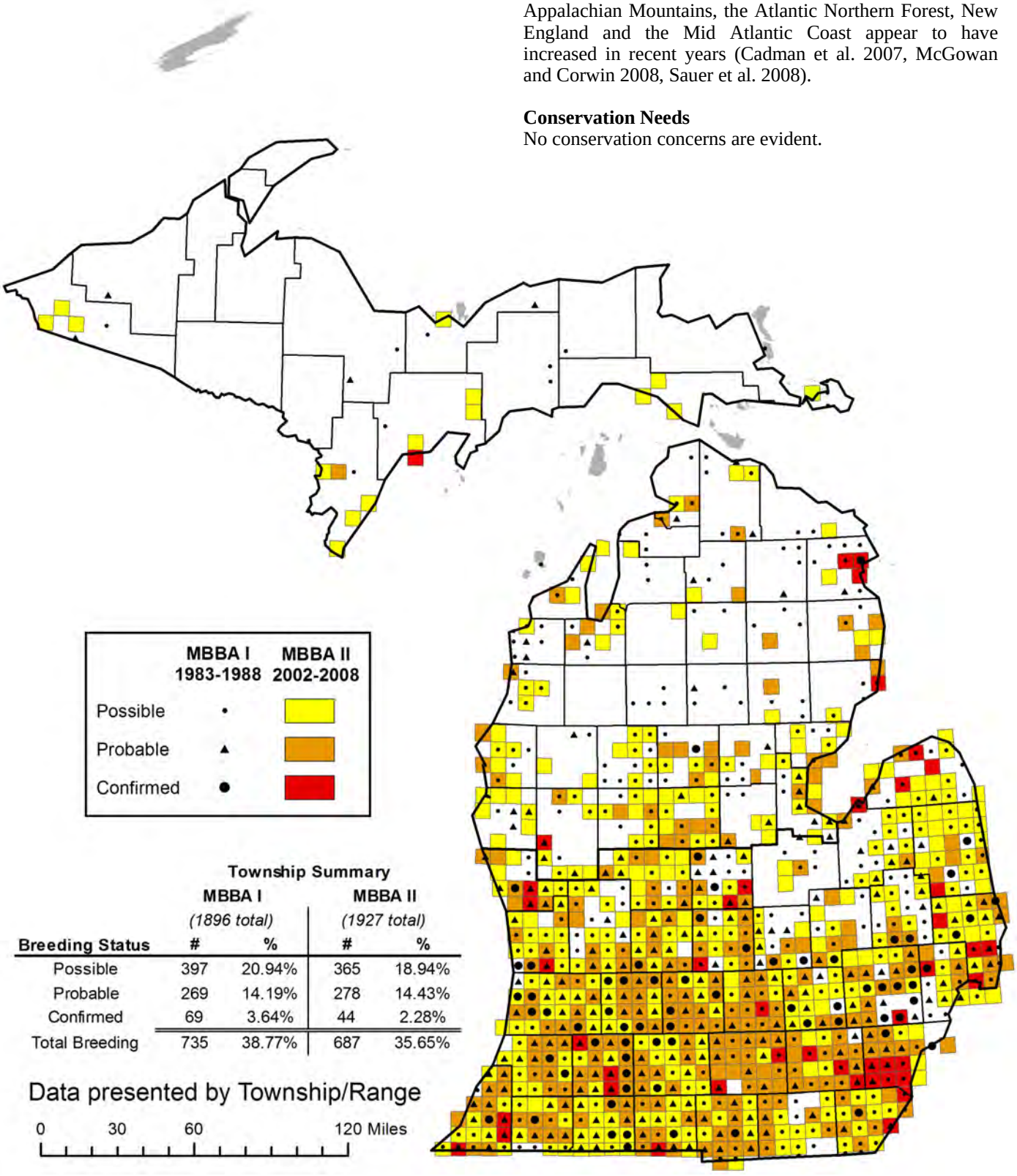
Willow Flycatcher *(Empidonax traillii)*

Robert B. Payne

Breeding Bird Surveys from 1996 to 2006, Willow Flycatchers have undergone a small but significant decrease in numbers both in Michigan and throughout the range of the species. However, in the combined data for both Alder and Willow Flycatchers, there has been no significant change in numbers in Michigan or throughout North America (Sauer et al. 2008). In contrast to Michigan, Ontario, and elsewhere in the Western Great Lakes, the numbers of flycatchers in Quebec, New York, the Appalachian Mountains, the Atlantic Northern Forest, New England and the Mid Atlantic Coast appear to have increased in recent years (Cadman et al. 2007, McGowan and Corwin 2008, Sauer et al. 2008).

Conservation Needs

No conservation concerns are evident.



Least Flycatcher *(Empidonax minimus)*

Max A. Henschell



Robert Epstein ©

The Least Flycatcher is the most diminutive and common of the Michigan "Empids." Its emphatic "*che-BEK*" call is a common sound in forests throughout the state during the breeding season. This small flycatcher is often found in groups, with several males all calling in close proximity. Reasons for these breeding aggregations are not clear, but it seems to be an essential part of the Least Flycatcher's mating system.

Distribution

The Least Flycatcher is found in the deciduous or mixed forests of the northern Lower 48 states and Canada during the breeding season. It is often noted for its tendency to aggregate breeding territories and is rarely found singly (Tarof and Briskie 2008). In winter, this tiny flycatcher flies south to the warmer climes of Central America and southern Florida.

The Least Flycatcher is a common resident in Michigan in the summer. It typically arrives in the state in mid-April (Chartier and Ziarno 2004) and reaches extreme northern Michigan around the third week of May (Binford 2006). It vacates the northern reaches in early September (Binford 2006) and disappears from the state by mid-October (Chartier and Ziarno 2004).

During MBBA II, Least Flycatcher was recorded in just under 60% of townships, though it was recorded in every county. Least Flycatcher was recorded in 74%, 64% and 44% of townships in the UP, NLP and SLP, respectively. All three areas experienced a drop in breeding records from the first to second atlas; both the NLP and SLP had records in approximately 10% fewer townships during the second atlas period.

Least Flycatcher is an uncommon breeder in Illinois and Indiana, with most records in the northernmost tier of counties in both states (Kleen et al. 2004, Weeks 1998). Most records in Ohio are restricted to the northern third of the state (Peterjohn and Rice 1991). These patterns are consistent with what is seen in Michigan, Ontario (Mills 2007) and Wisconsin (Windels 2006); breeding records are concentrated in the north of these areas and much less common in the southern portions.

Breeding Biology

The breeding biology of the Least Flycatcher is rather complex and not fully understood. Least Flycatcher males arrive on the breeding grounds in early to late May, congregating in the best habitats, with each male defending a small, but exclusive territory reminiscent of a lek. Females arrive within a week, and pair bonds are formed shortly thereafter. Though pairs are socially monogamous, extra-pair copulations are common (Tarof et al. 2001). These extra-pair copulations create social pairs of males, which help defend and feed the young of a single female (Tarof et al. 2005). Rarely are the defending males the sole sire of the young they protect (Tarof et al. 2001).

Females construct nests within two days of pair formation. Walkinshaw (1966) found that Least Flycatchers in Michigan prefer to nest in maples or white oak. Egg laying is typically completed by the middle of June (Tarof and Briskie 2008). Michigan clutch size averages just under four eggs. Incubation is done only by the female and lasts from 13-15 days, at which time the altricial young hatch (Walkinshaw 1966). Males infrequently feed the incubating female (MacQueen 1950). The young leave the nest after approximately 15 days during which time both the male and female feed the young which are independent 2-3 weeks later (Walkinshaw 1966; Tarof and Briskie 2008) Brood parasitism from Brown-headed Cowbirds was recorded in just under 10% of nests monitored by Walkinshaw (1966).

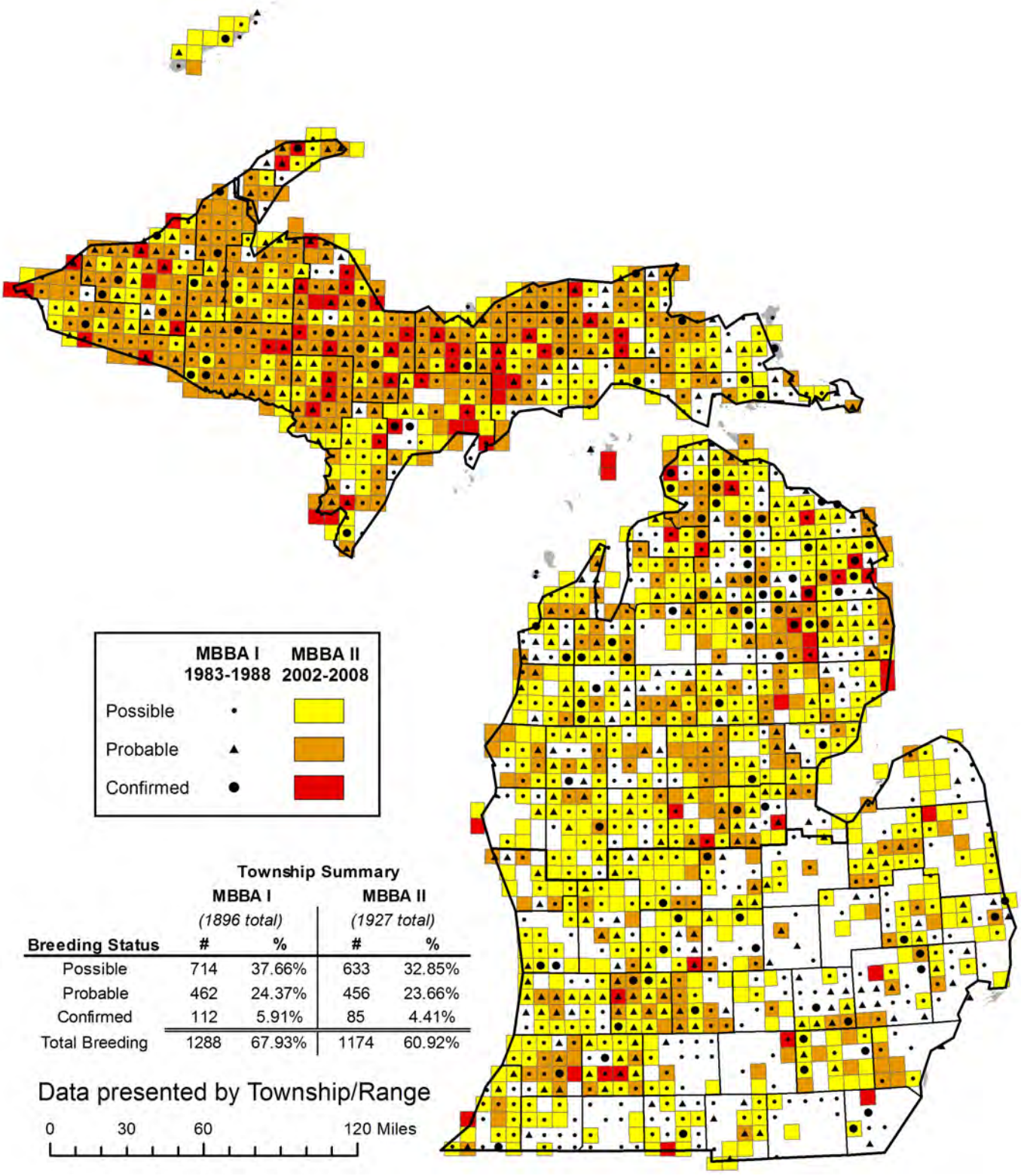
Abundance and Population Trends

Partners in Flight lists the Michigan population of Least Flycatcher at 220,000 birds (PIF 2007). BBS data for Michigan show a decrease of approximately 2.73% per year between the beginning of MBBA I and the end of MBBA II (Sauer et al. 2008). Using data from the BBS during the period 1966-2005, Tarof and Birskie (2008) have shown that Least Flycatchers are experiencing dramatic, widespread declines throughout their breeding range.

Conservation Needs

Studies have shown that the Least Flycatcher is sensitive to logging, environmental pollution, exotic pathogens, and deer density. Extensive logging forces Least Flycatchers into forest interiors and causes population declines due to loss of appropriate breeding habitat (Dellasala and Rabe 1987). Darveau et al. (1992) showed that Least Flycatcher nesting density dropped 67% in areas with die-back in maples, a preferred nesting tree of Michigan's Least Flycatchers, caused by acid rain. Proliferation of beech saplings following pathogen outbreaks have outcompeted maples in areas of New England, resulting in local extinction of Least Flycatcher (Smith et al. 1993). Browsing

by abnormally high deer populations removes forest understory and decreases forest complexity, which in turn removes breeding habitat for the Least Flycatcher (Decalesta 1994). Michigan must deal with many of these issues, from clearcut logging in the UP, to beech bark disease outbreaks, to the management of deer densities well above natural levels. Many of Michigan's breeding songbird species require similar habitat to that of the Least Flycatcher and probably face similar threats from these environmental issues. Though still common, Least Flycatcher populations in the state are on the decline. If we are to preserve this species as one that we can observe throughout the state, action needs to be taken to change the policies that let such issues continue in the state.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	714	37.66%	633	32.85%
Probable	462	24.37%	456	23.66%
Confirmed	112	5.91%	85	4.41%
Total Breeding	1288	67.93%	1174	60.92%

Data presented by Township/Range

0 30 60 120 Miles

Eastern Phoebe *(Sayornis phoebe)*

Torrey Wenger



Willie McHale ©

Species sponsored by John Talbot & Nora Iverson.

Returning to Michigan in March, the Eastern Phoebe and its distinctive "fee bee" song is one of the first guarantees of spring. The ability to switch to fruits during inclement weather, unlike the flying insect only diet of other flycatchers, enables the newly arrived birds to survive the sometimes capricious weather of early spring (Weeks 1994). Phoebes readily accept man-made structures as nest sites and have expanded their range both west and south as a result (Weeks 1994). The combination of close proximity to human sites, early arrival, and easily recognized song makes the phoebe a bird familiar even to non-birders.

Distribution

Phoebes can be found in all counties throughout the state, including Isle Royale. This is essentially unchanged from MBBA I. Statewide, they were documented in 66% of all townships surveyed during MBBA I and in 75% during MBBA II, a net increase of 14%. The proportion of townships occupied in the SLP and UP increased by 23% and 26%, respectively; that in the NLP decreased by 2%.

Breeding Biology

Pair formation occurs quickly after birds arrive in mid-March, later in the UP. Adults exhibit strong site fidelity and return to previous nesting sites, leading them to pair with their previous mate (Weeks 1994). Depending on the substrate, the mud, moss, and grass nests are either attached to a vertical surface (e.g., a wall) or placed on a horizontal surface (e.g., a barn rafter); in all cases, the nest is tucked under a protective overhang. Five eggs are typically laid and take about two weeks to hatch. Only the female incubates. The young can fledge as early as two weeks but may stay in the nest for another week (Weeks 1994).

Phoebes will reuse nests from previous years and will also make use of the old nests of other birds, such as Barn Swallow and American Robin. Nest reuse increases success, allowing the pair to lay eggs sooner and renest sooner, but does not affect clutch size (Hauber 2002). Old nests are always "renovated" and the presence of green moss is diagnostic of a phoebe nest, no matter the original builder (Weeks 1994).

Cowbirds are frequent nest parasites of phoebe nests. Parasitism rates vary by region and documented rates range from 0% to 42% (Weeks 1994, Ortega 1998). About 70% of parasitized nests produced only cowbirds, 10% produced both phoebes and cowbirds, and 20% produced only phoebes (Weeks 1994). Parasitized nests fledged 0.75 phoebes and 1.25 cowbirds while non-parasitized nests fledged 3.78 phoebes. Egg success rates are more dramatic, with only 17% of phoebe eggs, and 71% of cowbird eggs, producing fledglings in parasitized nests compared to 89% of eggs in non-parasitized nests (Berger 1951). Phoebes are tolerant of cowbird parasitism and do not abandon the nest or remove the eggs (Rothstein 1986).

Abundance and Population Trends

The phoebe is an abundant bird with a growing population. BBS data show positive trends at all levels: survey-wide, an annual increase of 0.8% ($P = 0.00$, $n = 2069$) during the 1966-2007 period; an increase of 2.2% annually in USFWS Region 3; and in Michigan, a non-significant increase of 3.0% (Sauer et al. 2008).

The second atlas of Ontario reported increases in both probability of observation and population (McLaren 2007); in New York, their second atlas found phoebes in 9% more blocks than their first atlas (McGowan 2008). This species is common in states throughout the Great Lakes region, although the first Ohio atlas noted reduced numbers in some areas due to habitat loss (Peterjohn and Rice 1991).

Conservation Needs

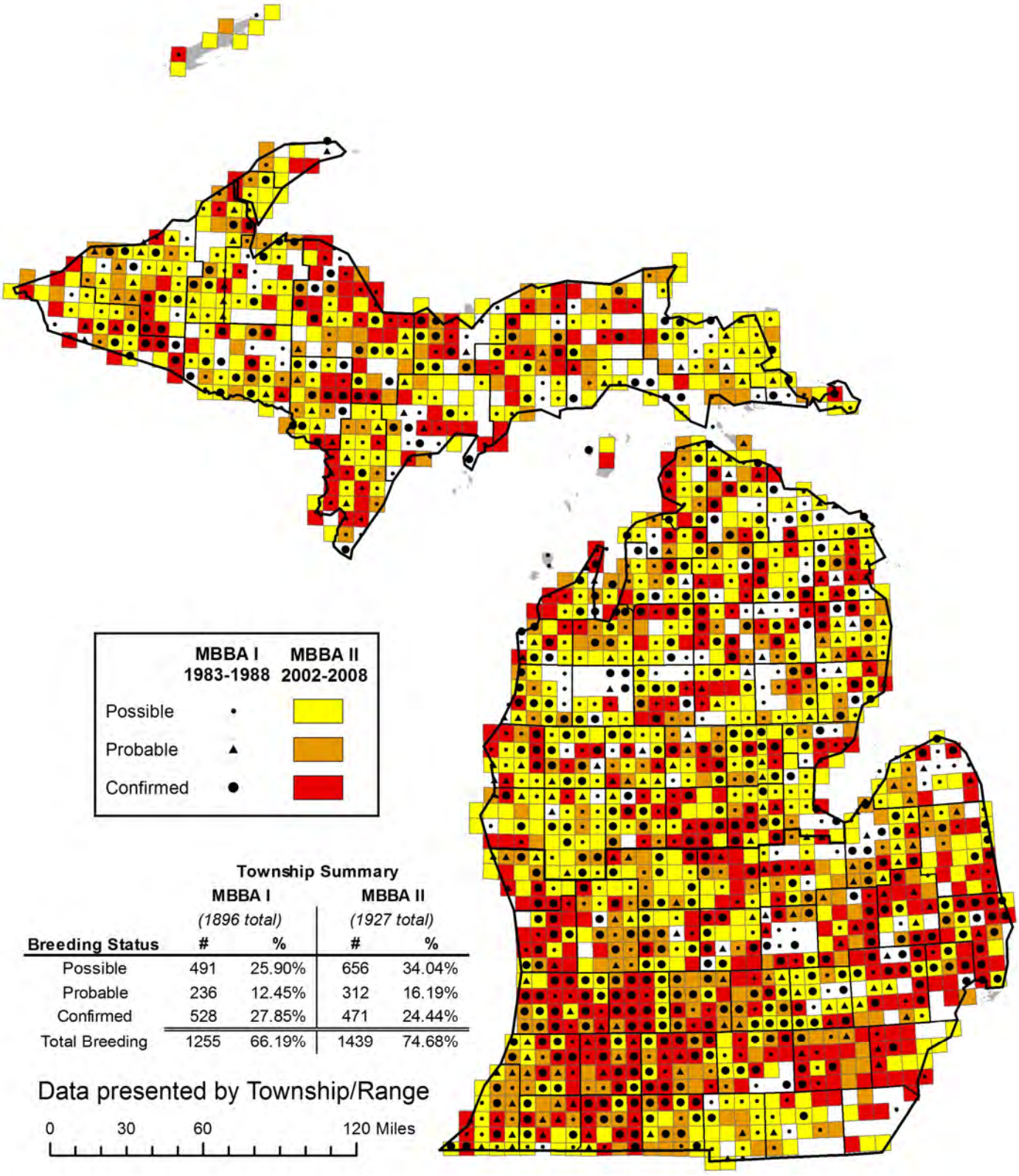
The near future of the Eastern Phoebe is secure. This species is tolerant of human activity and will nest on man-made structures, ensuring it potential habitat for years to come. Bridges designed to provide nest building sites could help this species and others. Phoebes do require woody vegetation close to the nest site (Weeks 1994) so conscientious landscaping might be required.

Populations wintering in the southeastern U.S. and Mexico are vulnerable to severe weather events. Some mortality of young birds is due to nests parasites (e.g., lice) in reused nests (Weeks 1994). As a short distance migrant, the phoebe is responding to global climate change: it is arriving about 20 days earlier in the spring than it did 60 years ago (Bradley et al. 1999).

The phoebe is a solitary bird – even mated pairs spend most of their time apart – and would benefit from increased study. Since it does not move in large flocks, little is known about its migration or winter range. Few studies have been done on its food choices, or on how long the fledged young remain dependent on their parents. These questions are important when planning for the long term conservation of this species. This charming bird of mystery would be a good candidate for citizen science driven research.

Eastern Phoebe *(Sayornis phoebe)*

Torrey Wenger



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	491	25.90%	656	34.04%
Probable	236	12.45%	312	16.19%
Confirmed	528	27.85%	471	24.44%
Total Breeding	1255	66.19%	1439	74.68%

Data presented by Township/Range

0 30 60 120 Miles

Great Crested Flycatcher *(Myiarchus crinitus)*

Deaver D. Armstrong



John Van Orman ©

The Great Crested Flycatcher is the only eastern North American representative of the *Myiarchus* group of tyrant flycatchers. However, it is easily distinguished from the three western U.S. species by its noisy *"whee-eep"* call and its bright yellow underparts that extend nearly to the breast. Its distinctive call and its use of small woodlots and woodland edges to place its cavity nests are some of the reasons why this species is so familiar to Michigan birders. This species breeds mostly in the eastern half of the U.S. and the southernmost parts of eastern Canada. Some Great Crested Flycatchers winter as far north as Florida but most move to southern Mexico and Central America (Lanyon 1997). It is a fairly common breeding bird throughout Michigan, a fairly common migrant in the SLP, but an uncommon migrant elsewhere in the state (Chartier and Ziarno 2004).

Distribution

Most early accounts note that the species was common to fairly common in the southern half of Michigan but less common to rare in the northern parts of the state (Barrows 1912, Wood 1951, Zimmerman and Van Tyne 1959). Zimmerman and Van Tyne (1959) confirmed Wood's (1951) report of no records from Keweenaw Point or Isle Royale. Payne (1983) noted that although the species is still uncommon in the UP, the numbers in Schoolcraft and Alger counties were increasing. The expansion of the species in the UP continued, and both MBBA I and MBBA II showed the Great Crested Flycatcher as widely distributed all over the state including the Keweenaw Peninsula and a few townships on Isle Royale. In fact, both Atlases reveal that every county in Michigan has a breeding record for this species. In MBBA I, Brewer (1991) described the species "as frequent in the UP as in the southern LP and perhaps even more frequent in the forested NLP." BBS data from 1994 to 2003 confirm Brewer's speculation and show the highest abundance in the NLP and the western SLP (Sauer et al. 2008).

Breeding Biology

Most state atlas accounts for this species mention the use of a shed snakeskin as an element of nesting material. The evidence for the snakeskin providing some protection has previously been somewhat anecdotal (Bent 1942). Others have proposed that the texture of snakeskin seems to be the more important factor and that similarly textured material like onionskin or plastic wrappers are found even when snakeskin is not (Lanyon 1997). However, a recent study shows that there may be some protection offered by snakeskin, at least from mammalian predators like flying squirrels (Medlin and Risch 2006).

The Great Crested Flycatcher is an obligate cavity nester, completely dependent on other species, particularly woodpeckers, to provide cavities, but they will also nest in a variety of manmade structures, including nest boxes. The nest site is usually on the edge of deciduous woodlots, and cavities are lined with a variety of roots, grasses, and fibers (Lanyon 1997) as well as the snakeskin mentioned above. In Michigan, egg laying peaks in June (Brewer 1991), with clutch size ranging from four to eight (average 5). Great Crested Flycatchers are single-brooded, and incubation lasts about 13-15 days, with young fledging at 13-15 days of age (Lanyon 1997).

Abundance and Population Trends

Estimates show the Great Crested Flycatcher to be the most abundant flycatcher in the state, with Eastern Phoebe placing a close second (PIF 2007). The same data suggest that Michigan is the breeding site for approximately 4% of the world's population of Great Crested Flycatchers, making Michigan a significant contributor to the region's population of this species.

Overall, the Great Crested Flycatcher was found in only slightly fewer townships in MBBA II compared to MBBA I, with the greatest decline occurring in the UP. BBS data from the first to the second atlas also show a declining trend for Michigan as well as a small though significant decline in USFWS Region 3 (Sauer et al. 2008). From 1966 to 2007, some significant but small declines in Great Crested Flycatcher populations are shown in all states adjacent to Michigan (Sauer et al. 2008) but the most recent atlases from those states report the species as still common and widespread (Peterjohn, and Rice 1991, Weeks 1998, Kleen et al. 2004, Polk 2006).

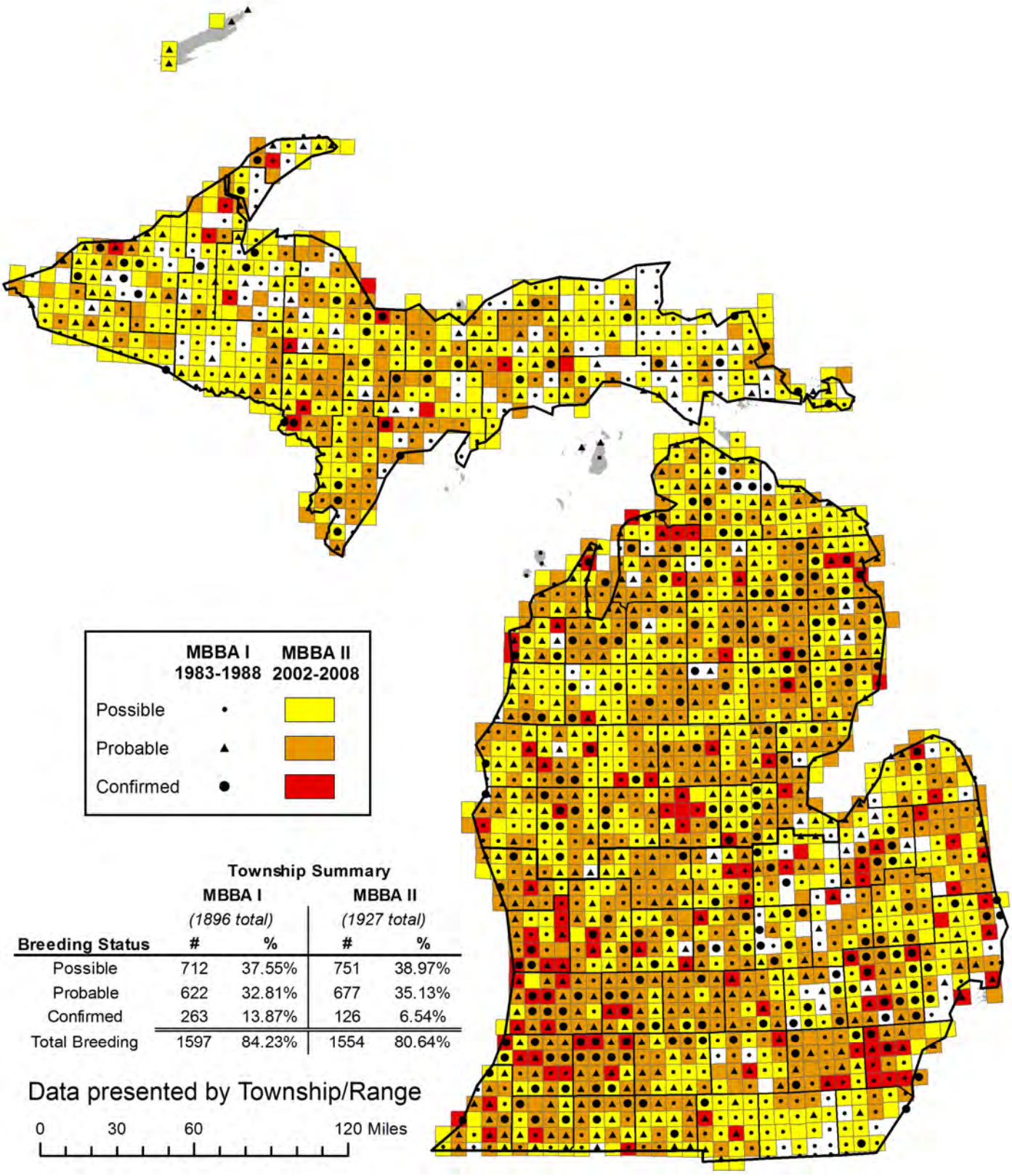
Conservation Needs

It is not clear why the Great Crested Flycatcher is experiencing modest population declines in Michigan. Perhaps competition for nesting cavities or simply reduction of appropriate habitat may be at work; most likely both. In one study, Great Crested Flycatchers were found more often in oak-hickory dominated stands than in shade tolerant maple dominated forests (Rodewald 2003). These oak hickory forests are declining in Michigan as a result of fire suppression and heavy deer browsing, among other causes,

Great Crested Flycatcher *(Myiarchus crinitus)*

Deaver D. Armstrong

and these declines will take many years to reverse (Sargent and Carter 1999). Preservation and management of large oak hickory dominated woodlots and forests may be helpful in improving habitat for Great Crested Flycatcher.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	712	37.55%	751	38.97%
Probable	622	32.81%	677	35.13%
Confirmed	263	13.87%	126	6.54%
Total Breeding	1597	84.23%	1554	80.64%

Data presented by Township/Range

0 30 60 120 Miles

Eastern Kingbird *(Tyrannus tyrannus)*

Deaver D. Armstrong



Darlene Friedman ©

This aggressive flycatcher's scientific name says it all: a tyrant of tyrants. Eastern Kingbirds defend their territory fiercely against other Eastern Kingbirds and, should a crow or hawk simply fly overhead, the bird will seek it out and perhaps try to pluck feathers from its back to let the "intruder" know it is not welcome (Murphy 1996). Yet this species is completely accepting of a nearby nest of an American Robin, Red-eyed Vireo or other songbird (Bent 1942). Perhaps the "eastern" part of its common name is not appropriate, as it nests as far west as British Columbia. Though it is not found along the west coast of the U.S. or in most of California, Nevada, Arizona and New Mexico, the Eastern Kingbird's breeding range is still more widely distributed than any other flycatcher in North America. It breeds as far north as the Northwest Territories and throughout the eastern U.S. and Canada (Murphy 1996). This bird is a fairly common breeder throughout all of Michigan and an uncommon migrant (Chartier and Ziarno 2004). Eastern Kingbirds spend the winter months in northern South America (Murphy 1996).

Distribution

Barrows (1912) described the Eastern Kingbird simply as "common throughout the state in summer." Wood (1951) noted that he did not find the species very numerous near Whitefish Point in 1914, but that by 1936 individuals were reporting the Eastern Kingbird as common everywhere in the UP except the Huron Mountains. Neither Wood (1951) nor Zimmerman and Van Tyne (1959) had evidence of the species nesting on Isle Royale. Payne (1983) continued to report Eastern Kingbird as a "common transient and summer resident." Both MBBA I and MBBA II show evidence of Eastern Kingbirds breeding on Isle Royale. There appear to be no obvious changes in distribution between MBBA I and MBBA II. The open, old field and savannah-like habitats that this species prefers appear plentiful enough for it to maintain breeding territories in every county in Michigan and approximately 80% of all townships.

Breeding Biology

Eastern Kingbirds often return to the same location year after year. If both the male and female in the pair return from South America to breed again, they will usually breed with each other again (Murphy 1996). Some returning birds have even nested in the same tree as in a previous breeding season (Bent 1942). Nests are typically placed in trees, often in open areas, on horizontal branches in fairly exposed locations. The nest itself is a fairly large open cup composed of small twigs, roots, plant fibers, and sometimes strips of bark (Murphy 1996). Clutch size ranges from two to five eggs (Murphy 1996) with three being the most frequent number (Brewer 1991). Eggs are incubated for about 14-17 days and young fledge at about 16-17 days of age (Murphy 1996).

Abundance and Population Trends

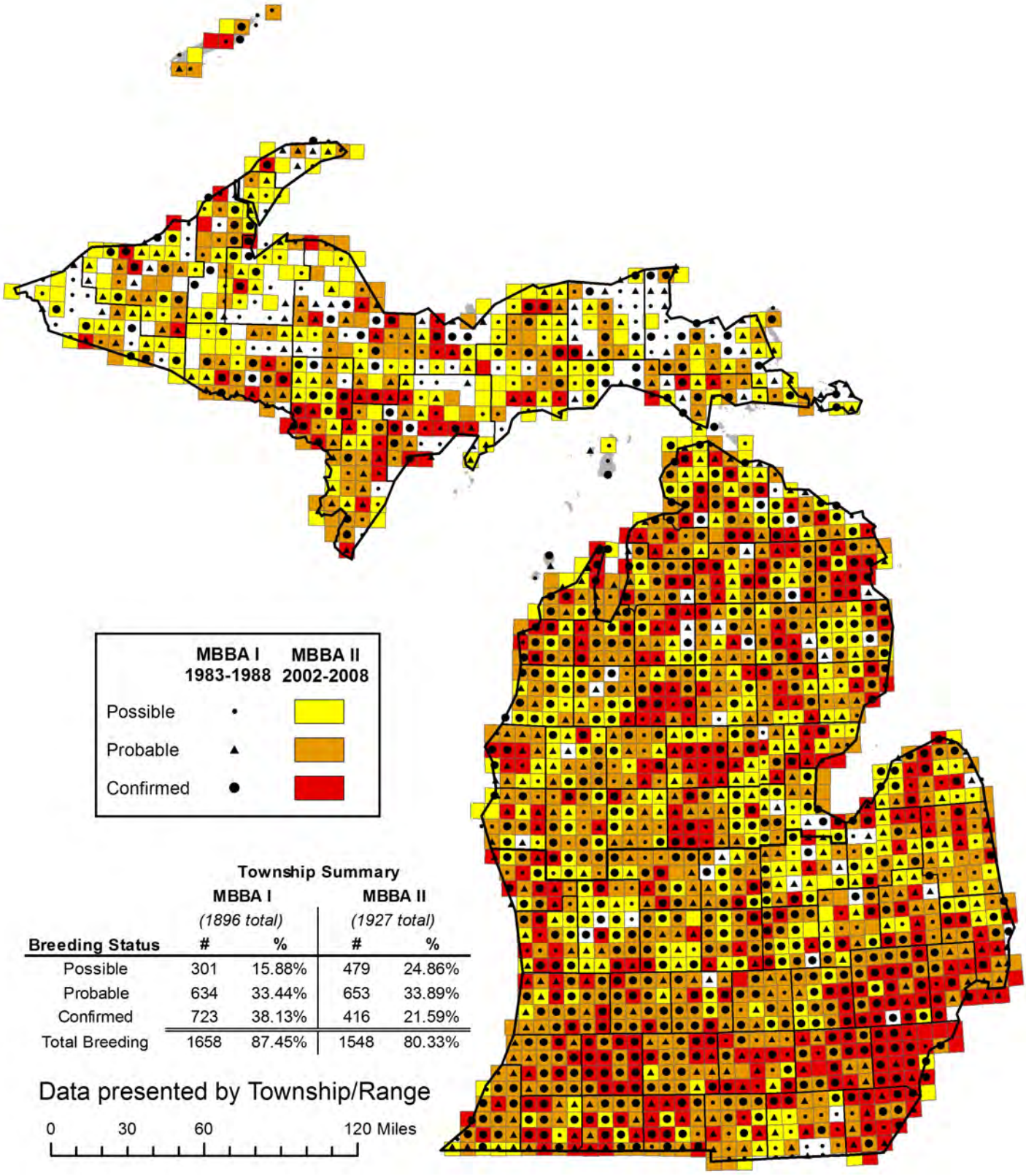
The Partners in Flight database shows an estimated 260,000 Eastern Kingbirds in Michigan, approximately 2% of the global population of the species (PIF 2007). This makes it the third most common flycatcher in the state, after Great Crested Flycatcher and Eastern Phoebe. In Michigan, the NLP and the tip of the thumb have the highest density of Eastern Kingbirds (Sauer et al. 2008).

When compared to the first atlas, both the UP and LP have seen a decline in the number of townships reporting Eastern Kingbirds, with the greatest decline occurring in the UP. This follows the Michigan BBS trends between the two atlases that show significant population declines of more than 4.5% per year (Sauer et al. 2008). Brewer (1991) stated that Eastern Kingbird numbers had not changed in the 20 years prior to MBBA I, and it is true that Eastern Kingbird populations continue to be widespread in Michigan and all the states and provinces that abut Michigan (Peterjohn and Rice 1991, Weeks 1998, Kleen et al. 2004, Lesher 2006, Cadman et al. 2007). However, all of these states show declines in the BBS population trends from 1966 to 2007 with only Ohio and Illinois not being statistically significant (Sauer et al. 2008). This species' decline is almost certainly a result of habitat loss, including the natural loss of open, shrubby areas due to increased growth of woody and invasive vegetation.

Conservation Needs

There are no specific management plans for the Eastern Kingbird, a species most likely to be found around hedgerows, old fields, or pastures. These habitats are certainly all in decline in Michigan today. In spite of its wide distribution in our state, the Eastern Kingbird is a species whose numbers bear watching over the next decade.

Eastern Kingbird *(Tyrannus tyrannus)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	301	15.88%	479	24.86%
Probable	634	33.44%	653	33.89%
Confirmed	723	38.13%	416	21.59%
Total Breeding	1658	87.45%	1548	80.33%

Data presented by Township/Range

0 30 60 120 Miles

White-eyed Vireo *(Vireo griseus)*

Jack Reinoehl



Darlene Friedman ©

The White-eyed Vireo is a vocal inhabitant of dense brush; it has the curious habit of occasionally incorporating call notes of other species into its song. In Lost Nation State Game Area in Hillsdale County, if you hear the "*wheep*" call of a Great Crested Flycatcher in September, it is most likely a White-eyed Vireo (pers. obs.). This vireo is a characteristic species of thick second growth and streamside vegetation in the southeastern United States, nesting west to Iowa and central Texas. Breeding Bird Survey data show this species occurring in moderate density in the Ohio River Valley and at highest density in the lower Mississippi Valley and Florida. The White-eyed Vireo is a short distance migrant, with significant numbers wintering near the Gulf Coast. This vireo is relatively unfamiliar to observers in the state and tends to remain hidden; on the other hand, it sings its unique song throughout its presence at its nesting grounds.

Distribution

In Michigan, the White-eyed Vireo is scattered thinly across the southern three tiers of counties with individuals occasionally found farther north. The range of the White-eyed Vireo shows a very slight shift north between MBBA I and MBBA II, although in both the range is essentially the southern three tiers of counties. In MBBA I, there were reports from 50 blocks, and 48 of these were in the bottom three tiers of counties. In MBBA II, the number of blocks increased slightly to 59; of these, 51 were in the southern three tiers and 6 were in the next two tiers north.

This species is primarily a bird of successional habitat, requiring dense thickets. Thus its occurrence in an area is somewhat transient; at the same time, new habitat for the White-eyed Vireo is emerging from abandoned farmland and old fields. This may explain apparent increases in Kalamazoo and western Wayne Counties. In Hillsdale County, eight individuals in four blocks were recorded in MBBA I and 14 in eight blocks in MBBA II (pers. obs.). In northern Lost Nation State Game Area, extensive thicket habitat contributed to a count of seven singing males in one block in 2007 (pers. obs.).

This vireo seems more frequent in Michigan than in regions to our east and west. It has to be admitted that the southern borders of Wisconsin and Ontario are both slightly north of Michigan's. It is still somewhat surprising that this vireo was found in only five blocks in Wisconsin, though this species has shown a "marked increase" there in the last 30 years (Hansen 2006). In Ontario, it was found in 19 squares in the first atlas and in about 15 in the second atlas. A good proportion of the Ontario population is along the Lake Erie shore at Point Pelee, Rondeau Provincial Park, and Long Point (James 2007).

The species becomes common quickly as one moves south of Michigan. In Indiana, the White-eyed Vireo was found in one-sixth of the blocks in the northern third of the state but in 87% in the southern third (Whitehead 1998). In Michigan, this vireo was all but absent in the intensively farmed counties of Lenawee and Monroe but found widely in Ohio immediately south of these counties. In the southeastern part of Ohio, which retains much forest cover, this vireo was found in over 99% of surveyed blocks (Peterjohn and Rice 1991).

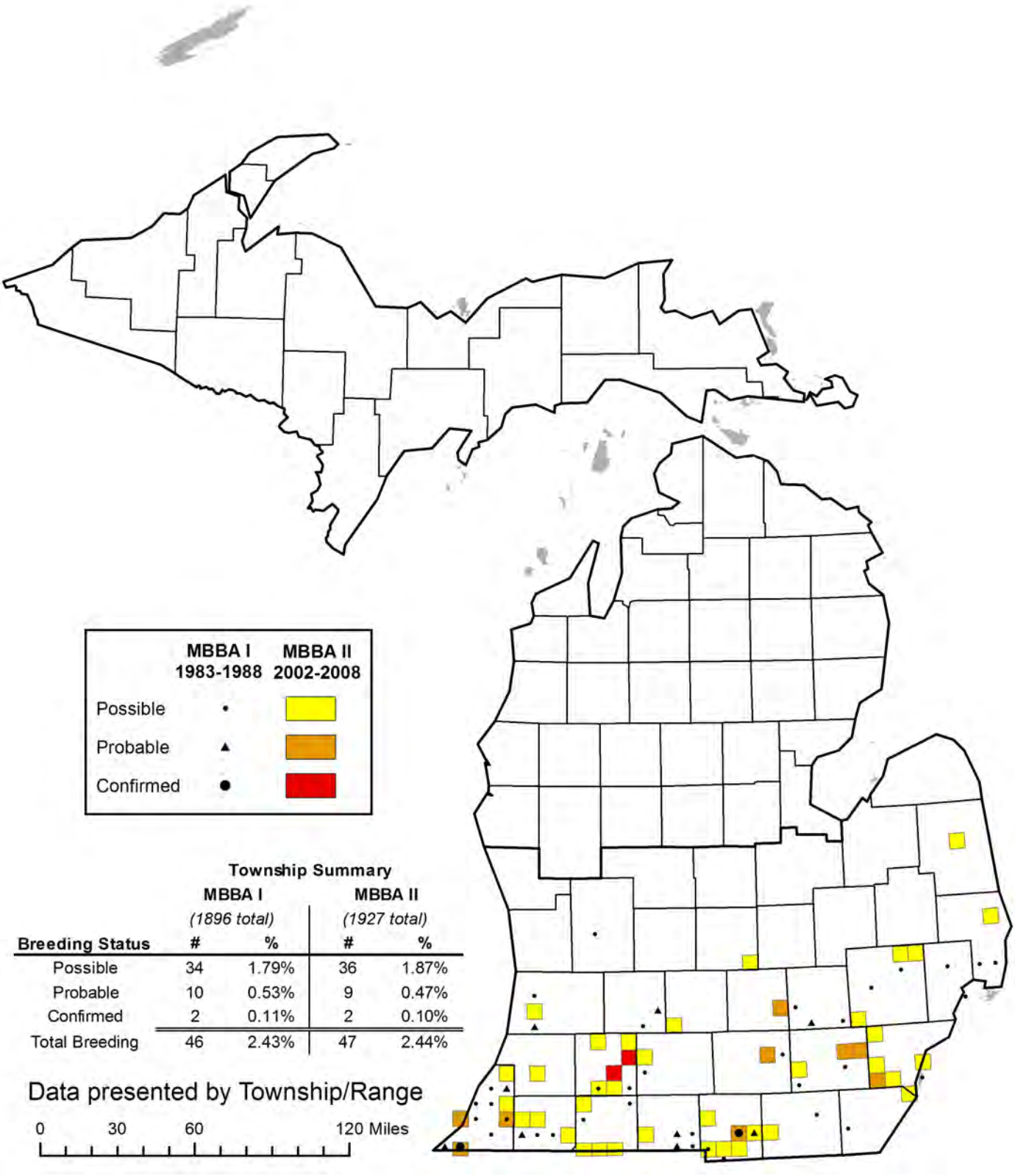
Breeding Biology

The White-eyed Vireo generally arrives in the first week of May, occasionally in late April (Chartier and Ziarno 2004). In Ohio, nests with young are found by the first half of June (Peterjohn and Rice 1991). Because of the small numbers of this species and its dense nesting habitat, there were only two confirmations of nesting in each atlas project. In parts of its range, egg laying continues into July (Hopp et al. 1995).

Abundance and Population Trends

Breeding Bird Survey data for the Midwest region (USFWS Region 3) showed a 4.9% annual rate of increase from 1965 to 1979 but this rate of increase has slowed to 0.9% over the last 30 years (Sauer et al. 2008). As pointed out in MBBA I, the increase in population during the 1960s and 1970s led to the spread of the nesting range of this vireo into the state. The very modest change in range between MBBA I and MBBA II is consistent with the much diminished rate of increase during the years between the two atlases. Continent-wide data has shown a more modest but still significant increase over the same period (Sauer et al. 2008). The White-eyed Vireo is thus not on any watch list.

White-eyed Vireo *(Vireo griseus)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	34	1.79%	36	1.87%
Probable	10	0.53%	9	0.47%
Confirmed	2	0.11%	2	0.10%
Total Breeding	46	2.43%	47	2.44%

Yellow-throated Vireo *(Vireo flavifrons)* ***Jack Reinoehl***



John Van Orman ©

The Yellow-throated Vireo is the most brightly colored of Michigan's vireos. Its breeding range is the eastern United States, where it typically inhabits deciduous forests, though it has tolerance for pine trees within its territory (Rodewald and James 1996). In the Great Lakes region, the northern limit of this species' range passes through the UP. The Yellow-throated Vireo winters from southern Mexico to northern South America (Rodewald and James 1996). This vireo vocalizes persistently both throughout the day and throughout the summer season. Besides its burry song, it produces a chatter like that of the closely related Blue-headed Vireo but descending in pitch. Its preference for edge environments contributes to its relatively easy detectability.

Distribution

During MBBA I, the Michigan breeding range of the Yellow-throated Vireo was the entire LP and the southwestern UP mostly in Iron, Dickinson and Menominee Counties. MBBA II data suggests that the UP population has expanded westward into Gogebic County, northward to the base of the Keweenaw Peninsula and eastward along the Lake Michigan shoreline. Additionally, several *Confirmed* or *Probable* breeders were located in the northeastern UP near Lake Superior. Perhaps as the deciduous forests mature in the Upper Peninsula, often near the Great Lakes, they are becoming more attractive to this species. A Yellow-throated Vireo was heard on 30 June 2007 in western Mackinac County in the rich maple forests a couple miles north of Lake Michigan (pers. obs.); this vireo was found in a similar situation in Schoolcraft County. In total, these extensions in range resulted in a 57% increase in UP blocks in which the Yellow-throated Vireo was observed. In the rest of the state, smaller increases in detection were noted – about 22% in the NLP and 6% in the SLP.

Echoing MBBA II findings, BBS data indicate that Yellow-throated Vireos in Michigan occur at highest densities in the southwestern LP. This would seem to reflect the species' preference for open woodland, which is prevalent in the oak woodlands growing in the sandy soils near Lake Michigan. In Wisconsin, this vireo was found throughout the state; there, as in Michigan, it is almost completely restricted to hardwood forest (Lesher 2006). In Ontario, the northern edge of its range is roughly the same latitude as the Straits of Mackinac (James 2007). In Indiana and Ohio, the Yellow-throated Vireo was also found nearly statewide. There, as in Michigan, it was less common than several other forest species. In Indiana it was found in 48% of the blocks surveyed, while the Red-eyed Vireo, for example, was found in 86% of these blocks (Whitehead 1998).

Breeding Biology

Most Yellow-throated Vireo arrive in southern Michigan in the first few days of May (pers. obs.). The nest is usually placed in the upper crown of a tree; Wisconsin observers reported nest building as early as 25 May and young being fed by 9 June (Lesher 2006). In September, the species is a vocal member of the woodland fall flocks along with Red-eyed Vireos, Eastern Wood-Pewees, Scarlet Tanagers, Black-capped Chickadees and migrant warblers (pers. obs.).

Abundance and Population Trends

The slight increase in Yellow-throated Vireo abundance suggested by MBBA II is supported by BBS data, which show an increase of 1.2% annually in Michigan breeding numbers from 1984-2008. Although this trend falls below the level of statistical significance, across the broader USFWS Region 3, a comparable annual rise of 1.8% was highly significant.

The Partners in Flight estimate of the state population of this species is 60,000; in contrast, the figure for the Red-eyed Vireo is 2,400,000 (PIF 2007). This ratio of 40 to 1 does not apply for southern Michigan; the Red-eyed Vireo's large total comes primarily from northern Michigan where it is exceptionally abundant, and the Yellow-throated Vireo is of marginal occurrence. In Hillsdale County during MBBA II, 185 Red-eyed Vireos were counted compared to 68 Yellow-throated Vireos, a ratio of almost 3 to 1. Similar ratios likely apply for most southern counties, and, with small and rather disturbed but maturing woodlots characterizing most of this area, these will change little in the near future.

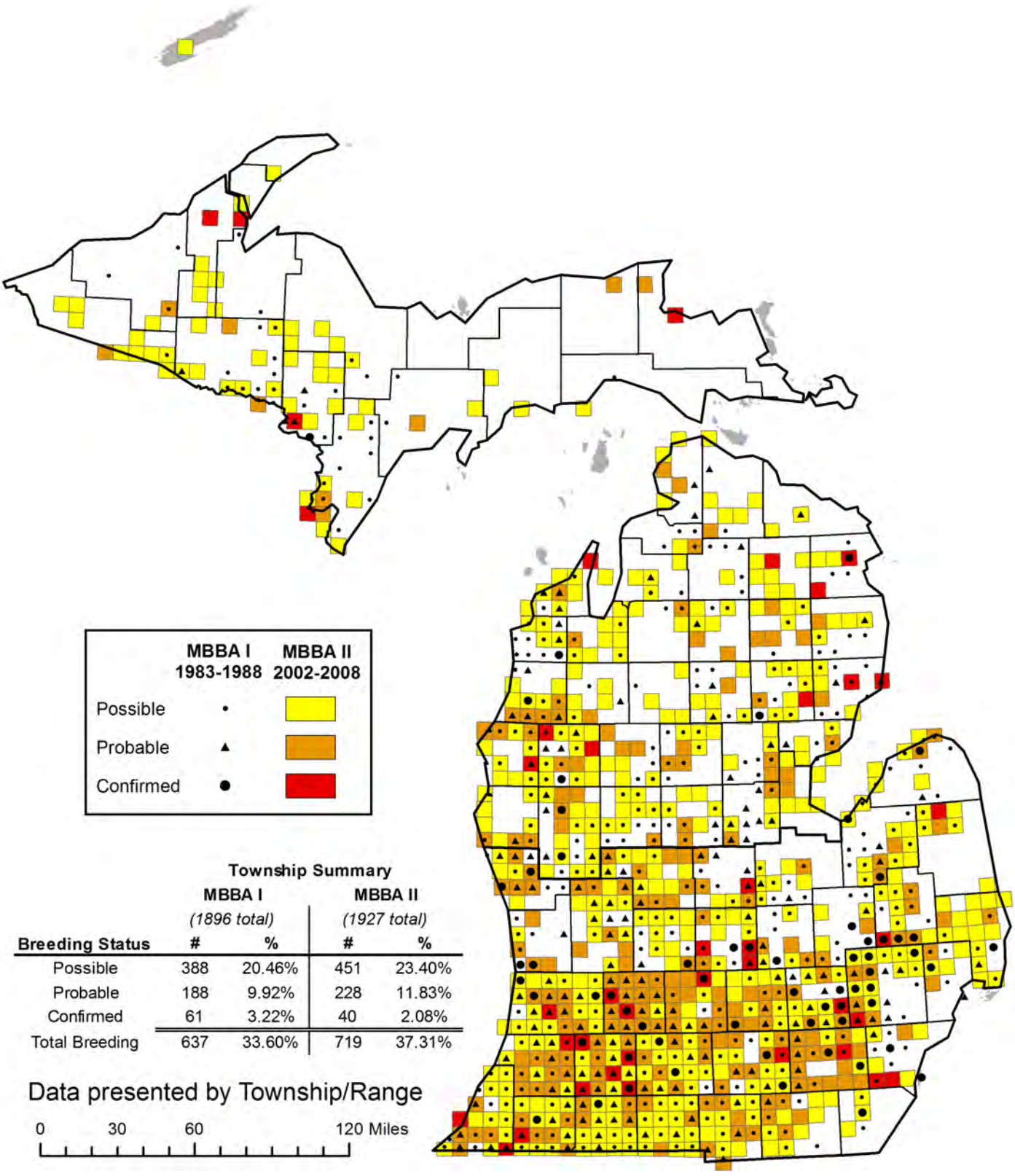
Within neighboring states over the longer time period of 1966-2007, populations in Wisconsin, Minnesota and Illinois appeared to be increasing while numbers in Indiana and Ohio populations appeared to be stable over this period (Sauer 2008). In Ontario, as in Michigan, the range of the species is expanding to the north. However, populations in the province have decreased, especially in the southernmost regions where the species is most numerous (James 2007).

Conservation Needs

Although not included on the American Bird Conservancy Watch List, the Yellow-throated Vireo is listed as a species requiring additional stewardship by Partners in Flight (Rich et al. 2004). This designation highlights species whose range is restricted to a single biome which in the case of the Yellow-throated Vireo is the forests of the eastern United States. The fact that most populations of this species are increasing suggests that at present this listing is precautionary.

Yellow-throated Vireo *(Vireo flavifrons)*

Jack Reinoehl



Blue-headed Vireo *(Vireo solitarius)*

Raymond J. Adams, Jr.



Darlene Friedman ©
Species sponsored in honor of:
The Recreation Fishing Club's 110th Anniversary

Because the larger Michigan vireos share similar song types, foraging styles, and habitats, aural identification of the Blue-headed Vireo – which tends to produce comparatively shorter phrases, higher pitches, and longer pauses – can prove challenging for even skilled birders (Bent 1950). To confuse matters, this species (formerly known as the Solitary Vireo) mimics other songs, usually other vireos or a flycatcher or two (James 1998, pers. obs.). Visually, however, this vireo is rendered distinctive by its striking blue-gray head with bright white spectacles. It is a fairly common resident in the NLP and the UP, rare to uncommon and local in the SLP, and a common migrant heading north into Canada. It breeds across the boreal mixed forest in Canada from the Atlantic Coast to northeastern British Columbia, and from the Great Lakes states into the northeastern U.S. and through the southern Appalachian Mountains. It winters from the south central and southeastern U.S. south into Mexico and Central America (James 1998).

Distribution

It is unclear how common the Blue-headed Vireo was in Michigan prior to 1900, as various authors differed in their opinions. While Wood (1951) writes that it was first listed for the state by Gibbs (1879), Boies (1875) reported it as a transient in southern Michigan. Cook (1893) noted it as a rare migrant in May and October, with records from Iron Mountain and Mackinac Island and a report by Gibbs from Wexford County in summer. Barrows (1912) called it "a not very common" spring migrant, but more frequent in autumn and breeding in the upper portions of the NLP and UP. Surprisingly, there were only four Michigan nest reports by 1950, with the first from the Huron Mountain Club in Marquette County in 1928 (Wood 1951, Dodge 1961). By the late 1950s, it was a summer resident south to Iosco and Oscoda Counties, with 10 nest records (Zimmerman and Van Tyne 1959). Breeding expansion into the SLP subsequently occurred in the 1960s and 1970s (Adams 1991). More broadly, during this period the species expanded its breeding range throughout the Great Lakes Region. The specific distribution of the Blue-headed Vireo in Michigan is easily explained by its habitat preference: in addition to the typical occupancy of deciduous forest, it is the only vireo in the Great Lakes that extensively uses coniferous stands such as spruce, fir, hemlock, and pine or mixed coniferous-deciduous stands (Harriman 2006, Adams 1991). It is less common in fragmented forest, but more frequent along riparian areas with a coniferous component.

Michigan's two Atlas projects clearly demonstrate the Blue-headed Vireo's recent breeding expansion within the state. The species was found in 14.9% of blocks during MBBA II compared to only 6.7% during MBBA I; similarly, township-level presence increased from 20.4% to 36.5%. The Blue-headed Vireo is now widespread across the UP (a 118% block-level increase between Atlases), distributed throughout the more heavily forested regions of the NLP (146% block-level increase), and present in some of the larger forests of the SLP (a 148% block-level increase).

Breeding Biology

The Blue-headed Vireo is usually the earliest Michigan vireo to return in spring, and has been observed in the SLP as early as the end of March; more typically it reappears in mid to late April. The peak of its migration is the first week of May in the SLP; by the end of that week most resident birds have reached the UP. The Blue-headed Vireo typically produces one clutch, but will re-nest following early-season failure; uncommonly, second clutches are laid following successful first attempts. Nests usually consist of four eggs, occasionally three and rarely five (James 1998). Incubation requires 13 to 14 days, with the female brooding at night and both adults sharing incubation duties during the day. Because males help incubate, territorial defense is reduced during incubation (Chiver et al. 2007). Cowbird parasitism rates are often low, especially in the northern part of its range (James 1998). Unlike many woodland songbirds, the species is not especially social: observers are as likely to hear a Blue-headed Vireo in simultaneous concert with a Red-eyed or Yellow-throated Vireo as they are to detect the songs of multiple Blue-headeds. Interspecific antagonism seems uncommon (pers. obs.). The Blue-headed Vireo is usually the last vireo to depart during autumn migration, with birds regularly observed into the last weeks of October in the LP and as late as 9 November in Berrien County (Chartier and Ziarno 2004, Smith et al. 1991).

Abundance and Population Trends

Currently the Michigan Blue-headed Vireo population is estimated at 110,000 birds, representing 2% of the continental population (PIF 2007). Nearly 70% of Blue-headed Vireos breed in Canada, and many of these birds pass through Michigan during spring and fall migration. Blue-headed Vireos were uncommon as Michigan residents prior to the 1950s. BBS data show a 7.1% annual increase in the state from 1966 through 2007 (Sauer et al. 2008); during

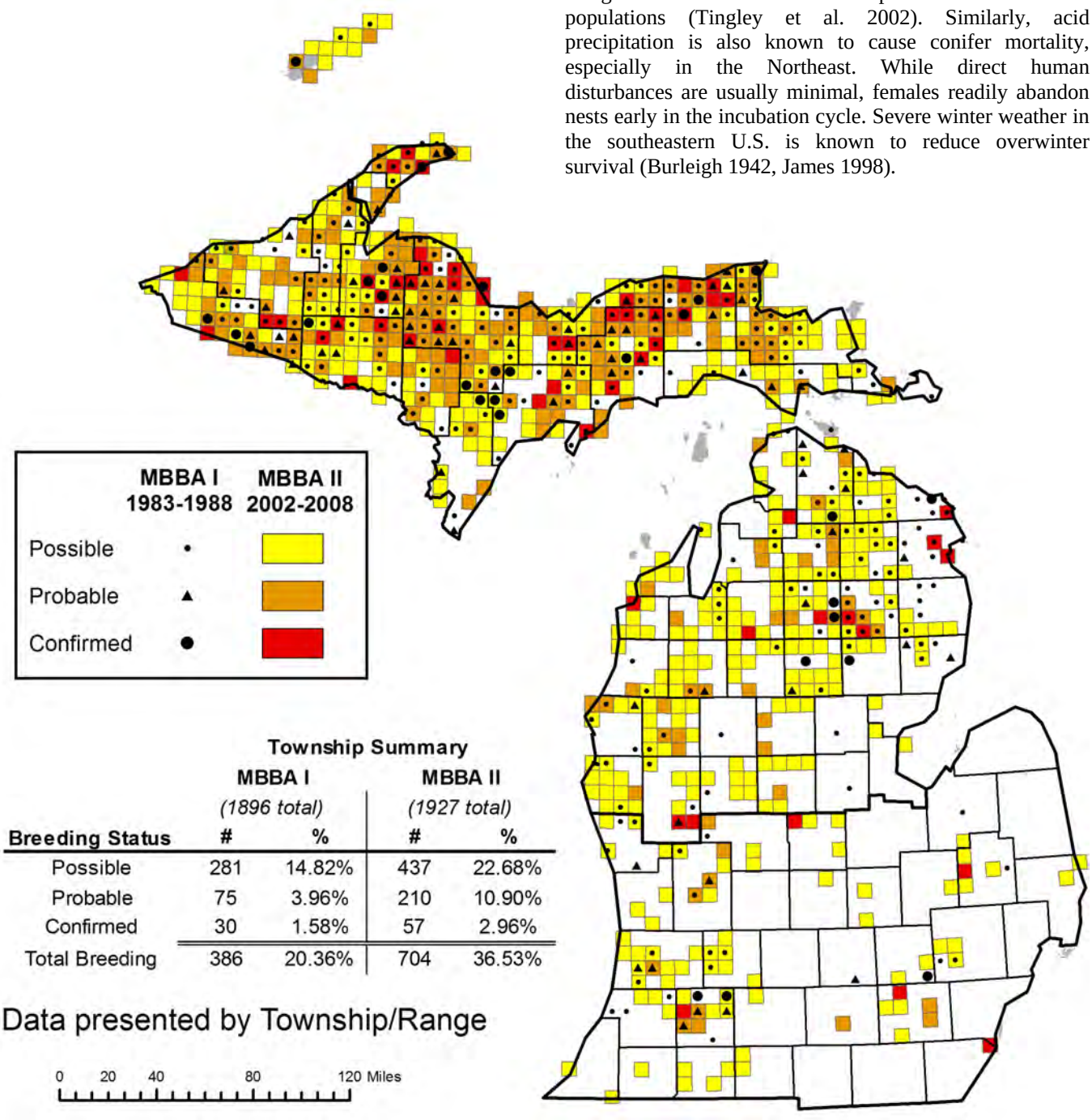
Blue-headed Vireo *(Vireo solitarius)*

Raymond J. Adams, Jr.

the shorter and more recent time frame of 1983-2007, the statistically significant increase has occurred at a more modest rate of 3.6%. This rise has been echoed by population growth in the broader Great Lakes region, including Ontario (Blancher et al. 2009, James 2007, Badzinski and Francis 2001), New York (McGowan 2008), and Wisconsin (Harriman 2006). The Blue-headed Vireo population increase was especially notable during the spruce budworm outbreak in Canada in the late 1970s and early 1980s (Venier et al. 2009).

Conservation Needs

The Blue-headed Vireo appears to be coping well with today's changing landscape. The population is expanding statewide, and widespread loss of suitable habitat is not anticipated. Nonetheless, a number of factors could impact the species on local levels. Clear-cutting and habitat fragmentation are known to reduce the likelihood of pair formation (James 1998). Several authors have indicated that insect outbreaks can influence vireo populations through destruction of critical tree species such as hemlock, balsam fir, and spruce (Brooks 2004, Venier et al. 2009); for example, the loss of hemlock to heavy outbreaks of wooly adelgid infestation is known to impair Blue-headed Vireo populations (Tingley et al. 2002). Similarly, acid precipitation is also known to cause conifer mortality, especially in the Northeast. While direct human disturbances are usually minimal, females readily abandon nests early in the incubation cycle. Severe winter weather in the southeastern U.S. is known to reduce overwinter survival (Burleigh 1942, James 1998).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	281	14.82%	437	22.68%
Probable	75	3.96%	210	10.90%
Confirmed	30	1.58%	57	2.96%
Total Breeding	386	20.36%	704	36.53%

Data presented by Township/Range

Warbling Vireo *(Vireo gilvus)*

Mike Bishop



John Van Orman ©

Species sponsored by: Loretta Gold.

The distinctive, yet un-vireo-like, song of the Warbling Vireo is commonly heard in early successional woodlands around wetlands, wet meadows, and watercourses as well as edge habitat associated with mature mixed deciduous woodlands (Gardali and Ballard 2000). These are the preferred habitat of this nondescript vireo. It is found throughout the state in stable numbers in habitats that often include parks and suburban neighborhoods as well as more undisturbed locations. Like the better known Red-eyed Vireo, the Warbling Vireo is a canopy species that forages and nests well above the ground. With a broad range that extends from the western U.S. and Canada and east through the Midwest and into the northeastern U.S., Michigan marks the northern limits of the Warbling Vireo's breeding range in the Midwest (Sibley 2000).

Distribution

Fairly common throughout its range, the Warbling Vireo prefers deciduous woodlands that are relatively open and associated with water (Gardali and Ballard 2000). Coniferous stands seem to be avoided. Consequently in Michigan, the Warbling Vireo is better represented in the LP than the UP. Furthermore, in the LP it is more widely distributed in the SLP than the NLP. This coincides with the change in the coniferous component of the forests in the state.

The proportion of townships where Warbling Vireos were detected increased dramatically from the UP to the SLP. Warbling Vireos were detected in only about 19% of townships surveyed in the UP compared with about 64% and 90% in the NLP and SLP, respectively. Breeding confirmations showed a similar pattern. Breeding was confirmed in 2% of townships in the UP, 3% of townships in the NLP, and 10% of townships in the SLP.

All three regions of the state showed slight decreases in the number of blocks with breeding observations between MBBA I and MBBA II. Possible and confirmed designations decreased for all three regions, although by only a small percentage while probable designations increased slightly. Most notable was a decrease in the number of townships that reported confirmation for the SLP from 120 to 73.

Because their nests are difficult to detect and observe, a low number of townships reported breeding confirmations statewide (5.4%). However, the strong demonstration of singing males (which often sing at the nest) throughout the breeding season suggests a high percentage of nesting pairs. Possible and probable breeding determinations for all townships were at 27.3% and 26.2% respectively. In the SLP, where the abundance of warbling vireos is highest, the percentage of possible and probable breeding determinations was 31.6% and 47.8% respectively.

Breeding Biology

Warbling Vireos arrive in Michigan during the first week of May and nesting begins around the end of the month (Hull 1990). A single brood is fledged around the fourth of July and fall migration begins in late August. Warbling Vireo nests are the typical woven, open-cup nest of most vireos and are located at a height of 10 to 15 m. Females usually lay about four eggs which they incubate for approximately 13 days. Nestlings fledge when they are about 10-19 days old (Gardali and Ballard 2000).

Abundance and Population Trends

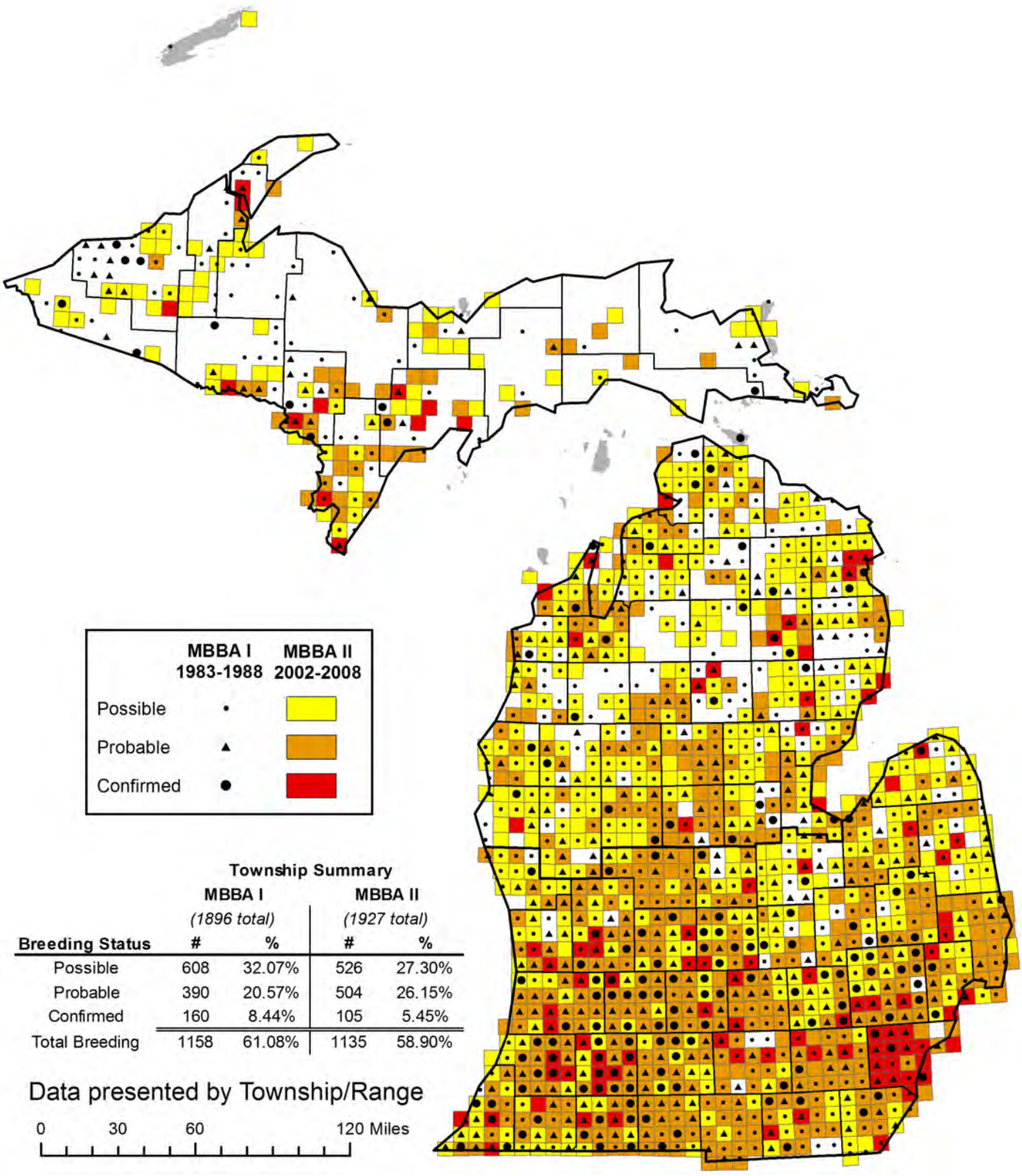
Warbling Vireo observations are greatest in the southern half of the LP and decrease as one moves north to the UP. This has not changed since the first atlas (Brewer et al. 1991). This clearly reflects the lack of appropriate breeding habitat as one moves north in the state. According to the BBS data for Warbling Vireo in Michigan, there has been no significant change in abundance (Sauer et al. 2008) and the entire USFWS Region 3, shows a very slight increase (1.21%). Both the Ontario and New York breeding bird atlases showed very little change for Warbling Vireo between their first and second atlases (James 2007, McGowan 2008). Overall this would indicate a population that is relatively stable. This makes sense as the species continues to take advantage of human-modified habitat.

Conservation Needs

As with many of our songbirds, pressure from nest predators and nest parasites (e.g. Brown-headed Cowbird) and impacts on the quality of the wintering grounds could affect Warbling Vireo numbers throughout its range. Additionally, being a nocturnal migrant, collisions with buildings, cell towers, and wind turbines, will continue to pose a threat to Warbling Vireo abundance (Graber et al. 1985, Stevenson and Anderson 1994). More specifically, it is likely that as wooded areas of Michigan become more mature and develop a more extensive closed canopy, available breeding habitat for Warbling Vireo will become more limited.

Warbling Vireo *(Vireo gilvus)*

Mike Bishop



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	608	32.07%	526	27.30%
Probable	390	20.57%	504	26.15%
Confirmed	160	8.44%	105	5.45%
Total Breeding	1158	61.08%	1135	58.90%

Data presented by Township/Range

0 30 60 120 Miles

Philadelphia Vireo *(Vireo philadelphicus)*

Skye Christopher G. Haas & Ryne D. Rutherford



Darlene Friedman ©

One of the most poorly understood breeding species in Michigan, the Philadelphia Vireo is found in deciduous forests in the central and western Upper Peninsula. Their breeding range extends from the Canadian Maritime Provinces west through Alberta and eastern British Columbia, barely reaching south into the northern Great Lakes states and New England (Moskoff and Robinson 1996). A subtle and likely under-reported bird, its voice is incredibly similar to the abundant Red-eyed Vireo; even the most experienced birders are wise to hesitate to call this species without getting a visual confirmation of the bird. This emulation represents an excellent example of adaptive interspecific territoriality: the Philadelphia Vireo can frequently defend territory from the larger Red-eyed without risking physical confrontation (Rice 1978).

Distribution

Authors have been offering the same assessment concerning the status of Philadelphia Vireos in Michigan for nearly a hundred years: an uncommon species, but probably under-reported as a breeder in the northern reaches of the state. Barrows (1912) wrote "This is one of our rarest vireos, though probably more numerous than our observations would show" and that the species was "not certainly known to nest within our limits, but it is not improbable that it may do so in the northern part of the State." Breeding was not confirmed in Michigan until 1966, when a fledgling bird was found in Charlevoix County, and a second confirmation was gained in 1970 with the collection of a fledgling at Grand Sable Falls, Alger County (Binford 1991). Owing to the dearth of subsequent observations, atlas observers during MBBA I were surprised to record the species in 48 townships spread over 15 counties, including three in the NLP. Shortly after the completion of MBBA I, Dr. Laurence Binford discovered the first nest for Michigan in Hubbell, Houghton County on 27 June 1990 (Binford et. al. 1991). The distribution of Philadelphia Vireos in Michigan seems to have contracted between atlases. MBBA II located only one bird in the NLP, a possible breeder from Wilderness State Park in Emmet County, while formerly occupied areas of the eastern and south-central UP revealed few to no individuals. Consistent with MBBA I, Philadelphia Vireos were again found along the base of the Keweenaw Peninsula, particularly in central and southern Houghton County, and in northwestern Ontonagon County, but expanded into extreme western Gogebic County as well. Among UP areas of apparent expansion – Isle Royale, western Gogebic County and the Central Superior region between Marquette and Pictured Rocks National Lakeshore – some of these gains may be an artifact of better atlas coverage by experienced observers during MBBA II. In total, Michigan observations declined from 7.4% of all UP townships in MBBA I to 5.3% in MBBA II.

Breeding Biology

As with a few other boreal region species at the southern edge of their breeding ranges (e.g. Connecticut Warbler, Boreal Chickadee), the presence of seemingly suitable habitat did not often lead to the discovery of Philadelphia Vireos on territory. The species seems to have a preference for softwoods like aspen and birch (particularly big-tooth aspen), usually in second-growth to early mature age classes. Both published literature and MBBA II observers have noted a tendency to find nesting sites near small openings in the forest, typically a dirt two-track, paved road, select logging, creek valley or downfalls (Moskoff et al. 1996, Binford 2006, S. Haas and R. Rutherford pers. obs.).

In Michigan, big-toothed aspen groves are often selected by Philadelphia Vireos for breeding (Binford 2006). However, there were some sites where Philadelphia Vireos were found in MBBA II that were dominated by maples rather than aspens. In two locations where breeding was confirmed in MBBA II, (Gogebic and Alger counties), mature sugar maple was the primary tree present. At the Alger site on Grand Island there was a notable understory of sapling maples and ironwood (R. Rutherford pers. obs.). Rutherford also noted that many areas where Philadelphia Vireos were located were regenerated forest from select cuttings, with the Gogebic confirmed breeding site having only been logged in the previous few years, though maintaining a continual coverage of forest canopy. In many cases, in Gogebic, Ontonagon and Alger Counties, Philadelphia Vireos were found within 10 km of Lake Superior and frequently in hilly undisturbed regions. Another confirmed breeding site was on the outskirts of the City of Marquette in a mature maple forest with scattered mature aspen and yellow birch. At all three sites, the habitat was bisected by a dirt or small paved road. Still, many sites in Ontonagon, Houghton, Marquette and Alger counties were primarily aspen, birch or ash forest (S. Haas and R. Rutherford pers. obs.). Nests are typically placed high, and there is only one brood per year (Moskoff et al. 1996).

Abundance and Population Trends

Partners in Flight have an optimistic estimate of 1,600 Philadelphia Vireos breeding in Michigan (PIF 2007). While this number seems high relative to Atlas findings, it is well recognized that this is a cryptic species and many may go undetected during the breeding season.

Second atlas efforts in Ontario and New York both noted an increase in the number of Philadelphia Vireos compared to

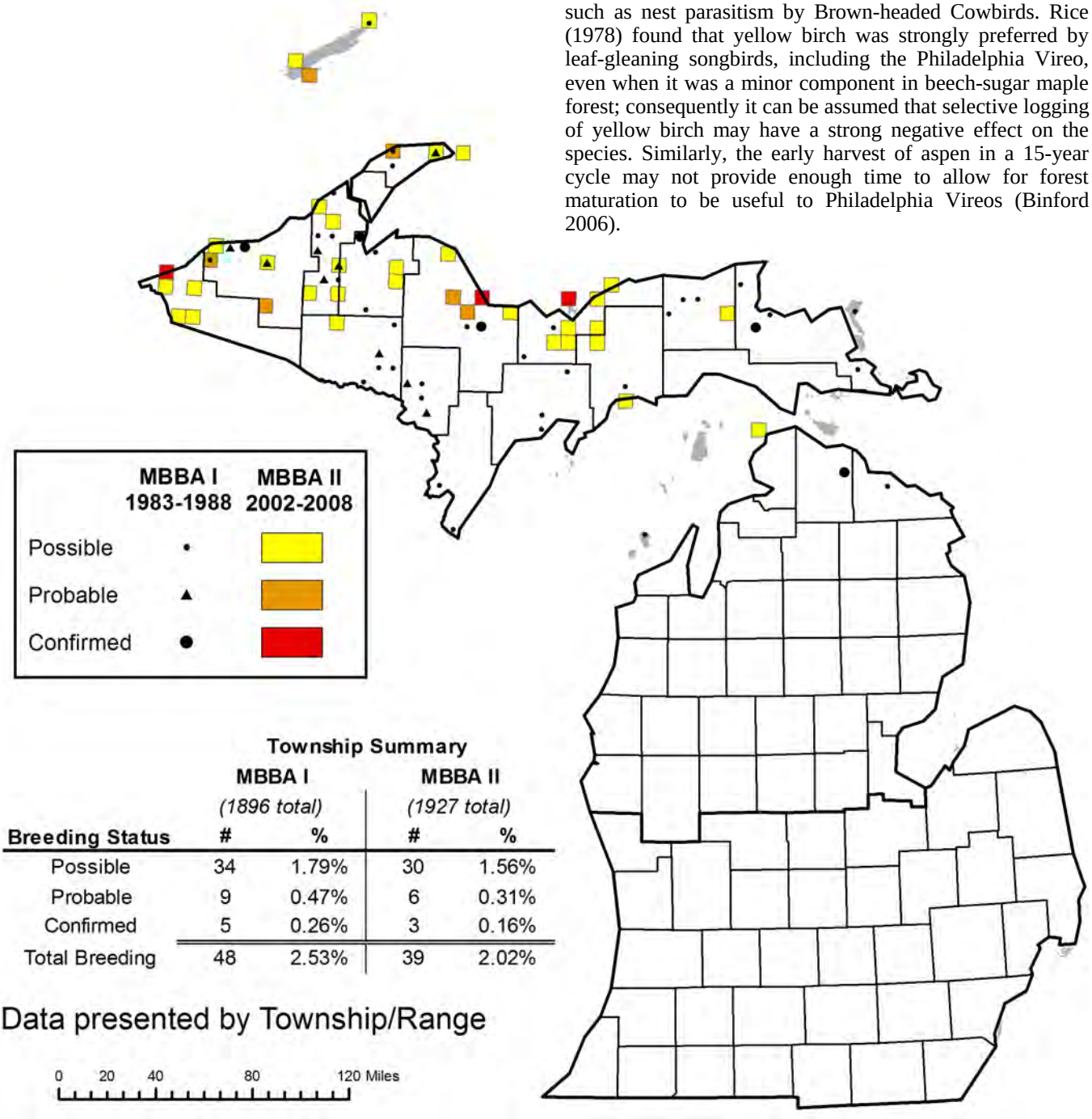
Philadelphia Vireo *(Vireo philadelphicus)*

Skye Christopher G. Haas & Ryne D. Rutherford

their respective first atlases (James 2007, McGowan 2008). 1966-1991 BBS data showed a slight decrease in the number of birds found on U.S. routes, and a slight increase on Canadian routes; neither trend was considered significant due to the small sample size (Moskoff et al. 1996). The Wisconsin atlas expanded the distribution of this species' range with the discovery of a small population found on the Bayfield Peninsula (Frank 2006). Geographically close to the western UP, the Bayfield peninsula shares many ecological and habitat-management similarities with Gogebic and Ontonagon Counties, and may be a natural extension of that population.

Conservation Needs

Establishing specific conservation parameters for such an irregularly occurring species can be complex, and likely any benefits to be had for Philadelphia Vireo would be shared by other species using a shared habitat. As with most forest-dwelling insectivores, controlled logging practices are required to guard against negative fragmentation effects such as nest parasitism by Brown-headed Cowbirds. Rice (1978) found that yellow birch was strongly preferred by leaf-gleaning songbirds, including the Philadelphia Vireo, even when it was a minor component in beech-sugar maple forest; consequently it can be assumed that selective logging of yellow birch may have a strong negative effect on the species. Similarly, the early harvest of aspen in a 15-year cycle may not provide enough time to allow for forest maturation to be useful to Philadelphia Vireos (Binford 2006).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	34	1.79%	30	1.56%
Probable	9	0.47%	6	0.31%
Confirmed	5	0.26%	3	0.16%
Total Breeding	48	2.53%	39	2.02%

Data presented by Township/Range

0 20 40 80 120 Miles

Red-eyed Vireo *(Vireo olivaceus)*

Mike Bishop



Darlene Friedman ©

It would border on the impossible to spend any time during the summer in or near a forest of just about any size and not hear the persistent and somewhat monotonous "*cher-wit, cheerio, cheer-oh*…." of the Red-eyed Vireo. More often heard than seen, this treetop forager sings continuously throughout the morning and well into the afternoon when most other birds are silent. Furthermore, it sings late into the summer, still being heard towards the end of August when many of the other long distance migrants have already begun their journey south. The Red-eyed Vireo's breeding range extends from Newfoundland to the eastern Yukon and south to northern Washington and the Dakotas and southeast through the eastern Great Plains to the Gulf states (Cimprich et al. 2000). The winter range of the North American populations of Red-eyed Vireo is in northern South America east of the Andes. This includes Colombia, Venezuela, Guyana, Suriname, Ecuador, Peru, and western Brazil (Cimprich et al. 2000).

Distribution

Considered to be one of the most common forest songbirds in eastern North America (Cimprich et al. 2000), Red-eyed Vireos can be found anywhere within their range where there are reasonably sized forest tracts. In both Ontario and New York, their second atlases showed an increase in detections of red-eyeds over their first atlases (James 2007, McGowan 2008). In Michigan this vireo's distribution is more than likely little changed from the period prior to settlement with the exception of the densely populated Detroit metropolitan area. All of Michigan, both the UP and LP, are within the heart of its eastern range. Consequently, within Michigan, the Red-eyed Vireo is found in any area where there are forested lands. Densities increase with an increase in larger contiguous forest tracts. Furthermore, mature forests support a greater abundance of Red-eyed Vireo compared to younger forests.

About 90% of all townships in the state exhibited at least possible breeding status, with probable designations being in the majority. The distribution of Red-eyed Vireos is remarkably uniform across the state. Clearly, the availability of forests, whether large or small, mature or young, provide Michigan populations of this species with acceptable breeding habitat, though the quality of that habitat can vary considerably.

Breeding confirmation by township was 14.8% of the townships surveyed. While this may seem low, the preponderance (68.3%) of probable breeding status designations supports the successful breeding of this species throughout the state. The UP boasted the highest documentations with 75% of all townships exhibiting probable breeding status and approximately 21% exhibiting confirmed breeding status. This is undoubtedly due to the extensive mature forested habitat present in the UP.

Interestingly, these changes translated to only very subtle and sometimes contradictory differences in breeding confirmations between the first and second Michigan atlases. Of the townships surveyed in the UP there was in increase in reported breeding confirmations from 8.5% to 18.5%. However, the NLP and SLP saw decreases from 13.1% to 10.9%, and 16.1% to 11.3% respectively. For all three regions the increase in probable breeding detections increased from 46.4% to 62.3%. It is safe to say that total detections were high during both atlas periods reflecting the success of the species in the state.

Breeding Biology

Red-eyed Vireos arrive in Michigan by early to mid-May in the LP and by late May in the UP. The small, neatly woven cup nest of the Red-eyed Vireo is usually placed at a height of 1.5 to 3 m in the fork of a branch in a small understory tree. Foraging occurs at all levels of the forest ensuring their need for well-developed vegetation layers. One brood is raised per season and by mid-July young have fledged and are being cared for by parents away from the nest (Southern 1958). As with most songbirds, Red-eyed Vireos have to contend with nest parasitism by Brown-headed Cowbirds. A 1980 study documented a parasitism rate of 69.3% between 1922 and 1978 (Southern and Southern 1980). After breeding adults begin their southward migration by the end of August with the young departing soon afterwards.

Abundance and Population Trends

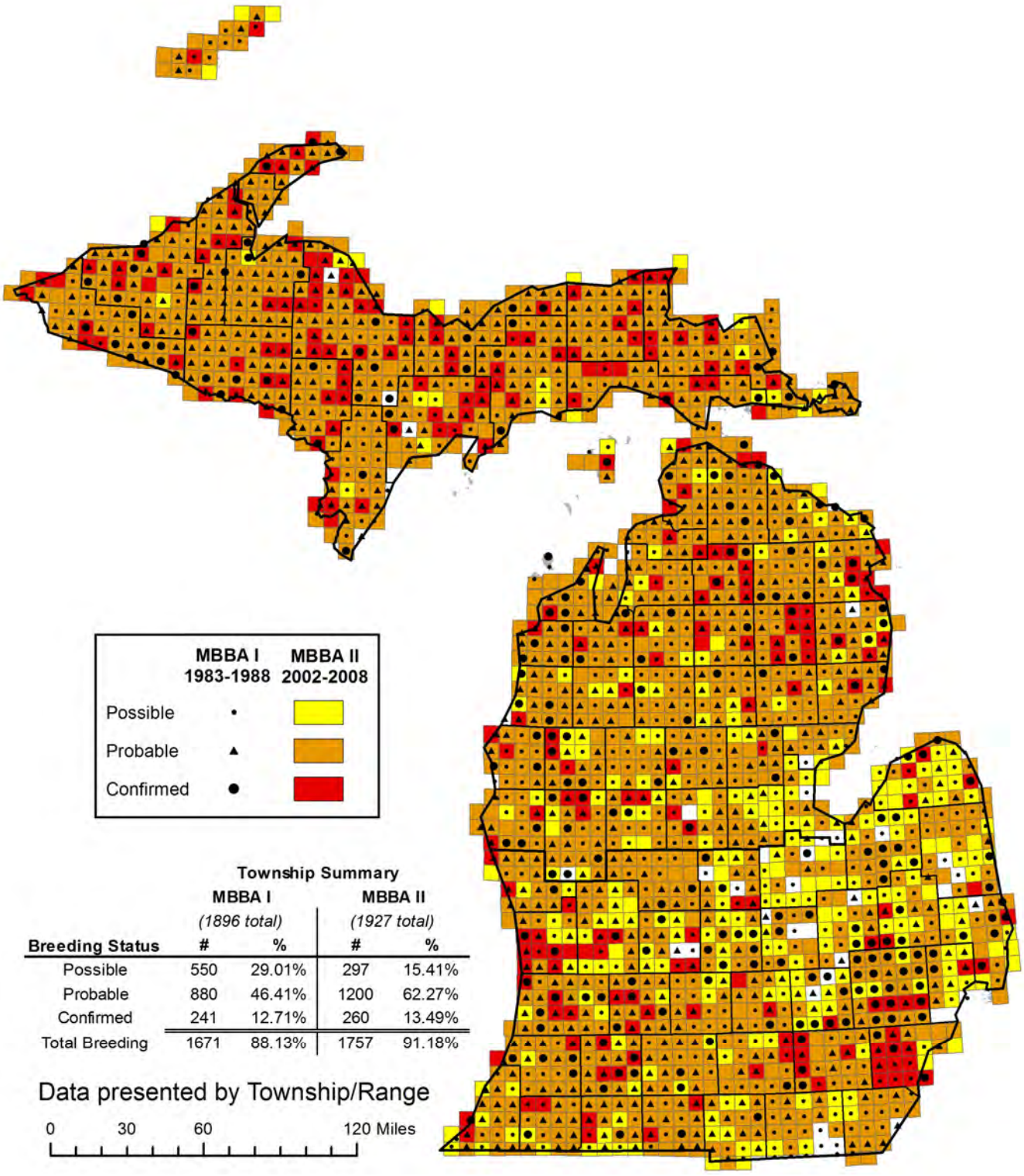
BBS trend data for Red-eyed Vireos in Michigan have demonstrated a significant gradual increase of approximately 3.7% from 1983 to 2008 (Sauer et al. 2008). This is almost twice the increase observed for red-eyeds for USFWS Region 3, which includes the Upper Midwest and western Great Lakes. Between the time of data collection for the first atlas and that of the second, Michigan's Red-eyed Vireo population index nearly doubled, from an average of 13.5 birds per BBS route to 28.3 birds per route.

Red-eyed Vireo *(Vireo olivaceus)*

Mike Bishop

Conservation Needs

Like many other forest breeding birds, Red-eyed Vireos are an area sensitive species. Therefore, fragmentation of breeding habitat could become a threat to population stability (Cimprich et al. 2000). Fragmentation also results in increased pressure from nest predators and nest parasites. Furthermore, impacts on the quality of the wintering grounds could affect vireo numbers as well. Finally, collisions with buildings, cell towers, and wind turbines, all of which are increasing in number, will continue to pose a threat to Red-eyed Vireos (Graber et al. 1985, Stevenson and Anderson 1994).



Gray Jay *(Perisoreus canadensis)*

Scott Hickman



Willie McHale ©

No welcome to the north woods surpasses the eloquence of a Gray Jay softly gliding into view as it emerges to inspect a visiting birder. These inquisitive birds are residents of the great coniferous forests that stretch from Alaska through Canada, the Pacific Northwest, sections of the mountainous west and southwest, northern portions of the states bordering Lake Superior, and northernmost New England (Strickland and Ouellet 1993). Gray Jays are able to survive the brutal winters of these regions partly due to their distinctive adaptation of caching food by attaching it to trees with sticky saliva (Dow 1965). Their breeding season range in Michigan is confined to the UP where they are uncommon to common residents of conifer dominated habitats, particularly those containing spruce (Payne 1983, McPeek 1994).

Distribution

Gray Jays were first listed as Michigan inhabitants by Fox (1853), who described them as within the Lake Superior region. Twenty-six years later, they were recognized as "found" within both peninsulas and occasionally wandering to the southern border of the state (Gibbs 1879). Cook (1893) considered them common from the middle of the LP northward, but McPeek (1994) described their range as having contracted north. By the early 1980s they were determined to be uncommon residents of the UP (Payne 1983), with "few even winter records" in the LP since the 1960s (Brewer et al. 1991).

MBBA I and II both confirmed that the breeding range of Gray Jays in Michigan is now restricted to the UP. The reason for this restriction is unclear because the coniferous forests containing spruce they prefer for nesting (Strickland and Ouellet 1993) exist nearby within the northern LP (McCann 1991). It has been hypothesized that warmer weather resulting from climate change may be increasing the spoilage of cached food (Strickland and Ouellet 1993). This hypothesis has not been tested, but would promote a northward shift in range for this species.

Breeding Biology

Use of cached food allows Gray Jays to nest early, with a typical clutch of three to four eggs laid from 6 March – 22 April (McPeek 1994). Females tenaciously incubate eggs, briefly leaving to feed only once every three or four hours even though fed as seldom as once per day by their mates (Strickland and Ouellet 1993). This incubation/feeding strategy is believed to minimize detection by red squirrels (Strickland 2007) which are such voracious nest predators that some species may not nest in sites where red squirrel density is high (Siepielski 2006). Gray Jays are also unusual in being regarded as both socially and genetically monogamous, with DNA fingerprinting indicating an absence of extra-pair paternity in at least one population (Strickland and Ouellet 1993).

Abundance and Population Trends

Gray Jays have an estimated total population of 16 million (Rich et al. 2004) and are restricted to North America (Strickland and Ouellet 1993). North American Breeding Bird Survey data do not indicate a significant change for the Gray Jay population of North America as a whole, regionally, or within Michigan (Sauer et al. 2008). Wisconsin's atlas indicated a possible retraction northward in the range of Gray Jays, but this was suspected to be the result of inadequate sampling (Gregg 2006). Ontario's second atlas showed Gray Jays to have increased by 16% within the province, but this was similarly conjectured to be due to differences in observer effort (Strickland 2007).

The number of Gray Jays in Michigan cannot be estimated by MBBA I or MBBA II. However, a difference in the number of townships inhabited during MBBA I vs. MBBA II could signify a change in population. Since the number of townships in which Gray Jays were found in the UP was almost unchanged between atlases, and differences in the number of townships reporting nesting status as confirmed vs. probable vs. possible were similarly minor, no overall change in Michigan's population is indicated.

Even though the state's number of Gray Jays may have changed little, there was a shift between atlases in the number of townships reporting Gray Jays within the eastern vs. western UP. In the eastern UP, townships reporting Gray Jays dropped from 30 to 23, a loss of 23%. Not counting Isle Royale, townships containing Gray Jays in the western UP increased from 67 to 77, a gain of 15%. This eastern UP loss vs. western UP gain may be the result of disparity in habitat loss. It is generally perceived that increased sale of forest land in the eastern UP has resulted in increased logging of boreal forests immediately prior to change in ownership (D. Kuhn pers. comm.) whereas this change has not been noted in the western UP (J. Ferris pers. comm.). This possible difference in habitat loss may have contributed to the reported changes in eastern versus western UP populations.

It should be noted that it is not possible to be certain of the reason for this eastern vs. western UP population shift, or

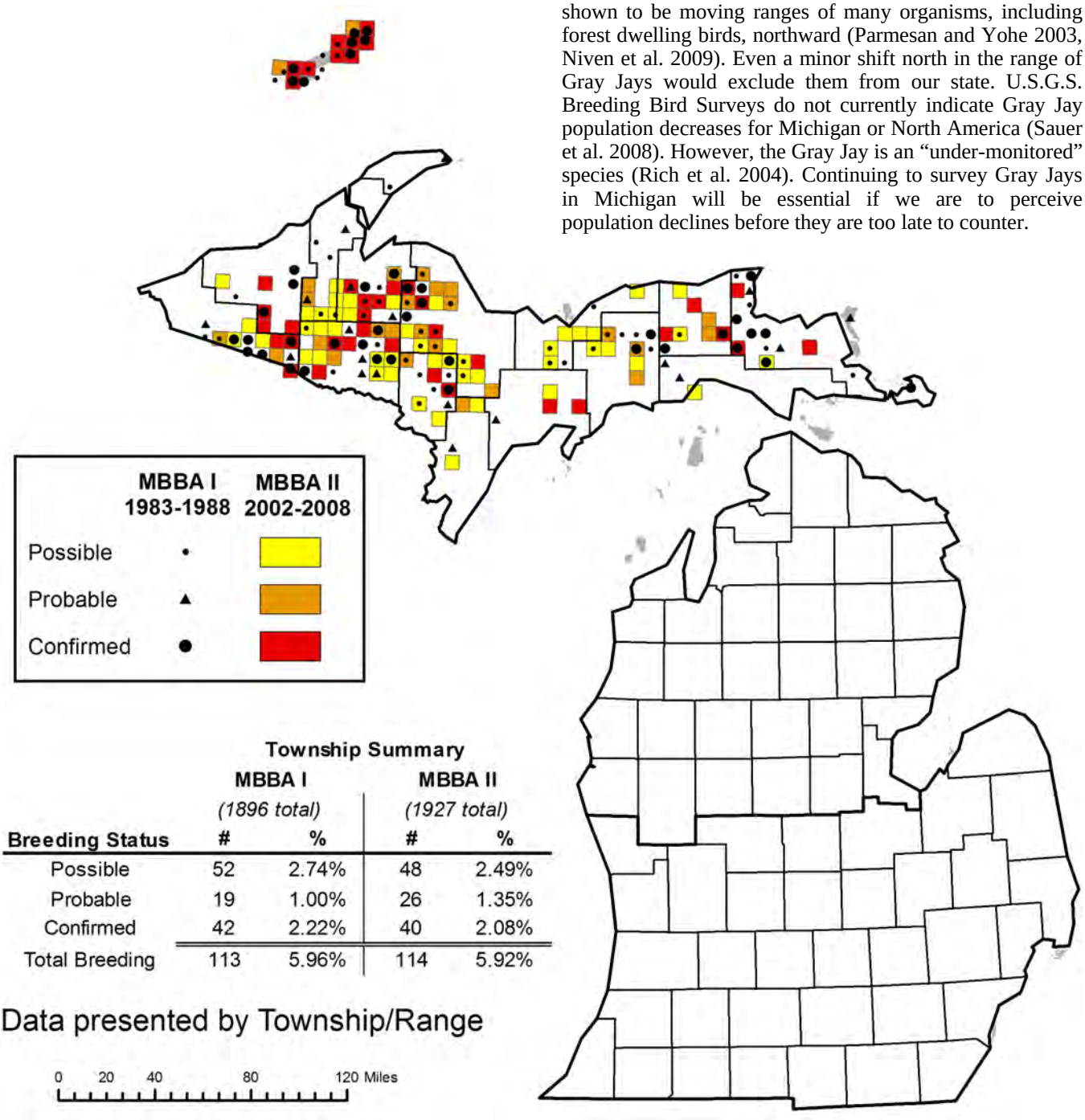
Gray Jay *(Perisoreus canadensis)*

Scott Hickman

even to be confident that there has been an actual change in these populations. Disproportionate observer effort can bias atlas results. Hours of observer effort were recorded for MBBA II and extrapolated for MBBA I by KNC. Their estimates indicate that effort during MBBA II compared to MBBA I increased by 34% in the western UP while decreasing in the eastern UP by 8%. This difference in observer effort could create the reported population changes, particularly if preferred nesting habitat was surveyed more intensely in the western than eastern UP. A relative increase in effort within a species' preferred habitat will overestimate population increases while decreased effort within preferred habitat underestimates populations (Lawler and O'Connor 2004).

Conservation Needs

Although Gray Jays are susceptible to being unintentionally caught in traps for furbearing mammals (Strickland and Ouellet 1993), habitat loss and global warming likely constitute the greatest potential threats to this species in Michigan. An increase in loss of conifer dominated habitats containing spruce would certainly decrease Michigan's Gray Jay population, and climate change has already been shown to be moving ranges of many organisms, including forest dwelling birds, northward (Parmesan and Yohe 2003, Niven et al. 2009). Even a minor shift north in the range of Gray Jays would exclude them from our state. U.S.G.S. Breeding Bird Surveys do not currently indicate Gray Jay population decreases for Michigan or North America (Sauer et al. 2008). However, the Gray Jay is an "under-monitored" species (Rich et al. 2004). Continuing to survey Gray Jays in Michigan will be essential if we are to perceive population declines before they are too late to counter.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	52	2.74%	48	2.49%
Probable	19	1.00%	26	1.35%
Confirmed	42	2.22%	40	2.08%
Total Breeding	113	5.96%	114	5.92%

Data presented by Township/Range

Blue Jay *(Cyanocitta cristata)*

Gail McPeek



Jerry Jourdan ©

The Blue Jay is a notoriously noisy bird, except at nesting time when adults are quiet and stealthy, being careful not to draw attention to their reproductive goal and what will soon become more noisy Blue Jays. This bird is very easy to identify, having bold blue plumage with various white and black markings, a regal crest, and a long tail. It is a member of the Corvid family and one of two jays found in Michigan.

The Blue Jay is a common permanent resident across the eastern two-thirds of the U.S. and southern Canada. For several decades, a westward expansion has been underway with occasional nesting as far west as Oregon and British Columbia. Although recognized as a permanent resident throughout its range, numbers do withdraw in winter from northern areas. In Michigan, for example, 7,468 Blue Jays were recorded on the 2006-07 CBC, but only 621 of these were in the UP, with 2,266 in the NLP and more than half (4,581) in the SLP (Palmgren 2008).

Being a more northerly state, Michigan also has well-defined spring and fall migrations. Spring migration occurs in late April to late May. Movements are particularly noticeable along the Lake Michigan and Lake Huron shorelines and at Whitefish Point Bird Observatory in the UP. In 2007, spring counts at WPBO recorded more than 9,000 Blue Jays from 9 to 31 May, with high counts of 1,500 and 1,170 on 18 May and 23 May, respectively (WPBO 2007). Fall migration occurs from mid-September to late October.

Distribution

Blue Jays breed throughout the Michigan landscape. Their loud "*jaaaay*" calls resound wherever there is some forest or forest edge, and that includes the multitude of woodlands provided by our parks, golf courses, and neighborhoods. Such a ubiquitous distribution is due, in large part, to an omnivorous diet. Foods include corn, grains, fruits, sunflower seeds, suet, insects, and most importantly, mast from trees. Blue Jays consume large quantities of acorns, beechnuts, hickories, and hazelnuts (Tarvin and Woolfenden 1999). Autumn is a busy time of caching and individuals are known to hide thousands of acorns and nuts for later use. The Blue Jay is a valuable "forester," spreading seeds and helping regenerate our woodlands.

Historic records from Barrows (1912) and others describe the Blue Jay as abundant in Michigan. Both Atlases confirm that this status has not changed. During MBBA II, this species was reported in 91% of the state's townships, earning seventh place honors on the "top ten" list. Occurrence drops off slightly in the UP (84% of townships) but this may be more a reflection of effort in this less populated, less accessible region.

Breeding Biology

As winter turns to spring, resident Blue Jay flocks break up into smaller groups, and those that migrated return north. Now is when Blue Jays really crank up the volume. This is the time when you can hear their amazing repertoire of calls, screams, whistles, guttural rattles, and mimicking of raptors. This conspicuous, rambunctious period is followed by several weeks of contrasting quiet, as mated pairs get down to the business of nesting. This switch in behavior makes finding nests quite challenging. You know there is a pair around somewhere but they seem to have suddenly disappeared.

Nesting in Michigan occurs from April through June (Kalamazoo Nature Center 2004). Blue Jays construct a bulky twig nest, well hidden in a coniferous or deciduous tree. Pairs do not maintain an overall territory but do aggressively defend the nest site from raptors, crows, squirrels, snakes, cats, and other predators (Stokes 1979, Tarvin and Woolfenden 1999). Incubation of the 3-6 eggs takes 15-18 days, with a similar number of days for nestlings to grow (Harrison 1975). Once young fledge, noise picks up again and family groups can be seen traveling about, with juveniles impatiently begging for food. Observations of fledged young account for many of the atlas breeding confirmations.

Abundance and Population Trends

The Blue Jay can be included in the upper echelon of Michigan's most common and widely distributed species. However, its overall numbers rank far below those of our most abundant birds. The PIF database provides a rough estimate of 640,000 Blue Jays for Michigan, a population similar to species like American Crow (590,000), Common Yellowthroat (650,000), Indigo Bunting (720,000), and Brown-headed Cowbird (590,000). Far more abundant are American Robin (5,900,000), Red-winged Blackbird (3,600,000), European Starling (3,400,000), Red-eyed Vireo (2,400,000), Song Sparrow (2,200,000), plus several more species with populations over one million (PIF 2007).

Within our state borders, Blue Jays are generally more abundant in the LP when compared to the UP. Both Atlas and BBS data indicate this general pattern, though there are clearly areas in the LP where numbers are low: for example, the Thumb region and some of the central counties, where woodland habitats are less common. BBS data from 1966-2007 identify two routes with especially high averages

Blue Jay *(Cyanocitta cristata)*

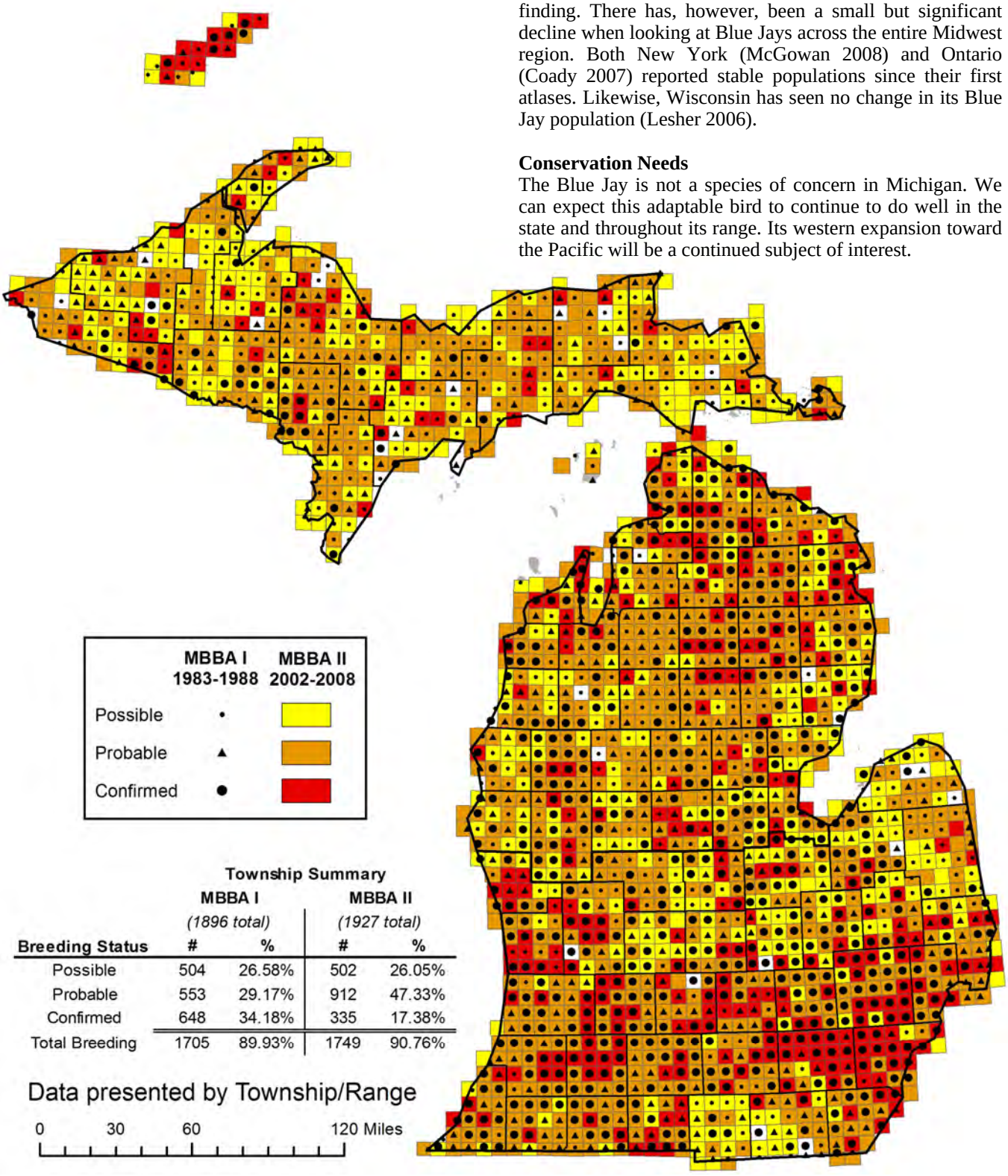
Gail McPeek

(Sauer et al. 2008). These are located in Crawford County (37.00 Blue Jays per year) and Oscoda County (35.94 per year). This is a forested area dominated by mast-producing trees. Other routes with averages exceeding 20 Blue Jays are in Charlevoix, Antrim, Grand Traverse, Mecosta and Newaygo counties in the NLP; Allegan, Van Buren, Barry, Calhoun, Kalamazoo, Kent and Montcalm counties in the southwestern LP; and Livingston and Washtenaw counties in the southeastern LP.

Comparison of MBBA I and MBBA II data suggest no significant change in the Blue Jay population in Michigan over the past 20 years. State BBS data concur with this finding. There has, however, been a small but significant decline when looking at Blue Jays across the entire Midwest region. Both New York (McGowan 2008) and Ontario (Coady 2007) reported stable populations since their first atlases. Likewise, Wisconsin has seen no change in its Blue Jay population (Lesher 2006).

Conservation Needs

The Blue Jay is not a species of concern in Michigan. We can expect this adaptable bird to continue to do well in the state and throughout its range. Its western expansion toward the Pacific will be a continued subject of interest.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	504	26.58%	502	26.05%
Probable	553	29.17%	912	47.33%
Confirmed	648	34.18%	335	17.38%
Total Breeding	1705	89.93%	1749	90.76%

Data presented by Township/Range

0 30 60 120 Miles

American Crow *(Corvus brachyrhynchos)*

Julie A. Craves



Robert Epstein ©

As Verbeek and Caffrey (2002) declared, everybody knows crows. The smart and conspicuous American Crow is found nearly across the continent in almost every type of habitat, being absent only from far northern Canada and Alaska and arid southwestern areas (Verbeek and Caffrey 2002). Crows winter mostly within their breeding range, withdrawing from the northern portions, generally where the mean minimum January temperature is 0°F (-18°C) (Root 1988).

Distribution

Up until the mid-1800s, the Common Raven was the large corvid found throughout Michigan (Gibbs 1879, Barrows 1912). American Crows first appeared in the state sometime around 1850, eventually displacing ravens over most of the state (Hubbard 1887, Wood 1951). Soon enough, crows were one of the most abundant, widespread, and recognizable species in Michigan, thriving on the mixed land use and open spaces created by human settlement (McPeek 1994).

In both Atlases, crows were found in every county and the vast majority of townships. They were a bit sparser in the UP, especially the extreme western part of the peninsula, and more concentrated in the SLP. This pattern isn't surprising, as settled areas are favored by crows. More than half of the crow sightings in MBBA I were in human-influenced environments such as old fields, row crops, and residential areas (Wenger 1991).

Breeding Biology

American Crows build platform nests of sticks on horizontal branches or in the crotches of deciduous or coniferous trees, usually at heights of 10 to 20 meters (33 to 66 feet) (Verbeek and Caffrey 2002). In southern Michigan, nest building may begin in early April, but usually in May (Kelley 1978); it commences slightly later further north (Wenger 1991). American Crows often breed cooperatively, with helpers consisting of the yearling offspring of a breeding pair, although these auxiliaries will sometimes continue as non-breeding helpers for four to six years (Verbeek and Caffrey 2002).

Abundance and Population Trends

Statewide, number of townships where crows were found was nearly identical in both Atlases, with the species being recorded in just over 89% of all townships. Crows were confirmed in a smaller percentage of townships in which they were found in MBBA II than MBBA I, but there was a small increase in the number of probable plus confirmed records in each region of the state, with the biggest bump occurring in the UP.

The Atlas map and the apparent increase in records does not really tell the story of what has been, and is happening to American Crow populations in Michigan. In fewer than ten years, a disease has altered crow numbers not only in the state, but across the country.

The mosquito-borne West Nile virus (WNV) was first identified in North America in New York in 1999 and spread throughout most of the continent within six years (McLean 2006). American Crows are especially sensitive to the North American strain of the virus, which is typically fatal to crows inside of a week (Komar et al. 2003, Brault et al. 2004). Risk of mortality does not typically differ with age, sex, or breeding status, but substantial social disruption is expected in the long run in this family-oriented, often cooperatively breeding, species (Clark et al. 2006).

The impact of WNV on crow populations can be profound. WNV was first detected in Michigan in late summer 2001 (SOM 2007), and the BBS trends covering the period of MBBA II show a disturbing, highly significant annual decline of 7.2%. However, outbreaks of WNV tend to be more common in urban areas where container-breeding *Culex* mosquitoes, the primary vector, are prevalent, and habitat fragmentation brings mosquitoes and birds closer together (McLean 2006, LaDeau et al. 2008). Since BBS coverage in urban areas tends to be poor, it may not be the best data set to use to examine population trends for crows (Hochachka et al. 2004, Ladeau et al. 2006).

About half the wintering crows in the SLP are resident birds, with the remainder from northern breeding areas (Black 1941). Even so, winter surveys have been used to assess declines in American Crows in northern latitudes, especially from sites which do not have winter roosts that can confound analyses (Bonter and Hochachka 2003, Caffrey and Peterson 2003, Hochachka et al. 2004). Two such data sets from southeast Michigan provide examples of the decimation of local populations.

Winter bird surveys have been conducted twice-weekly for 18 years at the Rouge River Bird Observatory on the University of Michigan-Dearborn campus, Wayne County. The average number of crows per survey dropped 96% for the post-WNV period compared to the ten previous years (Craves unpub. data). Likewise, the average number of crows per party hour on the Detroit River Michigan-Ontario Christmas Bird Count dropped 97% for the post-WNV

American Crow *(Corvus brachyrhynchos)*

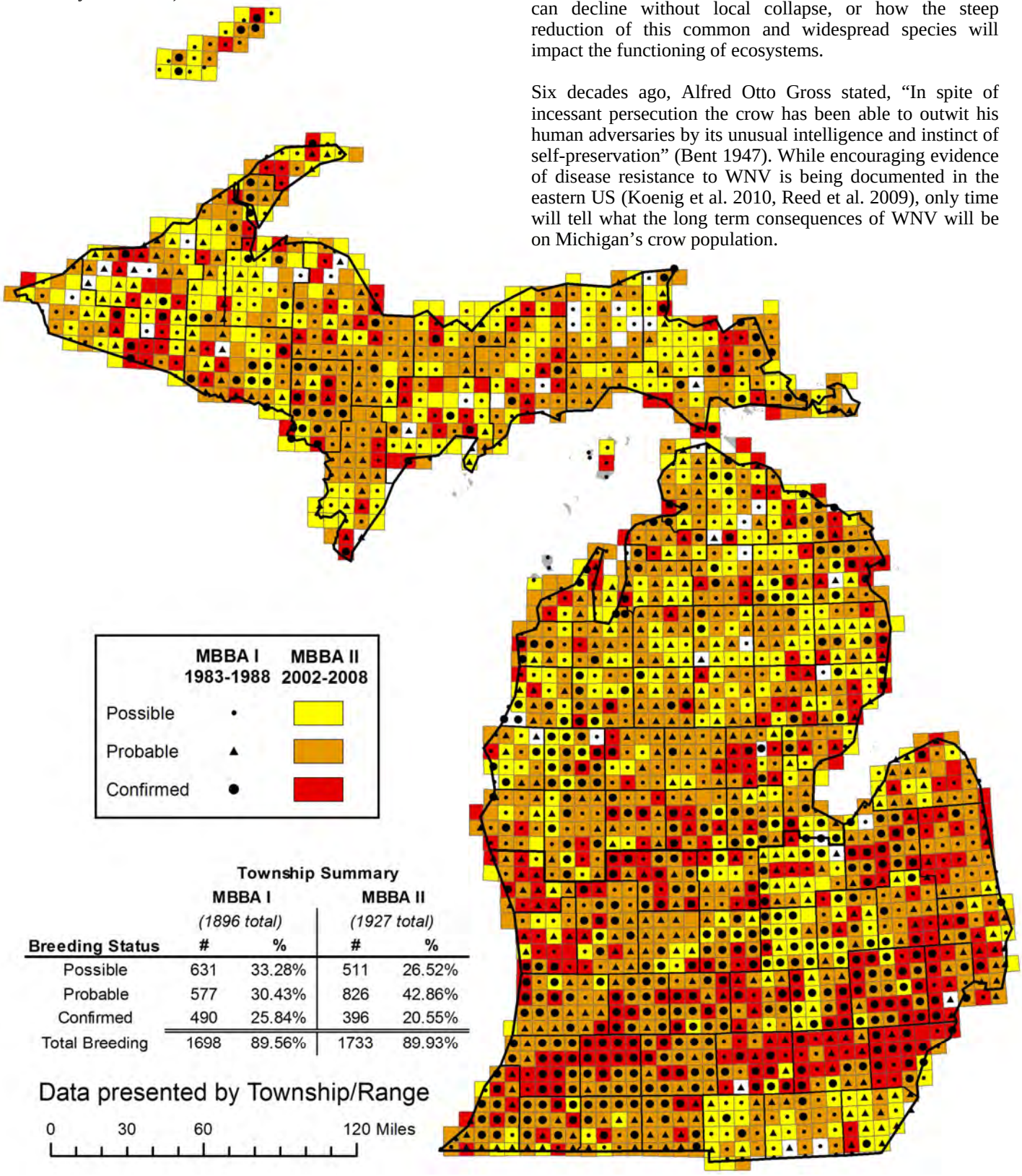
Julie A. Craves

period versus the prior 25 years (NAS 2002). These results are similar to the declines noted for marked breeding populations, where single-year mortality was 68% in central Illinois and 72% in Oklahoma (Yaremych et al. 2003, Caffrey et al. 2005).

Conservation Needs

Prevention or management of WNV in crow populations will prove extremely difficult due to the ecology of the virus. Eradication of WNV in North America is highly unlikely. We have yet to discover how far crow populations can decline without local collapse, or how the steep reduction of this common and widespread species will impact the functioning of ecosystems.

Six decades ago, Alfred Otto Gross stated, "In spite of incessant persecution the crow has been able to outwit his human adversaries by its unusual intelligence and instinct of self-preservation" (Bent 1947). While encouraging evidence of disease resistance to WNV is being documented in the eastern US (Koenig et al. 2010, Reed et al. 2009), only time will tell what the long term consequences of WNV will be on Michigan's crow population.



Common Raven *(Corvus corax)*

Max A. Henschell



Doug Leffler ©

Jet black with a shaggy throat, highly varied hoarse utterances, and an affinity for carrion, the Common Raven is often associated with war and death and thus has earned a less-than-endearing place in the avian community. But its ability to problem-solve, count, and even play should earn the Common Raven the title of Most Intelligent Bird in Michigan. Not the black bird you often see in towns of the Upper Peninsula – that position is typically reserved for the smaller American Crow – the wedge-tailed Common Raven patrols the treetops of unbroken forests, rolling in the wind and soaring with the eagles. With a Holarctic range, the Common Raven, largest of all songbirds, is a familiar sight throughout the northern hemisphere.

Distribution

The Common Raven is found throughout North America but is absent in the Great Plains, the southeast states, and westwards into east Texas. It can be found in a variety of remote habitats including deserts, mountains, and tundra as well as boreal and deciduous forests (Boarman and Heinrich 1999). In the Great Lakes, it prefers extensive tracts of the latter two habitats for breeding. This year-round resident is far more common in the UP than in the NLP and is rarely found in the SLP, which lacks extensive forest cover. Migration has been recorded at Whitefish Point and Brockway Mountain, though it is most evident only in the spring (Binford 2006). The destination of these migrating birds is unclear.

Historically, the Common Raven was found throughout southern Michigan, into Ohio, Indiana and Illinois. Forest clearing and widespread shooting of Common Ravens led to their extirpation in the three states directly south of Michigan, as well as the withdrawal of the species into the UP (McPeek and Adams 1994).

During MBBA II, Common Ravens were found in just over 42% of townships in the state. However, due to habitat requirements, it was not evenly distributed throughout the state. The species was found in more than 80% of the townships in the UP, just over 50% of the townships in the NLP, and it was absent from the SLP. The UP and NLP witnessed increases in Common Raven records between the first and second atlas. The NLP recorded the largest change in occurrence, doubling from MBBA I. The MBBA II map shows an overall southward extension of Common Raven's breeding range.

Common Ravens occurred most frequently in the northern third of Wisconsin (Matteson 2006) and Ontario north of the Precambrian Shield (Peck 2007). A comparison of the Atlas maps from Wisconsin, Michigan, and Ontario shows a trend that breeding records are rare south of a line along the southern boundaries of Manistee, Wexford, Missaukee, Roscommon, Ogemaw, and Iosco Counties, extended into Wisconsin and Ontario.

Breeding Biology

The breeding season for Common Ravens in Michigan begins in February or March with the construction of a stick nest of up to four feet in diameter. These are typically located high in a tree, up to 50 feet off the ground, quite often in coniferous trees (McPeek and Adams 1994). Nests have also been found on cliff faces. One nest found during MBBA II in Marquette County was located in the Little Garlic River Canyon. The habitat was mixed conifer-upland, dominated by hemlock. The nest was above the river on a ledge of a granitic cliff face. The nest was similar in size, three to four feet, and height off the ground, 40-50 feet, of those found in trees (S. Haas, pers. comm.). Nests are typically lined with soft material such as hair, shredded bark, or moss (Boarman and Heinrich 1999).

Three to seven eggs are laid less than a week after the completion of nest construction. The eggs are incubated for 20-25 days, after which the young emerge blind and sparsely covered with down. The parents care for the young for about six weeks, after which the young fledge and leave the family area within one week (Boarman and Heinrich 1999).

Abundance and Population Trends

The Michigan population of Common Raven is estimated at 12,000 birds (PIF 2007), though estimates of Common Raven populations are difficult due to their irregular and unpredictable distribution (Boarman and Heinrich 1999). BBS data show that the number of Common Ravens reported per route in 2007 was five times greater than at the beginning of MBBA I (Sauer et al. 2008). This increase in the state is paralleled by regional increases in Common Ravens. The expansion in range is also evident when comparing MBBA I and MBBA II occurrence maps. Eight new counties in the NLP had confirmed breeding reports of Common Raven during MBBA II.

Conservation Needs

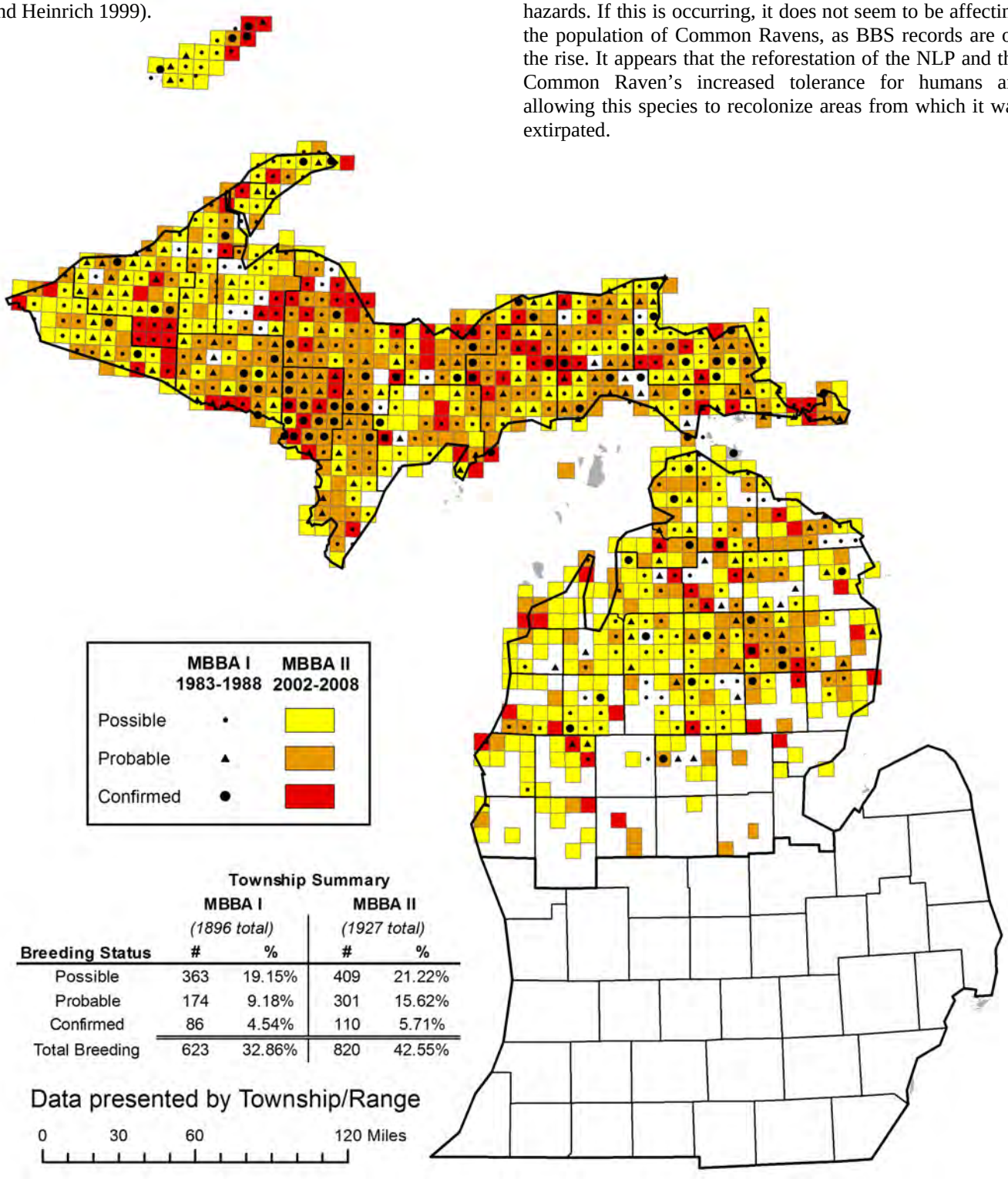
In the early twentieth century, forest clearing for agricultural lands and cities throughout New England and the Great Lakes areas removed vast expanses of Common Raven breeding habitat. Ravens were also persecuted by poisoning,

Common Raven *(Corvus corax)*

Max A. Henschell

trapping, and shooting. This change in the landscape was accompanied by increased American Crow populations, a species closely associated with anthropogenic change (Boarman and Heinrich 1999). Common Ravens were pushed north; they disappeared from the LP during this time. By the middle of the century, reforestation efforts had reestablished habitat for Common Ravens. The first successful nest in the LP in decades was in 1976 (Boarman and Heinrich 1999).

Though protected by the Migratory Bird Treaty Act, their similarity to American Crow probably results in the accidental shooting of a few Common Ravens annually during lawful crow harvest activities and under "Depredation order for blackbirds, cowbirds, grackles, crows and magpies" (Depredation… 2008) which allows for the shooting of American Crows and other blackbirds causing conflicts to humans, crops, or creating health hazards. If this is occurring, it does not seem to be affecting the population of Common Ravens, as BBS records are on the rise. It appears that the reforestation of the NLP and the Common Raven's increased tolerance for humans are allowing this species to recolonize areas from which it was extirpated.



Horned Lark *(Eremophila alpestris)*

Haley Breniser



Darlene Friedman ©
Species sponsored by: Anne Naber

This is a bird of bare ground—of rock, soil, and thatch. The watery timbre of its song is easily carried over fallow field and treeless plain. At first glance, the Horned Lark is camouflaged amid shades of brown, its musical song providing comfort in a seemingly desolate countryside while its black mask and feather tufts add allure. Of the *Alaudidae* family, it is the only lark native to North America, and its gallant courtship display and pleasing flight song are enjoyed by many. There is high geographic variation within this species detected in body mass, wing chord, and coloration (Oberholser 1902, Behle 1942), with the shade of its back often matching the shade of local soil (Beason 1995). The Horned Lark breeds throughout both the Eastern and Western Hemisphere in temperate regions. In the East, they are found in North Africa and Eurasia. In the West, their breeding range extends from the islands of the Arctic south to the highlands of Mexico (Beason 1995). Throughout the U.S., they are found in open landscapes. Physically larger subspecies are observed in mesic habitat of the Northeast while smaller races are known to exist in the arid lands of the southwest (Beason 1995). They breed in all states except Florida and Hawaii. The northernmost breeding populations commonly migrate south for the winter, seeking less harsh conditions; they can be found flocking with snow buntings, pipits, and longspurs often in windswept fields.

Distribution

The Horned Lark's range expanded into Michigan following European settlement due to the accessibility of farmland for nesting. In fact, the same trend was recorded in the neighboring province of Ontario in 1868. The Horned Lark was first observed there following the clearing of Ontario's southern Carolinian forest (McIlwraith 1894). Since the 1940s however, this trend has reversed as agricultural production has decreased and old field has succeeded back to deciduous forest (Robbins et al. 1986, Hussell 1987).

In Michigan, Horned Larks are most commonly found breeding where human activities, such as agriculture, have exposed bare ground, creating favorable nesting habitat. Interestingly, if you were to overlay Michigan's MBBA II breeding evidence with the agricultural land currently in production, one would closely match the other. However since MBBA I, breeding evidence for the Horned Lark has declined in Michigan; this is most notable within the agricultural counties of the NLP and UP. Throughout Michigan's agricultural counties, many residents have witnessed the rapid conversion of farmland to suburban development or to abandoned field over the past 20 years. In fact, Norris and Soule (2003) found that farmland acreage in Michigan decreased by almost 1.5 million acres or 13.3% between 1982 and 1997. USDA (2002) recorded an additional 3% decline between 1997 and 2002. Knowing that Horned Larks prefer farmland for nesting in Michigan, this decrease in farmland statewide most likely had a direct impact on the decline in breeding evidence that was observed in the NLP and UP.

Breeding Biology

Throughout its range, the Horned Lark nests on bare ground within agricultural fields, tundra, desert, and open plains. As soon as bare ground is available in March, the male Horned Lark begins a courtship display on Michigan's open landscape with tail spread, breast patch displayed, and musical trills resonating from his bill, all the while strutting back and forth in front of the female (Sutton and Parmelee 1955, Beason 1970). Once a mate succumbs to this elaborate display, fine grasses are collected and placed in a shallow depression dug out by the female for nesting. The first brood is usually fledged before the farmlands are plowed and planted, and snow can often still be seen melting in piles on the ground. For subsequent broods, the young are not as fortunate. Cultivation of fields usually displaces the pair to freshly mowed hayfields or short grass areas along airstrips if nearby (Hussell 1987).

Abundance and Population Trends

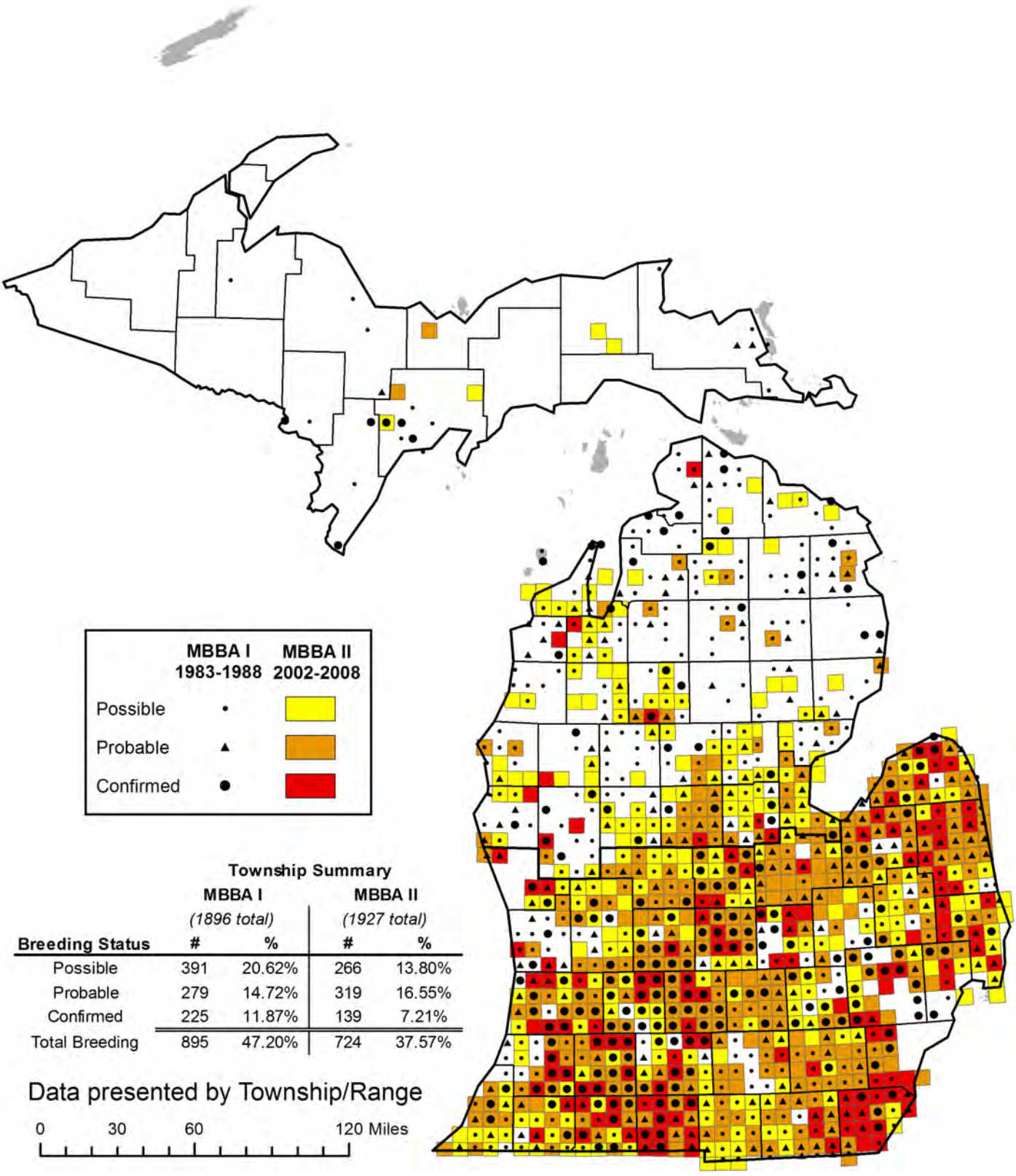
According to Partners in Flight (2007), the estimated North American population of 99,000,000 Horned Larks is about 71% of the global population estimate of 140,000,000. They estimate that 0.3%, or 400,000, of the global population occurs in Michigan (PIF 2007). Although Beason (1995) reports that Horned Lark populations have remained relatively stable over the past 40 years, their population has been in steady decline over most of its continental range since 1966 (Sauer et al. 2008). Much like Ontario and New York (Cadman et al. 2007, McGowan and Corwin 2008), Michigan's second atlas shows a decline in breeding evidence across the state. While Michigan's BBS data also illustrates a steady downturn since the early 1980s, it is not statistically significant. However, USFWS Region 3 BBS data illustrates a gradual and significant 2.83% decrease in population (Sauer et al. 2008). Researchers believe this is correlated with the persistent decline of available farmland for nesting, forest regeneration, and landscape development

by humans (McGowan and Corwin 2008). These patterns of habitat change are witnessed across Michigan's landscape and in turn have been the catalyst for landowner incentive programs (USDA, USFWS, MDNR) to assist farmers in habitat restoration and in establishing environmentally friendly farming practices. Even though these programs have successfully restored grassland habitat throughout Michigan, during MBBA II only 37% of Michigan's townships (compared to 47% during MBBA I) documented breeding activity of the Horned Lark. The highest concentration lies in the SLP with 79% of townships occupied compared to only 1% in the UP. The NLP recorded the biggest change since MBBA I with 50% fewer townships showing breeding evidence. As mentioned above, this suggests that substantial alterations of nesting habitat have occurred in this region, most likely farmland taken out of production.

Conservation Needs

Because of its world-wide distribution, Partners in Flight (2007) does not define specific conservation needs for the Horned Lark. However, over the past 20 years this handsome lark has been in a slow but sure decline across North America (Beason 1995), and Michigan's population continues to follow a similar trend. In the North American Bird Conservation Initiative, U.S. committee's *State of the Birds Report* (NABCI 2009), the Horned Lark is #18 on the *Common Birds in Decline* list, and cultivation of farmland is identified as the foremost threat to their breeding habitat. In a survey conducted by Best et al. (1997), Horned Larks were found nesting in rowcrop fields in Michigan and not on Conservation Reserve Program (CRP) lands such as restored grasslands. This suggests that in spite of landowner incentive programs like CRP, these birds still prefer farmland for nesting sites. However, many farmers are plowing, planting, and mowing fields in the middle of the breeding season, displacing breeding pairs. Conservation of the Horned Lark raises thought-provoking questions and should stimulate discussion regarding what future conservation goals are appropriate for this species. We know that range expansion for the Horned Lark was largely human induced in the 1800s by clearing of land for agriculture. Yet, because of the combination of increased landscape development and necessary, time-sensitive farming practices executed by humans today, the Horned Lark's nesting habitat is now in decline. Therefore, what is a suitable conservation strategy for this species over the next 20 years, and how might we apply it to other common birds in decline in Michigan?

Horned Lark *(Eremophila alpestris)*



Purple Martin *(Progne subis)*

Anna Kornoelje



Tom Hodgson ©

Species sponsored by: John & Lynda Camburn

Glossy dark purple gems, nesting Purple Martins have long been encouraged by humans. Early accounts describe Native Americans providing dried gourds for nesting (Allen and Nice 1952). Throughout the eastern United States, the colonial Purple Martin nests almost entirely in nest boxes, while in the west, where it is less common, it still nests in woodpecker holes or other natural cavities (Brown 1997). The Purple Martin is North America's largest swallow. This Neotropical migrant winters in South America in the Amazon Basin, Brazil, Bolivia, and Argentina (Brown 1997).

Purple Martins are found throughout North America and breed from Canada to Mexico although they are absent in most mountain regions in the west (Brown 1997) and at higher altitudes in the Appalachian Mountains (Andrle and Carroll 1988). Historically martins inhabited forest edges and riparian areas in the East, but they are now mostly found near human habitation (Brown 1997).

Distribution

In Michigan, breeding populations are concentrated in the southern LP and decrease northwards. Purple Martin distribution has declined sharply since MBBA I. Data from MBBA II shows that martins are now concentrated in the three southernmost tiers of counties, and populations become patchy north of a line stretching from Allegan to Macomb County and very sparse in the UP. Martins are particularly vulnerable to cold temperatures, and the contraction of populations from the northern regions of Michigan may reflect a response to climate changes (Brown 1997). Although martin populations remain strongest in the southern LP, distribution still decreased from 319 confirmed townships in MBBA I to 162 confirmed townships in MBBA II. In the northern LP, distribution declined from 143 confirmed townships in MBBA I to 39 confirmed townships in MBBA II. The UP showed the most dramatic decrease in Purple Martin distribution, from 86 confirmed townships in MBBA I to only five confirmed townships, all in the southernmost regions of the UP, in MBBA II.

Breeding Biology

Purple Martins are secondary cavity nesters, historically nesting in abandoned woodpecker holes or other natural cavities (Brown 1997). However, nest boxes provided by humans have constituted the bulk of nest sites for many years. Martins nest colonially in constructed martin houses that may be quite large. In general, older males return from wintering grounds before younger males and select nest sites that are higher, and suffer less predation from climbing predators (Morton and Derrickson 1990). A typical martin house consists of 12 compartments and for this reason the size of the majority of colonies throughout the eastern United States is less than or equal to 12 pairs (Brown 1997). This suggests that Purple Martin populations are limited by nest sites.

Abundance and Population Trends

While the overall Purple Martin population appears to have been stable and even increasing in some parts of the continent, Michigan and Wisconsin have shown declines (Damro 2006, Tautin 2007). In Michigan, BBS trends indicate that Purple Martin populations have declined since 2001, although this decline is not statistically significant (Sauer et al. 2008). BBS trends show that in the Midwest the number of martins per route has declined from approximately three birds to approximately two birds per route. Further, Breeding Bird Surveys conducted in Illinois, Indiana, Ohio, Ontario and Wisconsin also report declines in Purple Martin distributions (Peterjohn and Rice 1991, Castrale et al. 1998, Kleen et al. 2004, Damro 2006, Cadman et al. 2007). Currently, Purple Martin populations are estimated at 30,000 individuals in Michigan (PIF 2007). The total number of block observations declined from 20.5% in MBBA I to 7.8% in MBBA II. A similar trend occurred in total township observations. Possible, probable and confirmed observations of martins amounted to 45.9% of all surveyed townships during MBBA I compared with 19.3% of all surveyed townships during MBBA II.

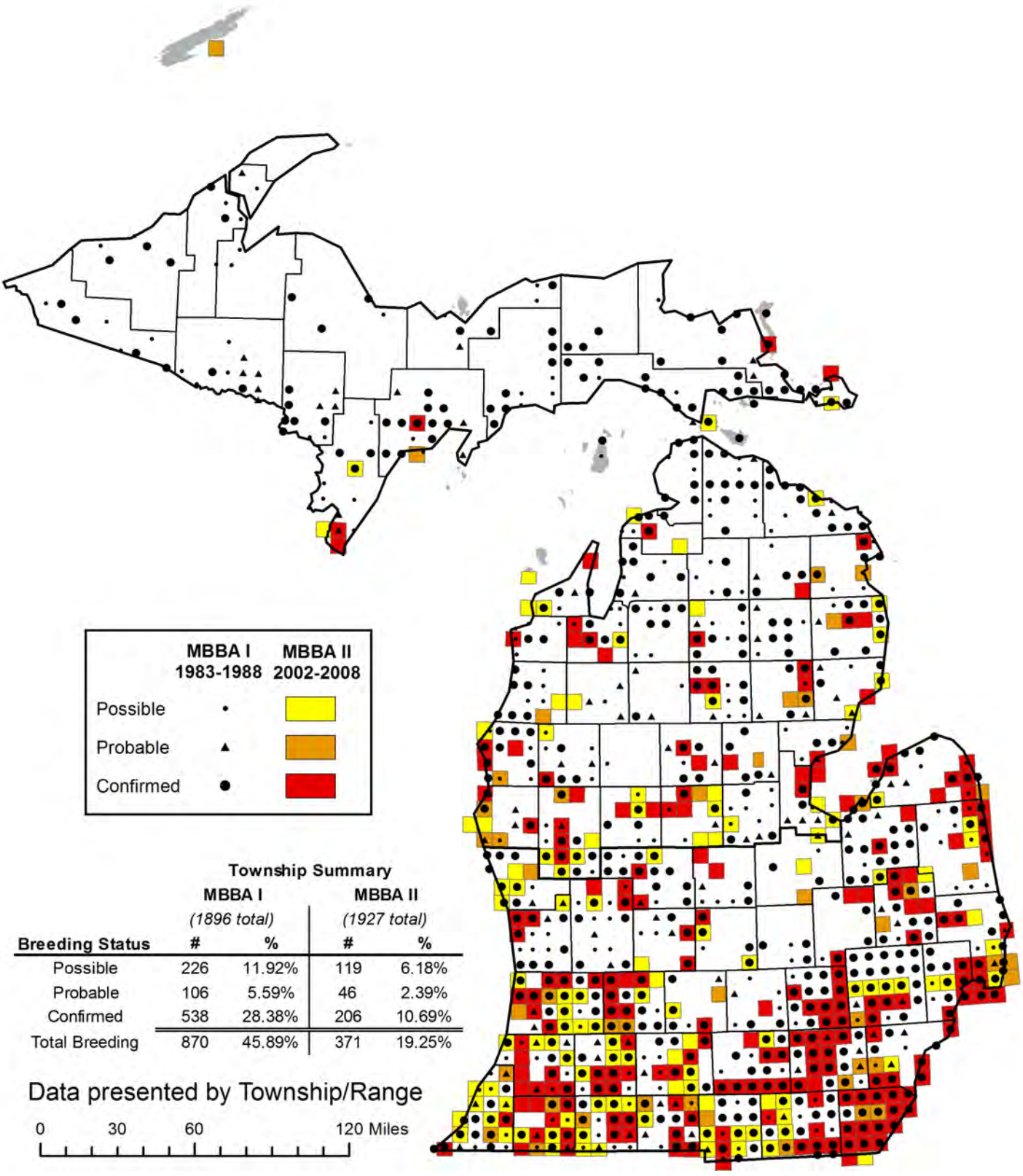
Conservation Needs

Despite the overall stability of the eastern continental population of Purple Martins, declines in the regional populations in the Upper Great Lakes are cause for concern (Tautin et al. 2008). Although Purple Martins are not currently listed as threatened or endangered, their decline has been observed, and a large amount of popular literature has been created to promote the increase of nesting colonies (Brown 1997). The most commonly prescribed conservation action calls for installation of nest boxes in order to increase the number of nest sites available for martins. Also it is recommended that nest boxes be checked for House Sparrows and European Starlings and that these species be removed in order to make space for the martins.

Cold, wet weather kills more Purple Martins than all other sources of mortality combined (Brown 1997). Die-offs occur regularly in North America during periods of cold weather in which the birds cannot find their insect prey (Brown 1997). Nest predation by owls or snakes can also be a significant local threat.

Purple Martin *(Progne subis)*

Anna Kornoelje



Tree Swallow *(Tachycineta bicolor)*

Richard A. Wolinski



Darlene Friedman ©

The iridescent blue-green plumage of the upper-parts coupled with a clear white breast and undersides make this cavity nesting species a common sight along shorelines and at inland locations where nest boxes are erected in open habitats (Turner and Rose 1989, Pinkowski 1991, Robertson et al. 1992).

The Tree Swallow is a breeding species of the central and northern portions of the continental U.S. northward to the limit of the tree-line in the Canadian provinces and Alaska. The species is largely absent from arid or heavily forested areas, where it is locally distributed. It is associated with open fields, lakeshores, and wetland margins where nesting cavities in trees have been excavated by woodpeckers, or in human supplied nest boxes in otherwise upland locations. The species winters in coastal areas from the Carolinas southward into the Florida peninsula and the island of Cuba and on the Pacific coast from Mexico northward to southern California (Turner and Rose 1989, Robertson et al. 1992).

Distribution

In Michigan, the species is widely distributed across the entire state, with highest density based upon BBS route data in central Michigan west of Saginaw Bay, where 10 to 30 birds per route were recorded between 1994 and 2003 (Sauer et al. 2008). The species density drops to between one and three birds per route in the eastern UP and in the heavily urbanized area of southeast Michigan surrounding the Detroit metropolitan area of the southern LP (Sauer et al. 2008).

The BBS route data and results of both MBBA I and MBBA II reflect the species' historical distribution. Barrows (1912) states "This is probably our most abundant and uniformly distributed swallow...", and adds that the species is less plentiful in the southern part of the state. Wood (1951) adds that Sager listed the species in his 1839 report and that the species was a common summer resident. Less than a decade later, Zimmerman and Van Tyne (1959) further refined the species' status, stating it was a summer resident and that it was common in the north, except on Isle Royale where it was uncommon. They further note that it was formerly common in the southern third of the state and was considered rather local and only fairly common as a breeding bird. Given the increase in the human population on inland lakes for home building, the loss of dead snags for nesting in southern Michigan is not entirely surprising and may be the reason for the perceived decline. Kelley (1978) found the species as a common nesting species in southeastern Michigan, particularly near water. Payne (1993) simply states that the species is a common transient and summer resident.

Breeding Biology

As a secondary cavity nesting species, the Tree Swallow is fully dependent upon existing cavities, a trait that informs its behavior in terms of its early spring arrival, defense of its selected nest site against other Tree Swallows and other species, and the delayed maturation of adult plumage in the female (Robertson et al. 1992). The species also exhibits a higher level of extra-pair copulations based upon recent studies that show females often mate with males other than the male with whom they have bonded (Dunn 2006), this reflecting the lack of mate guarding behavior by the male.

The species' flexibility in terms of using both natural and human supplied cavities in the form of nest boxes has doubtlessly aided its distribution into southern Michigan from the late 1800s into the early 1900s (Pinkowski 1991) and added to its abundance statewide.

Abundance and Population Trends

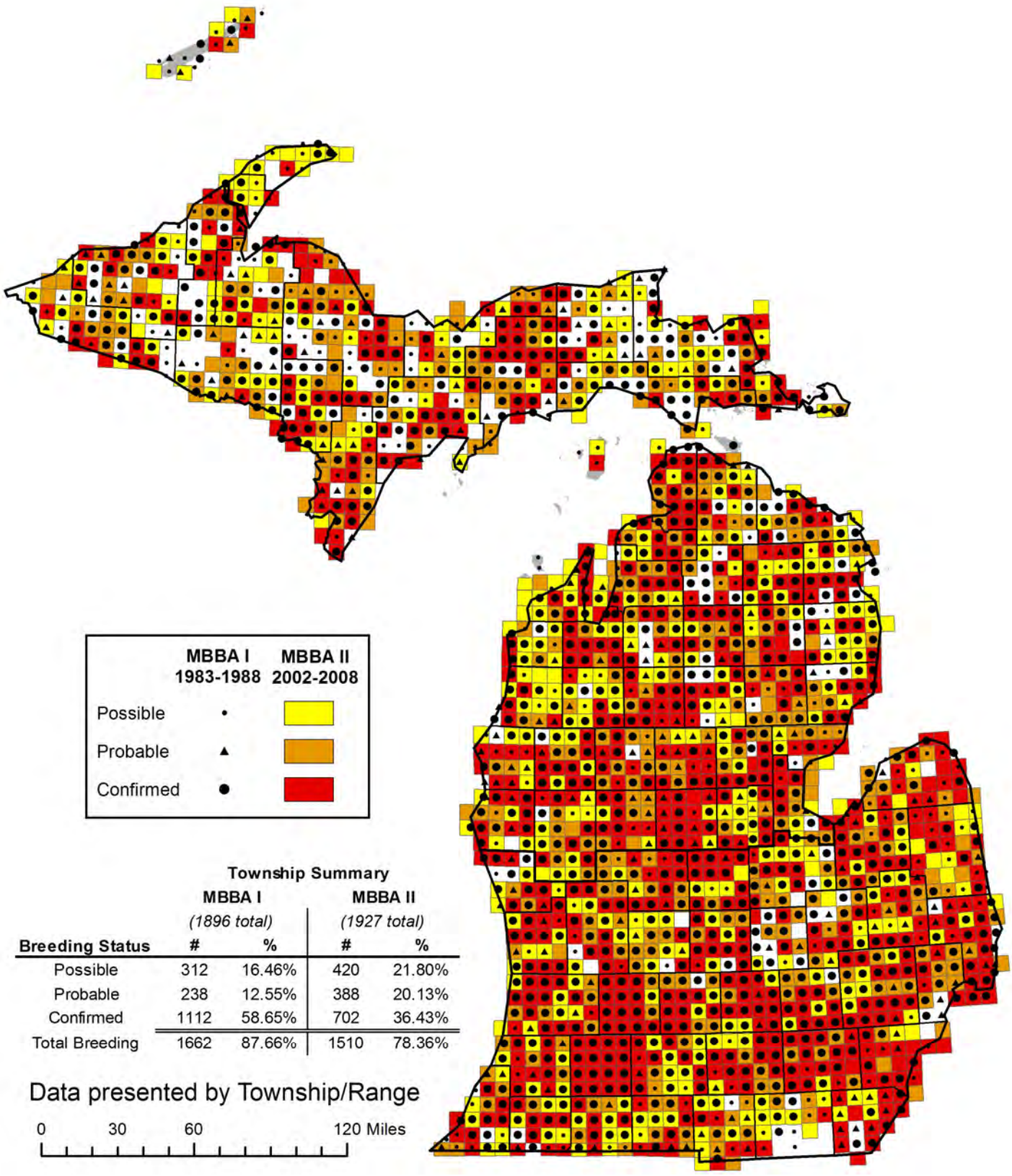
Similar to several other members of the swallow family in Michigan, the Tree Swallow shows a non-significant decline in population based upon BBS route data between MBBA I and MBBA II (Sauer et al. 2008), with declines showing on the atlas distribution map across the state in terms of block occupancy. The total number of atlas blocks with some evidence of breeding dropped about 15% for each of the three regions of the state, seemingly a strong indicator that the decline in numbers is real. The BBS trend line for the Upper Midwest showed a statistically significant upward trend of 1.7% per year for 1966 to 2000 (Kleen et al. 2004). In general, the species is increasing or stable in abundance in the southern portions of its range, but appears to be declining northward (Lepage 2007).

Conservation Needs

No conservation action is needed for this species given its wide distribution and robust population level.

Tree Swallow *(Tachycineta bicolor)*

Richard A. Wolinski



Northern Rough-winged Swallow *(Stelgidopteryx serripennis)*

Richard A. Wolinski



Jerry McHale ©

If the title of "swallow most likely to be overlooked" is to be applied, the Rough-winged would be the swallow of choice. Easily confused with the Bank Swallow due to overall coloration and choice of nesting sites, the more solitary Rough-winged is often not identified even when observed. Familiarity with its flight call is often the best way to confirm identification at a distance.

The Northern Rough-winged Swallow is generally distributed across the continent ranging into the southernmost portions of all the Canadian provinces save British Columbia, where it is found well northward to southeastern Alaska. To the south, the species is found in Mexico southward into northern Costa Rica, western Honduras, and northwestern Nicaragua (DeJong 1996).

Distribution

Before European settlement, distribution of the species within Michigan would presumably have been widespread and local, tied to those situations where Bank Swallow and Belted Kingfisher burrows were to be found in the eroded banks of streams and rivers, or to crevices and crannies in rock faces that provided some overhead cover. Nesting sites afforded by human activity and structures likely resulted in some increase in nesting density in areas previously devoid of natural nest sites as the human population expanded. Distribution is therefore tied to nest site availability rather than to a specific vegetative cover type or open water.

The northernmost Michigan record reported by Cook (1893) was of a dead bird on Mackinac Island in 1890. Its distribution in the UP was better understood by the 1950s, having been reported breeding from Luce and Schoolcraft Counties (Wood 1951) and later observed in Marquette, Iron, Houghton, and Baraga Counties (Zimmerman and Van Tyne 1959). The species was considered a fairly common summer resident north to the Straits of Mackinaw by Zimmerman and Van Tyne (1959) and as a common summer resident and local throughout the state by Payne (1983). The Rough-winged was considered an uncommon summer resident in the northwest portion of the LP (Pettingill 1974, Francke and Graf 1994) and a common summer resident in Isabella County (Cuthbert 1963) in the southern portion of this same region.

Results of MBBA I verified the general historical view of the species' distribution as most robust in the southern and central LP decreasing northward into the UP, with more occupied blocks in the western UP than in the eastern UP (particularly Luce, Mackinaw, and Chippewa Counties). The general distribution of breeding records remained the same between MBBA I and MBBA II, though differences were most apparent in terms of the total number of occupied blocks in the northern portions of the range in the northern LP and UP; though some counties in the southern LP also had fewer occupied blocks.

Breeding Biology

Unlike the Bank Swallow that remains tied exclusively to natural sites for nest placement, the Rough-winged displays the ability to utilize cavities afforded by human structures. These include bridges, dry drain pipes, and various cavities in buildings, though they can be found investigating a wide variety of potential nest sites, including the undersides of parked semi-trailers and the interiors of open garages (Kelley 1978).

Abundance and Population Trends

The Rough-winged has been expanding its range northward for over 100 years (DeJong 1996). Results of the BBS continent-wide and for the Great Lakes Region (Robbins et al. 1986) showed a significant increase between 1966 and 1979; the statistically significant trend estimate from 1966-2000 for the upper Midwest is 1.2% per year (Kleen et al. 2004). The Michigan BBS data suggest a significant upward trend from 1983-2007 of 2.66%, though these data should be viewed with care. The Michigan BBS data from 1994-2003 offer a comparison of routes in the UP and northern LP showing fewer birds/route (0.5-1.0) than the number of birds/route (1.0-3.0) in the southern portion of the state (Sauer et al 2008). Differences in abundance compared with Bird Conservation Regions, which show an overall decline over the same time period, may be hidden in the statewide trend analysis and hide eco-region effects on abundance. The upward trend data conflict with the atlas block data that show a decrease in the number of occupied blocks across the state more consistent with the Bird Conservation Region BBS analysis (Sauer et al. 2008).

The loss of occupied atlas blocks is perhaps a reflection that the Rough-winged Swallow population is reaching saturation, with the available artificial nest sites and any increases tied to an expanding Bank Swallow population. If

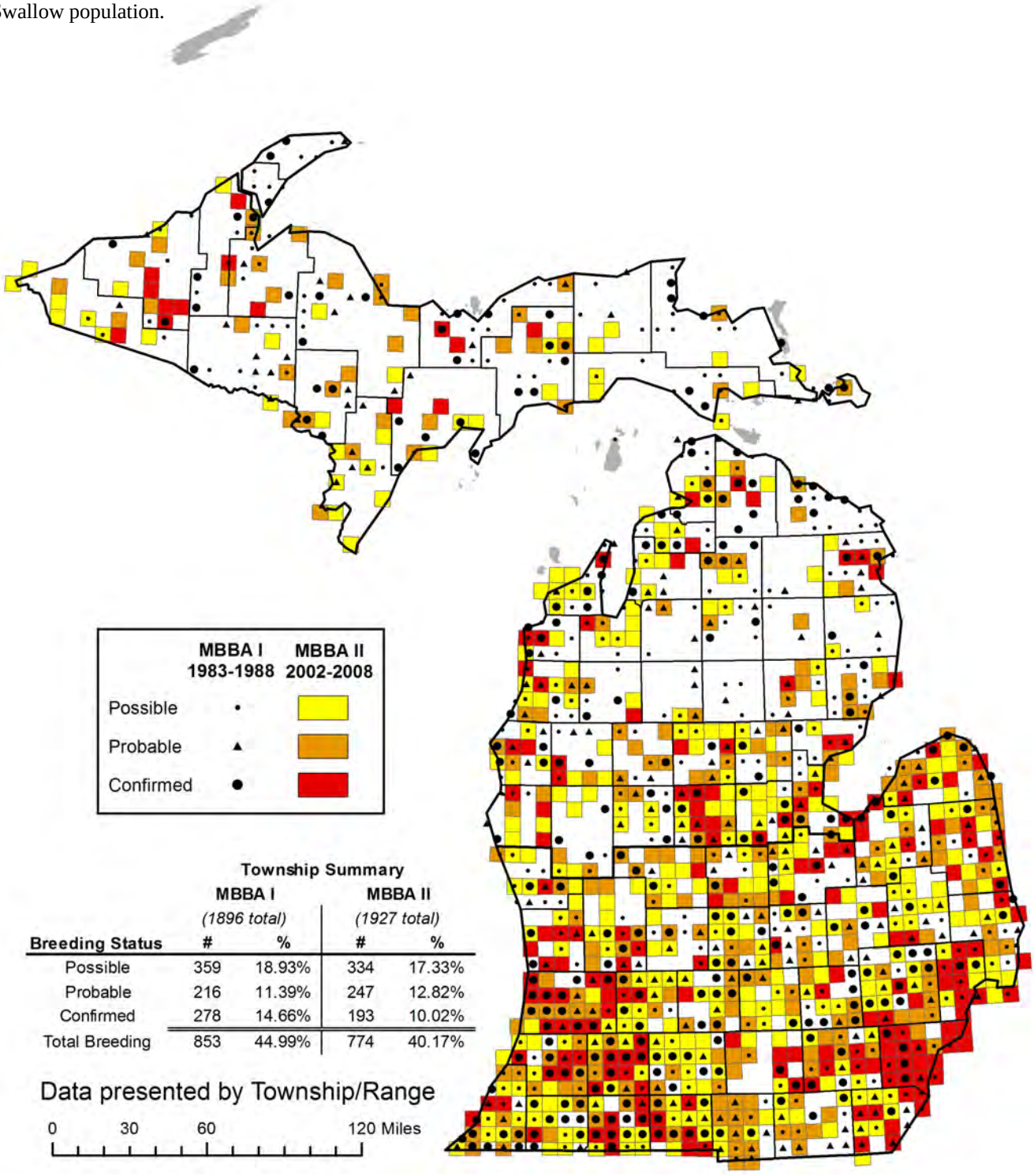
Northern Rough-winged Swallow *(Stelgidopteryx serripennis)*

Richard A. Wolinski

so, more Rough-wingeds per observation may be responsible for the perceived increase in abundance as more pairs are typically associated with Bank Swallow colonies (Turner and Rose 1989) or at loose colonies (DeJong 1996). This is in contrast to a situation in Ontario (Sandilands 2007) where the non-significant decline (based upon comparison of regional and all Canadian BBS route data) may be tied to the distribution of the declining Bank Swallow population.

Conservation Needs

Despite some indication that the Rough-winged population has declined in the northernmost portion of its range in Michigan based upon atlas block occupancy, there appears to be no need for management action.



Bank Swallow *(Riparia riparia)*

Richard A. Wolinski



John Van Orman ©

The smallest member of the swallow family found in Michigan, the Bank Swallow is clothed in brown above and white below, broken by a brown band across the upper breast. In flight the bird is often found in small groups giving harsh twittering or rapid bubbling chatter vocalizations as they fly about the colony or forage for small insects over open areas.

The Bank Swallow is one of the most widely distributed swallows in the world (Garrison 1999). It is found throughout North America as a breeding species from New England westward across the middle and northern portions of the continental United States into southern Canada northward into Alaska. This species retreats to South America and the eastern Caribbean during the non-breeding season (Rose and Turner 1989, Garrison 1999).

Distribution

Historical distribution in Michigan was reported by Barrows (1912) as abundant, while Wood (1951), simply states that the species is a common summer resident. Zimmerman and Van Tyne (1959) denoted some difference in status between the LP and UP by noting the species as common in the LP and fairly common in parts of the UP, with the added mention that it was apparently rare on Isle Royale. A more general description of breeding distribution, as a common summer resident, was given by Payne (1993) for the entire state. This species is generally considered to be locally distributed given the distribution of potential colony sites within its range.

Breeding distribution, as shown by the MBBA I and MBBA II, indicates that the species' distribution is similar between the two survey periods, but has generally declined statewide based upon the number of occupied blocks. Occupied blocks declined between the atlas periods by about 29%. The greatest decrease in occupied atlas blocks, about 62%, occurred in the UP, though decreases of about 38% in the NLP, and 17% in the SLP indicate that similar changes occurred throughout the state. For a species for which confirmed nesting is easily achieved by finding active burrows in colonies, it seems likely that the decrease in number of observed colony sites is real given the assumption that the level of effort expended between the two atlas survey periods is comparable.

Breeding Biology

The Bank Swallow is very much an opportunistic species when it comes to the selection of nesting sites in exposed banks, both those of natural creation or by way of human activity. Natural banks along the Great Lakes shorelines, rivers, and streams created by flowing water come and go over time but tend to offer a steady supply in slightly different locations over a period of years. Nesting in sites created by sand and gravel extraction may be more persistent in terms of availability between years, but potentially suffer from the need to remove material while the birds are using the site, and ultimately, conversion to other uses that no longer offer nesting sites once the pit has played out. Other human created sites associated with roadway or other construction activity may be present but for a single season, or part of a season, and create situations where birds begin nesting and are unable to successfully fledge young before the banks are stabilized. In such cases, reproductive failure may be total if it occurs too late in the season to afford an opportunity to begin a second nesting attempt. How often this situation occurs is unknown for both human created sites and natural sites where banks can collapse for any number of reasons related to specific site conditions.

Abundance and Population Trends

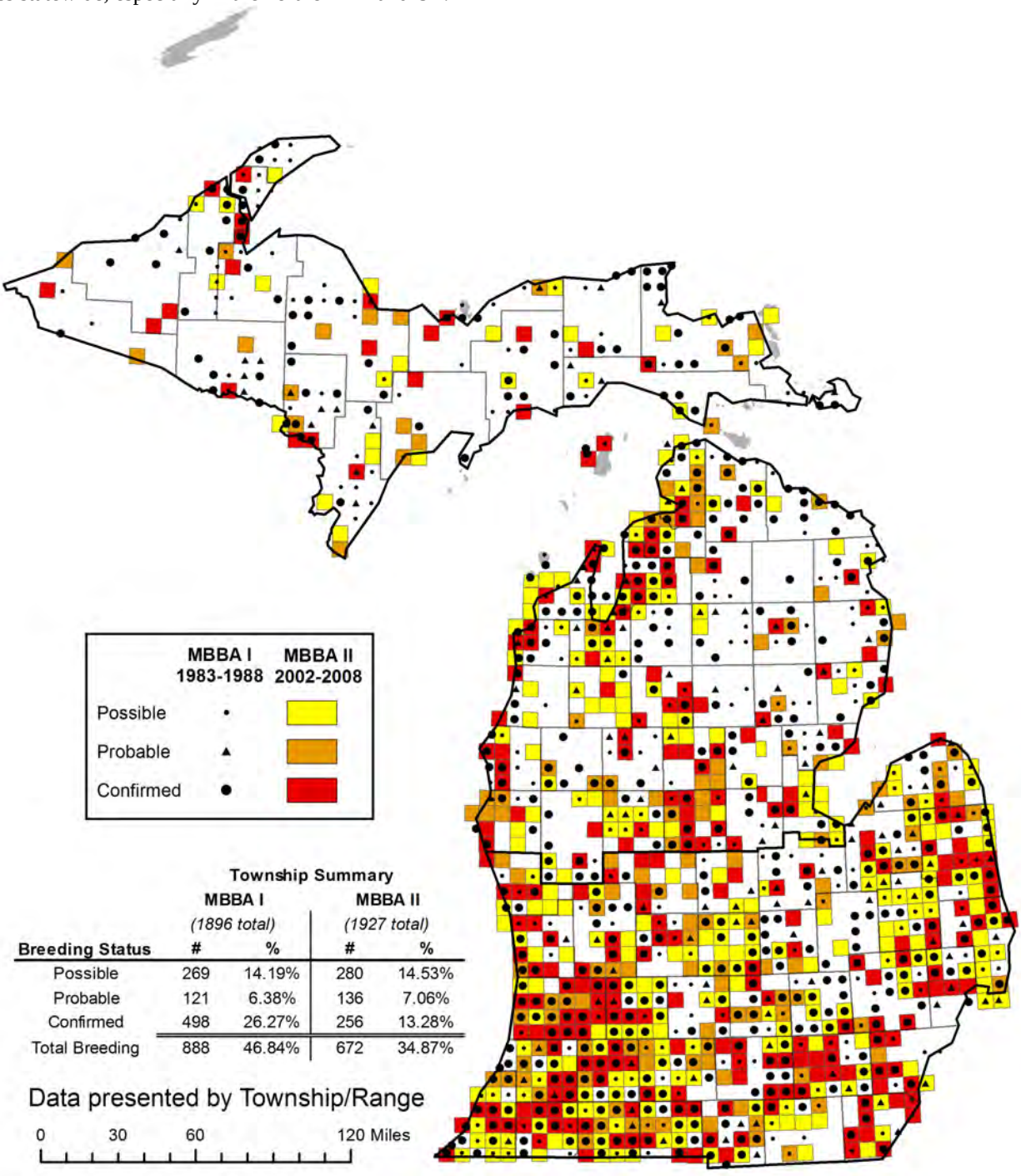
Review of BBS data at the statewide level reveals a non-significant upward trend in population size, seemingly in conflict with atlas results (Sauer et al. 2008). By viewing the BBS route data by physiographic region, trends that are more consistent with atlas results emerge. Trend data from the years 1966 to 2003 for the Great Lakes Plain, an area that covers most of southern and central Michigan, show an upward trend from 4.86 birds/route in 1966 to 12.90 birds/route in 2003. The remaining portions of the LP and UP are included in the Boreal Hardwood Transition area, where the BBS data show a statistically significant decline ranging from 11.56 birds/route in 1966 to 2.44 birds/route in 2003 (Sauer et al. 2008). Use of the BBS results by way of the physiographic areas is more consistent with results obtained in MBBA II, though the results should be viewed with some caution due to the narrow range of values for the percent downward change in occupied blocks between each of the regions used by the atlas and the very nature of the BBS methodology in regards to this species (Kleen et al. 2004). What remains unclear is if the apparent loss of colonies (occupied blocks) is due to the loss of smaller, more ephemeral colonies, a mix of small and larger colonies, or the loss of larger colonies near roads that could influence BBS results in a significant way given the survey design.

Bank Swallow *(Riparia riparia)*

Richard A. Wolinski

Conservation Needs

At present there is no data available that shows the proportion of nest sites associated with natural situations and human created colony sites. Also missing is information on colony size (the number of active burrows/site) that would illuminate the longevity of small, medium, and large colonies. At present there appears to be no need for active conservation measures, but overall population trends and distributions in the northern portions of the ranges of numerous aerial insectivores (Sandilands 2007) should alert us to the need for more detailed nesting ecology data on this species statewide, especially in the northern LP and UP.



Cliff Swallow *(Petrochelidon pyrrhonota)*

Anna Kornoelje



Robert Epstein ©

The colorful Cliff Swallow can be distinguished by its habit of nesting in large colonies of up to several thousand gourd-shaped mud nests at a single breeding site (Brown and Brown 1995). The Cliff Swallow is distributed throughout the United States, Canada, and Mexico during the breeding season, and although it is absent from the southeastern states, numbers of Cliff Swallows in this region have been increasing (Wolinski 1988). The Cliff Swallow breeds throughout Michigan and is usually associated with human constructions such as bridges, barns, dams, and lighthouses (Wolinski 1988).

Distribution

The Cliff Swallow's breeding range has expanded considerably in the southeastern United States in conjunction with the construction of bridges, buildings, and culverts in the past 100–150 years. In Michigan, the Cliff Swallow was probably limited by nesting sites before European settlement (Wolinski 1988). However, the widespread construction of buildings and bridges has provided opportunity for these swallows to expand their breeding range in Michigan. Also, while Cliff Swallows are found commonly in association with human development, they also require a nearby source of clay or clayey mud to make the "bricks" that comprise their nests (Samuel 1971, Eaton 1988). The Cliff Swallow is widely distributed throughout Michigan with the greatest concentrations occurring in the southeastern LP and decreasing numbers moving northwards to the northern LP and UP. This contrasts with data from MBBA I which shows Cliff Swallows being most numerous in the UP and decreasing southwards. A comparison of townships in which Cliff Swallows were documented shows an interesting reversal of trends. The data from MBBA I show that the percentage of townships in the UP, NLP, and SLP with breeding Cliff Swallow documentation are 47.5%, 38.6% and 24.1%, respectively. The data from MBBA II show that the UP, NLP, and SLP documented Cliff Swallows in 16.9%, 32.8% and 36.7% of townships respectively. It is unclear why this shift in population distribution has occurred; however House Sparrows are one of the most significant threats to Cliff Swallow nesting attempts (Wolinski 1988). Sparrows destroy eggs in order to usurp nests and a single House Sparrow may clean out 12–15 nests before selecting one for its own (Brown and Brown 1995). An increase in House Sparrows in the UP or a decrease in LP House Sparrows may be the cause of this range shift. Further study should be undertaken to confirm the reasons for the shift.

Breeding Biology

The Cliff Swallow begins egg laying in Michigan as early as May and peak laying time continues through June (Brown and Brown 1995). Three to five eggs comprise a typical clutch (Myres 1957). Nestlings are reported to fledge between 20 and 26 days after hatching (Brown and Brown 1995). Michigan's Cliff Swallow occupy breeding sites in groups that generally number around five pairs, although colonies as large as 3,500 pairs have been documented in the United States (Wolinski 1988, Brown and Brown 1995). The Cliff Swallow uses complex vocalizations to identify its offspring within the crowded colony and is also quite noisy when alarmed (Brown and Brown 1995, Cadman et al. 2007).

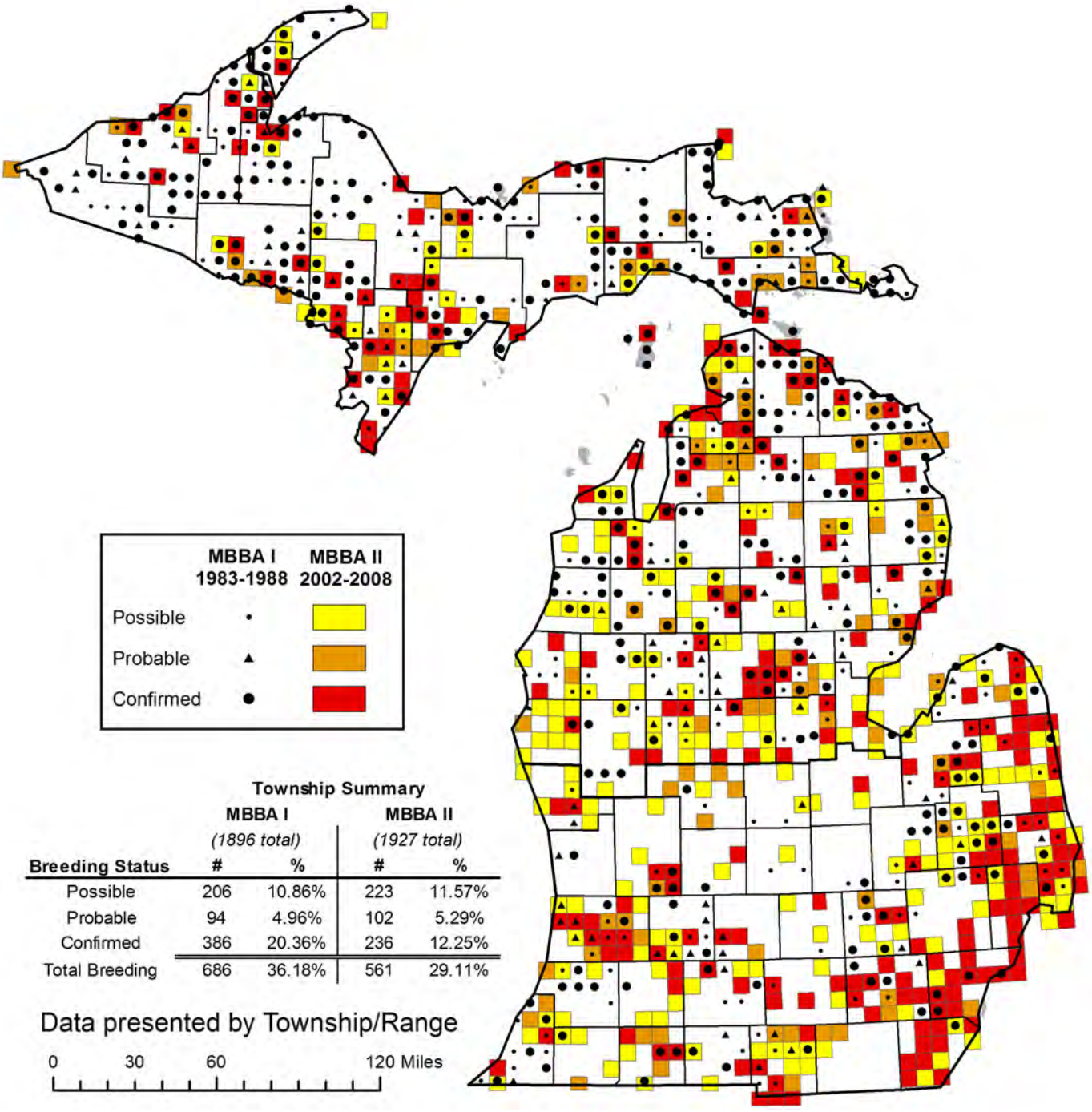
Abundance and Population Trends

In the Midwest it appears that Cliff Swallow populations are increasing. The BBS trends show that in USFWS Region 3 between 1983 and 2008, average swallows observed per route increased from approximately eight birds to approximately 15 birds. In Michigan, average swallows observed per route increased from approximately three birds to approximately five birds. This general increase is especially interesting when compared with the southward shift in distribution. Block Summaries from MBBA I show confirmed presence of Cliff Swallows in 206 blocks in the UP, 162 blocks in the NLP, and 92 blocks in the SLP. This may be contrasted with Block Summaries from MBBA II in which confirmed presence of Cliff Swallows occurred in 51 blocks in the UP, 74 blocks in the NLP, and 152 blocks in the SLP. However, BBS trends indicate a slight decline in Cliff Swallow numbers between 2001 and 2007, although this trend was not statistically significant (Sauer et al. 2008). Further, a decreasing trend in Ontario has also been observed. North of the road system in northern Ontario, there was no apparent decline of swallows; however, in road-accessible areas, a marked decline was observed (Cadman et al. 2007). The authors posit the hypothesis that as open fields are abandoned and returned to scrub land and forest, the habitat becomes less suitable for Cliff Swallows (Cadman et al. 2007). A similar shift in habitat types may be occurring in Michigan, corresponding with the southward shift of Cliff Swallows.

Conservation Needs

The Cliff Swallow is not included on any threatened or endangered species lists. House Sparrows are a significant threat to nest success and removal of sparrows can result in an increase of Cliff Swallows in suitable habitats (Wolinski 1988). Ectoparasites such as the hematophagous, or blood

sucking, swallow bug can also be a threat to nest success. Swallow bugs increase with colony size and nest density (Brown and Brown 1995). The swallow's habit of nesting under bridges can result in collisions with cars. A recent study showed that Cliff Swallow nesting on bridges can be reduced by the use of alarm and distress calls and surface modification with plastic sheeting (Conklin et al. 2009).



Barn Swallow *(Hirundo rustica)*

Richard A. Wolinski



Robert Epstein ©
Species sponsored by: Isaac R. Hunter

The colorful Barn Swallow is the most abundant and widely distributed member of the swallow family in Michigan. The glossy blue-black plumage of the upperparts, reddish-brown forehead and throat, rusty undersides, and deeply forked tail with white spots leave little doubt as to the identity of this species in rural areas of the state.

The Barn Swallow is one of the mostly widely distributed swallows in the temperate regions of the world (Rose and Turner 1989, Brown and Brown 1999). In the western hemisphere it is found throughout North America as a breeding species, with its core distribution lying east of the Rocky Mountains in the major agricultural areas from eastern Texas northward to the Upper Great Lakes states and southern Canada. This species retreats to South America during the non-breeding season (Rose and Turner 1989, Brown and Brown 1999).

Distribution

This species' historical distribution in Michigan, as reported by Barrows (1912), is not clearly stated though the account indicates wide distribution; whereas Wood (1951) states that the species was a common summer resident and that it was first documented in the state by Sager (1839). Zimmerman and Van Tyne (1959) proclaim the species a common summer resident and rare on Isle Royale. A description given by Payne (1993) is as a common transient and summer resident, more widely distributed in the LP than in the UP.

Breeding distribution as shown by MBBA I and MBBA II shows that overall distribution has remained similar between the two survey periods, but occupancy has generally declined about fifteen percent statewide based upon the number of occupied blocks. The ability to confirm nesting for this species at the highest level is high, with a total of 13.5% confirmed blocks. The largest change in terms of the number of unoccupied blocks appears throughout the UP, with Schoolcraft County showing only five blocks at some level of breeding status, down from 21 (76%) during MBBA I (Wolinski 1991).

Breeding Biology

This swallow is dependent upon two conditions in order to breed successfully, a protected location that offers a good attachment point for the nest and a source of mud for nest construction. The nest is constructed of mud or clay combined with grass or straw, and lined with animal hair or feathers, and fine grasses (Brown and Brown 1999). Natural locations for nesting are limited to rock overhangs and crevices, or the mouths of caves, situations seldom found in Michigan. The Barn Swallow therefore benefited greatly from European settlement, particularly as agriculture took hold and human structures in the form of open sheds and large barns with many rough-hewn beams and large openings were constructed. These buildings were kept open for the movement of livestock and allowed access by the swallows. The development of road and highway systems also benefited this swallow. Bridges over rivers and streams, even where farming was limited, provided adequate protected locations with attachment points for nests into the forested portions of the northern LP and much of the UP, where breeding opportunities would otherwise have been restricted to many fewer natural sites such as rock overhangs or crevices. It should also be noted that this species nests below piers and in boathouses along the shorelines of the Great Lakes and inland lakes which accounts for its distribution along forested shorelines in the northern LP and UP and many Great Lakes islands.

Abundance and Population Trends

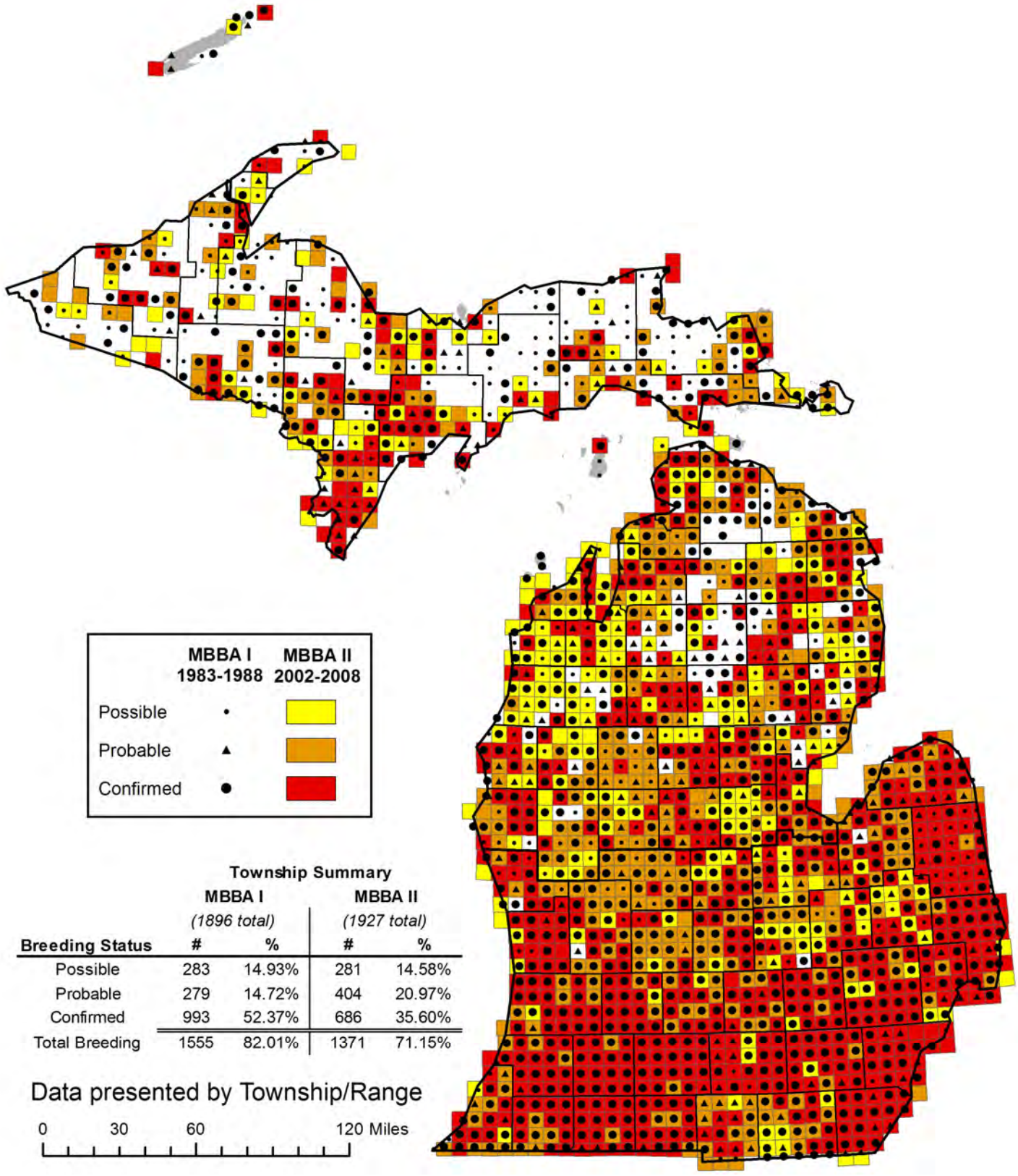
Recent changes in farm size, operations, and building construction materials for farm equipment storage, have provided fewer nesting sites for the Barn Swallow even as older barns and sheds have fallen into disrepair or have been shuttered. These changes are enough to affect population levels statewide and in part, nesting distribution, particularly in those inland areas that had few suitable nesting structures during the 19th and 20th centuries in the UP and parts of the northern LP. The relative abundance of the Barn Swallow as shown by BBS route data indicates a statistically significant decline from 1983 to 2007 for USFWS Region 3 (Sauer et al. 2008). Similar declines have been reported by atlas projects in New York (Medler 2008) and Ontario, Canada (Lepage 2007), and have been noted for all of North America by Brown and Brown (1999).

Conservation Needs

The Barn Swallow remains one of the most abundant nesting species in the state and no conservation action appears to be warranted at the present time. The species is not listed as a species of conservation concern in any national conservation plan; though see Lepage (2007) where aerial insectivores have been identified as a priority group for conservation actions by Ontario Partners in Flight.

Barn Swallow *(Hirundo rustica)*

Richard A. Wolinski



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	283	14.93%	281	14.58%
Probable	279	14.72%	404	20.97%
Confirmed	993	52.37%	686	35.60%
Total Breeding	1555	82.01%	1371	71.15%

Data presented by Township/Range

Black-capped Chickadee *(Poecile atricapillus)* ***Alec Lindsay***



Jerry Jourdan ©
Species sponsored by:
Petoskey Regional Audubon Society

Ubiquitous, social, and tolerant of human activities, Black-capped Chickadees are arguably among Michigan's most easily recognized birds. Year-round residents of urban, rural and wilderness habitats, Black-capped chickadees are also regular visitors to bird feeders. Unlike many other "feeder birds," chickadees are a scatter-hoarding species, storing individual food items in thousands of caches that they remember and return to over long periods of time (Hitchcock and Sherry 1990). For a small bodied bird like a chickadee, supplemental feeding can have positive impacts on winter survival (Wilson 2001). Chickadees typically spend the fall and winter months in larger chickadee flocks with linear dominance hierarchies, where males dominate females and older birds dominate new recruits (Glase 1973). Nuthatches, woodpeckers, brown creepers and kinglets will often join chickadee flocks during winter foraging.

The geographical range of Black-capped Chickadees stretches from the West Coast to the Eastern Seaboard of North America, from as far north as Alaska and Newfoundland to as far south as northern California and Pennsylvania. Near Michigan, Black-capped Chickadees are residents across the state of Wisconsin and the Province of Ontario. Their southern range extends only partially across Illinois, Indiana and Ohio, where the Carolina Chickadee becomes more common.

Distribution

Some of the earliest accounts of chickadees in Michigan (Barrows 1912) indicate chickadees have been breeding across both peninsulas of the state for a long period. Black-capped Chickadee distribution changed slightly between the two Atlas periods. Chickadees were reported from over 3,700 Atlas blocks during MBBA II, compared with over 4,100 blocks in MBBA I. Reports of chickadees were clearly widespread across the state, yet fewer than a quarter of reports were confirmed breeding records. With the exception of Lenawee and Hillsdale counties, confirmed breeding records were reported for all of Michigan's counties during both the first and second Atlas periods. Lenawee and Hillsdale counties showed scant evidence of chickadee breeding in both Atlas efforts (with no confirmed records in the second effort), in rough agreement with 1970-1989 Breeding Bird Survey data. The percentage of Atlas blocks with evidence of chickadee breeding declined from 58% in the first Atlas to 52% in the second Atlas, likely as a result of changes in survey effort, but at the township level, the remarkably high percentage of Atlas townships with breeding records in both Atlases (90%+) confirms what casual observers and backyard birders already know: chickadees are common across the entire Michigan landscape.

Breeding Biology

In late spring and summer, breeding pairs of chickadees excavate nest cavities in dead branches or tree snags and raise a single (rarely more) clutch of offspring. These family units remain together for a few weeks after the young fledge until one day the juveniles disperse some distance away (Weise and Meyer 1979), but usually not more than a few kilometers. Both males and females excavate cavities, but nests are built exclusively by females (Smith 1993). Pairs rarely reuse nests between nesting attempts or between breeding seasons. Chickadees are socially monogamous when nesting, but both males and females will frequently seek copulations from individuals other than their social mate. Otter et al. (1998) found that up to 30% of nests can include offspring sired by males other than the attending father and that in soliciting extra-pair matings, females preferentially seek the copulations from flock mates who rank higher than their social mate.

Abundance and Population Trends

Although the declines in reported numbers are conspicuous, it is more likely that reported declines are an artifact of variable efforts put forth between the two surveys, rather than a reflection of actual population changes. Recent BBS data indicate that Michigan ranks among the top ten states and provinces for total Black-capped Chickadee population size, and densities are higher in Michigan than most other states. North American Breeding Bird Survey data from 1983-2007 show a general, although non-significant, trend of increasing chickadee numbers in Michigan (Sauer et al. 2011). This trend parallels the significant chickadee population increases recorded across the broader region (i.e. USFWS Region 3).

With chickadees, what is perhaps more interesting than where they were found breeding is the places where they were not found breeding. In fact, some townships (during both Atlases) lacked confirmed evidence of chickadee breeding activity. This is especially true for some of the townships in southeast Michigan during both Atlases, and some townships in the western Upper Peninsula during MBBA II. Two different factors are potential causes for the limited evidence of breeding chickadees in these areas. First, heavy agricultural activities in counties like Hillsdale, Huron and Lenawee reduce the number of available nest sites (i.e., fewer suitable trees for cavity excavation), likely leading to reduced breeding in these areas. Further, although chickadees can be found in forest edges and other disturbed habitats, forest edges create harsher microclimates in cold and windy conditions and chickadees will avoid them (Grubb 1977, Yahner 1987), making habitats dominated by

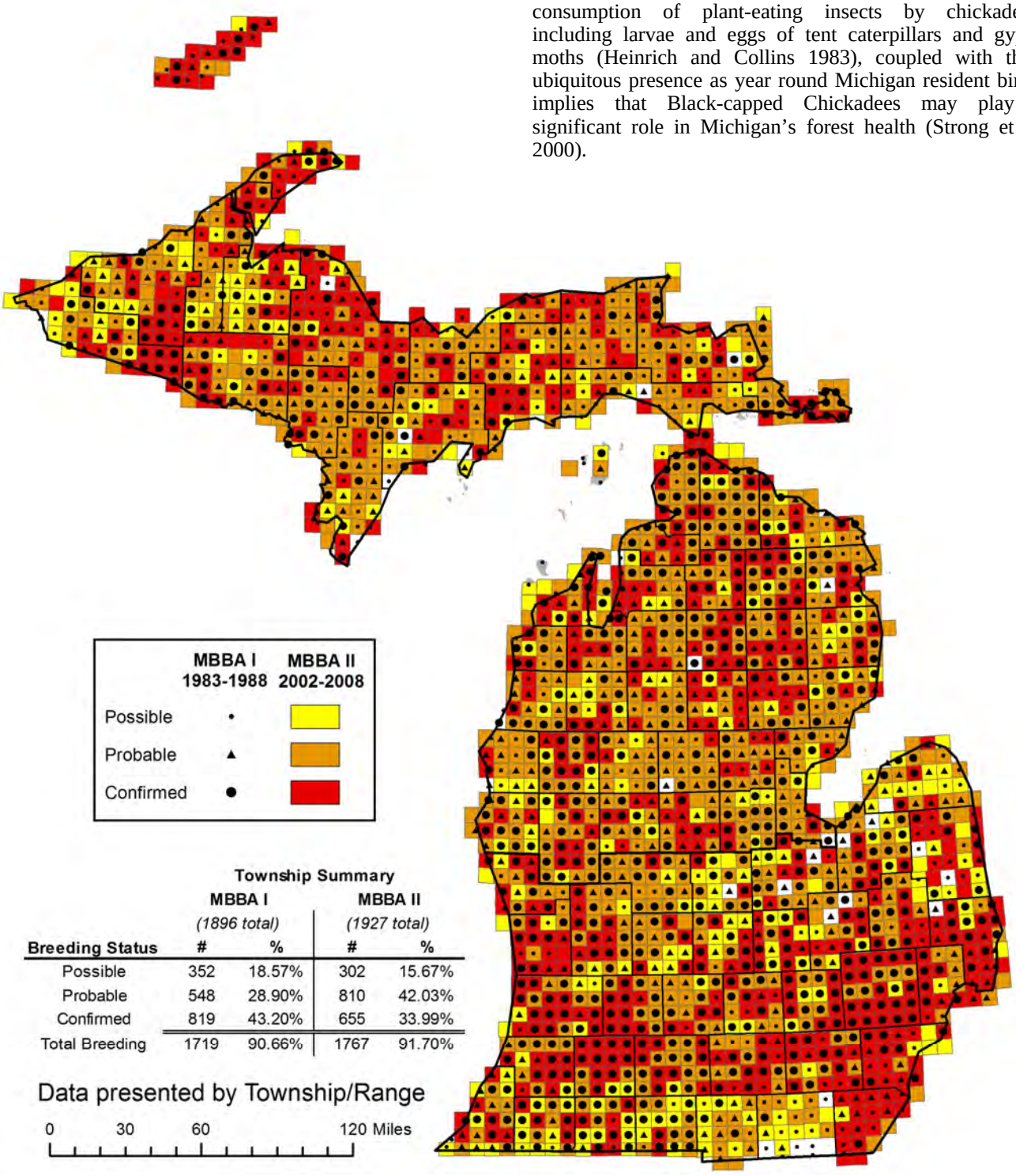
Black-capped Chickadee *(Poecile atricapillus)*

Alec Lindsay

agriculture less appealing to breeding chickadees. At the other end of the state, the limited evidence of breeding chickadees in the western Upper Peninsula, seen mainly in Gogebic and Ontonagon counties, is likely due to inaccessible Atlas blocks embedded in the Ottawa National Forest rather than any shortcomings in habitat quality. These counties received increased Atlas effort between the first and the second Atlas periods, but large tracts of forest in these counties remain remote and relatively inaccessible.

Conservation Needs

Black-capped Chickadee populations appear to be stable in Michigan and they are not listed by any state, federal or conservation agency as a species of special concern. Local populations do not seem to have changed demonstrably since the first Atlas effort. It is noteworthy that on an individual and population level, habitat modification and supplemental feeding by humans can have negative and positive effects, respectively, on winter survival in chickadees. As a broader conservation interest, the heavy consumption of plant-eating insects by chickadees, including larvae and eggs of tent caterpillars and gypsy moths (Heinrich and Collins 1983), coupled with their ubiquitous presence as year round Michigan resident birds, implies that Black-capped Chickadees may play a significant role in Michigan's forest health (Strong et al. 2000).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	352	18.57%	302	15.67%
Probable	548	28.90%	810	42.03%
Confirmed	819	43.20%	655	33.99%
Total Breeding	1719	90.66%	1767	91.70%

Data presented by Township/Range

0 30 60 120 Miles

Boreal Chickadee *(Poecile hudsonicus)* ***Scott Hickman***



Allen Chartier ©
Species sponsored by: Copper Country Audubon

Perhaps no species is more commonly regarded as an indicator of pristine boreal habitat in Michigan than Boreal Chickadee. This more reticent relative of the extroverted Black-capped Chickadee is a resident of the coniferous forests that extend from Alaska through the Canadian Maritimes and south to sections of the northernmost U.S. (Ficken 1996). Genetic analysis indicates that Boreal Chickadees emerged as a species approximately one and a half million years ago when they diverged from Eurasian ancestors that entered North America two million years earlier (Gill et al. 2005). In Michigan, the Boreal Chickadee is a resident in the UP where it is an uncommon breeding species (Payne 1983, Chartier and Ziarno 2004).

Distribution

Early accounts of Boreal Chickadee distribution in Michigan are inconsistent. Cook (1893) describes it as a "rare winter visitor" to northern Michigan. Barrows (1912) includes reports indicating Boreal Chickadee as abundant in the UP, rarer in the LP, and sometimes found as far south as St. Clair County, but hesitates to accept these reports as acceptable documentations. No "unquestionable" breeding records for Boreal Chickadee existed for Michigan even as late as 1950 (Wood 1951). These inconsistencies were likely due to a paucity of information; the species' irregular pattern of short-range, sometimes irruptive, migration (Ficken et al. 1996); its preference for difficult to survey black spruce-tamarack wetlands (Green 1995); and its relatively quiet and secretive behavior during the breeding season (Ficken et al. 1996).

The breeding season range of Boreal Chickadee in Michigan was determined to be confined to the UP by MBBA I. Evers (1991) concluded that MBBA I revealed two disjunct nesting populations within the UP; a western population primarily west of Marquette, and an eastern population extending east from central Alger County. MBBA II substantiated the continued existence of these same two populations, but indicates that the western population has expanded while the eastern population has contracted.

The reason for these distributional changes cannot be conclusively determined. Differences in survey effort constitute one possibility. Observer hours were not recorded during MBBA I, but were extrapolated by Kalamazoo Nature Center data editors. These estimates indicate that effort within the species' western UP range during MBBA II increased by 34% from MBBA I, while effort within the eastern UP population's range decreased by 8%. This disparity may have significantly contributed to the reported changes in distribution, particularly if the decrease in survey effort in the eastern UP was primarily within boreal habitat.

Disparity in habitat loss during the interval between atlases is another possibility. Logging in boreal forests in the western UP is generally perceived as minimal on public land, light on non-industrial, privately owned land, and only moderate on lumber company land (J. Ferris, pers. comm.). The impression is similar for the eastern UP, except that sale of land between forest companies in this region has been preceded by heavier harvesting (D. Kuhn, pers. comm.). It is then possible that the reported contraction of Boreal Chickadee range in the eastern UP is due to somewhat greater loss of habitat combined with less survey effort than in the western UP.

Breeding Biology

Boreal Chickadees are cavity nesters requiring conifer-dominated habitat, preferably wet areas containing spruce (Evers 1991). They begin forming pair bonds while members of winter flocks which start dissolving in late April in central Ontario (McLaren 1975). Pairs nest in existing holes or excavate their own within stumps or trees of a wide variety of species, as long as there is soft heartwood underlying a more solid exterior (McLaren 1975). Their clutch of six to nine eggs is likely laid in late May or early June in the UP (Schinkel 1994). Males feed incubating females for the 15 days it takes for eggs to hatch, after which both sexes deliver food until the young fledge 18 days later (McLaren 1975).

Abundance and Population Trends

The world-wide population of Boreal Chickadee is contained within North America and is an estimated 7,800,000 individuals (PIF 2007). Although this is a large number, this species' estimated total population decline of 73% from 1965 - 2005 (Butcher and Niven 2007) has prompted the National Audubon Society to list it as a "common songbird in decline". Although MBBA II located one additional township with confirmed status yielding an increase of 13%, overall occupations follow the continental trend, down by 23%. The number of UP townships listed as probable, or possible for nesting Boreal Chickadees has declined by 22%, and 31%, respectively since MBBA I. However, this decrease is chiefly confined to the eastern UP population. The total number of townships reporting Boreal Chickadees increased slightly for the western population. Marquette and Menominee counties and all counties to the west reported Boreal Chickadees in 35 townships, up from

Boreal Chickadee *(Poecile hudsonicus)*

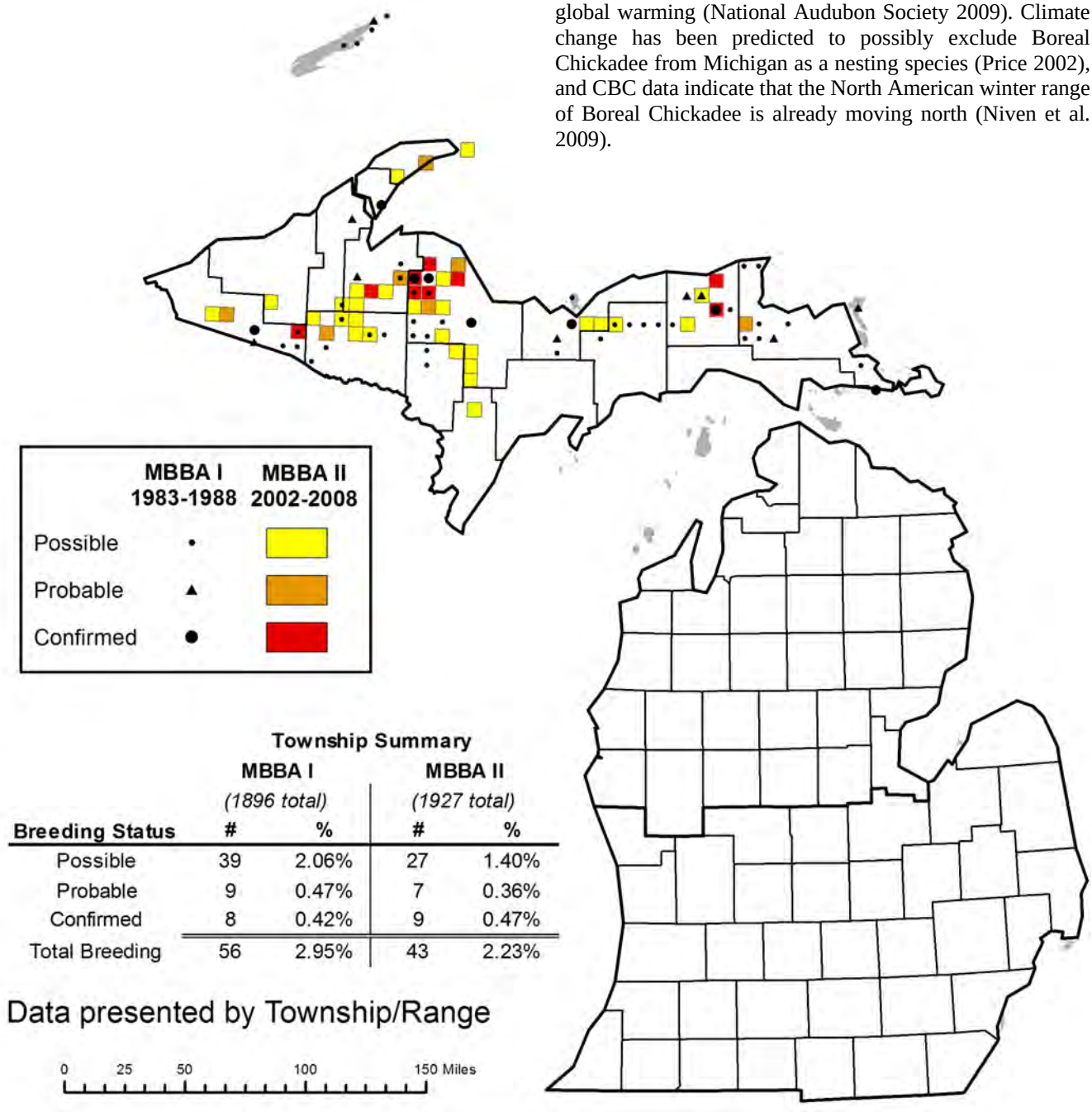
Scott Hickman

32 during MBBA I. In stark contrast, the number of townships within the eastern UP population noting Boreal Chickadees dropped from 24 to eight, a decrease of 75%. No eastern population townships achieved confirmed status, only one was listed as probable, and five as possible.

As explained above for distribution, it is possible that the decrease in eastern UP Boreal Chickadees indicated by MBBA II is due to relatively less survey effort and greater habitat loss in the eastern portion of the UP. While the importance of habitat loss is easily appreciated, the influential effect of survey effort within habitat is often not recognized. Surveying primarily preferred habitat underestimates population declines while primarily surveying marginal habitat overestimates declines (Lawler and O'Connor 2004). Differences in survey effort within habitat type are unknown for either MBBA I or MBBA II.

Conservation Needs

Dependence of Boreal Chickadee upon black spruce/tamarack/fir wetlands makes conservation of these habitats critical to their survival (Merkel 2006). In particular, availability of mature stands for winter habitat has been highlighted as a concern (Hadley and Desrochers 2008). Suspected reasons for decline in this species within North America as a whole include excessive logging and global warming (National Audubon Society 2009). Climate change has been predicted to possibly exclude Boreal Chickadee from Michigan as a nesting species (Price 2002), and CBC data indicate that the North American winter range of Boreal Chickadee is already moving north (Niven et al. 2009).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	39	2.06%	27	1.40%
Probable	9	0.47%	7	0.36%
Confirmed	8	0.42%	9	0.47%
Total Breeding	56	2.95%	43	2.23%

Data presented by Township/Range

Tufted Titmouse *(Baeolophus bicolor)*

Gail A. McPeek



Joan Tisdale ©

With a healthy appetite for sunflower seeds, the Tufted Titmouse is a common feeder bird. In fact, Grubb and Pravosudov (1994) hypothesize that our enthusiasm for feeding birds may be partly responsible for this species' northward expansion. Titmice can reside year round in colder climates thanks to the popularity of winter feeding. Climate change and reforestation have also played a role in its expansion (Grubb and Pravosudov 1994). The Tufted Titmouse is found across eastern North America, west to the Plains and north to northern New England, southern Ontario, Michigan's NLP, and central Wisconsin. The southern portion of its range extends across Texas and into eastern Mexico. In Texas, the gray-crested form of the East meets with the locally-distributed Black-crested Titmouse.

Distribution

The slow and steady northward expansion of the Tufted Titmouse in Michigan is well documented. Gibbs (1879) listed it as an "accidental visitor." Barrows (1912) described this bird as "confined to the southern part of the Lower Peninsula," and that it appears to be "nowhere common." He noted records dating back to 1870 for Eaton and Barry counties, and a nest in Ann Arbor on 24 May 1908. Along with its irregular distribution, Barrows commented that most reports occurred during winter when it was observed in flocks with chickadees, nuthatches, and kinglets.

Forty years later, Wood (1951) categorized the Tufted Titmouse as a resident in the southernmost two to three tiers of counties, and indicated it was "increasing in numbers and spreading northward." He noted winter records as far north as Ogemaw and Charlevoix counties. Zimmerman and Van Tyne (1959) reported confirmed breeding records in Newaygo (1937) and Lapeer (1945) counties, plus a family group seen 8 August 1945 in Benzie County.

The state breeding bird surveys have been timely in continuing to document the continued expansion of the Tufted Titmouse. By the end of MBBA I in 1988, it inhabited most (83%) of SLP townships and one quarter of NLP townships (Eastman 1991). These records provided a clear picture of this species' population increase and major northward expansion since the 1940s. Twenty years later, in MBBA II, titmice were recorded in 88% of SLP townships. There was even an increase in the eastern thumb, though they were still largely absent from eastern Huron County. More remarkable is the greater presence of titmice in the NLP, with breeding evidence in 54% of townships, more than twice that of MBBA I.

In the UP, Atlas data suggest that this species may be reaching its northern limit, at least for now. There were no detections in MBBA I, and only six reports (and no confirmations) in MBBA II. So while the expansion was very dramatic across the NLP, there has been little or no expansion into the UP. The Tufted Titmouse's sedentary nature makes for slow dispersal, and the Great Lakes may deter movement into the UP. There were numerous new reports in the northernmost LP counties but only a few possible records across the lakes in the UP. Other UP observations were near the Wisconsin border, where dispersing birds are not impeded by the Great Lakes.

The Tufted Titmouse resides in deciduous or mixed forests, particularly those with tall trees and with oak and beech. The mast from these tree species is an important winter food (Grubb and Pravosudov 1994). This species has also adapted well to parklands, orchards, and suburban areas with large trees. The UP forests are more coniferous, with a colder climate possibly making them less hospitable. CBC data provide further evidence that titmice have not taken hold in the UP. In 2006-07, there were 2,564 titmice recorded in the SLP, 581 in the NLP, but none in the UP (Palmgren 2007).

Breeding Biology

After spending the winter in small flocks, usually made up of family units, signs of the approaching breeding season are evident in March and early April. These signs include the break up of the flock, mate feeding to strengthen the pair bond, and, of course, the frequent "*Peter, Peter, Peter*" song proclaiming its territory. Studying titmice in Michigan, Pielou (1957) found that young birds formed pairs and dispersed from winter flocks between 21 March and 12 April.

The Tufted Titmouse is a cavity nester, using natural tree holes, old woodpecker holes, or nest boxes. Females do the interior work, adding moss, bark, hair, leaves, and other material to the nest. Witnessing this behavior allows you to distinguish the sexes, which are identical in appearance. Mate feeding is another time; during pair bonding and incubation, the male feeds the female.

May is the primary nesting month in Michigan, but eggs have been reported in late April. Clutches average five to six eggs, incubation takes two weeks, and young remain in the nest for 15-16 days. Once out of the cavity, fledglings are a noisy, feisty bunch, following parents and begging for food.

Tufted Titmouse *(Baeolophus bicolor)*

Gail A. McPeek

This is a great time for observation and breeding confirmation. Juveniles match the plumage of adults with one exception, they lack the black patch just above the beak.

Abundance and Population Trends

Although now widely distributed across Michigan's LP, the Tufted Titmouse is most abundant in the southwest quarter. BBS data consistently show larger numbers in this region. The highest BBS averages, greater than 12 birds/route, for the 1966-2007 period are from Allegan, Barry, Eaton, Van Buren, Kalamazoo, Calhoun, and Berrien counties (Sauer et al. 2008).

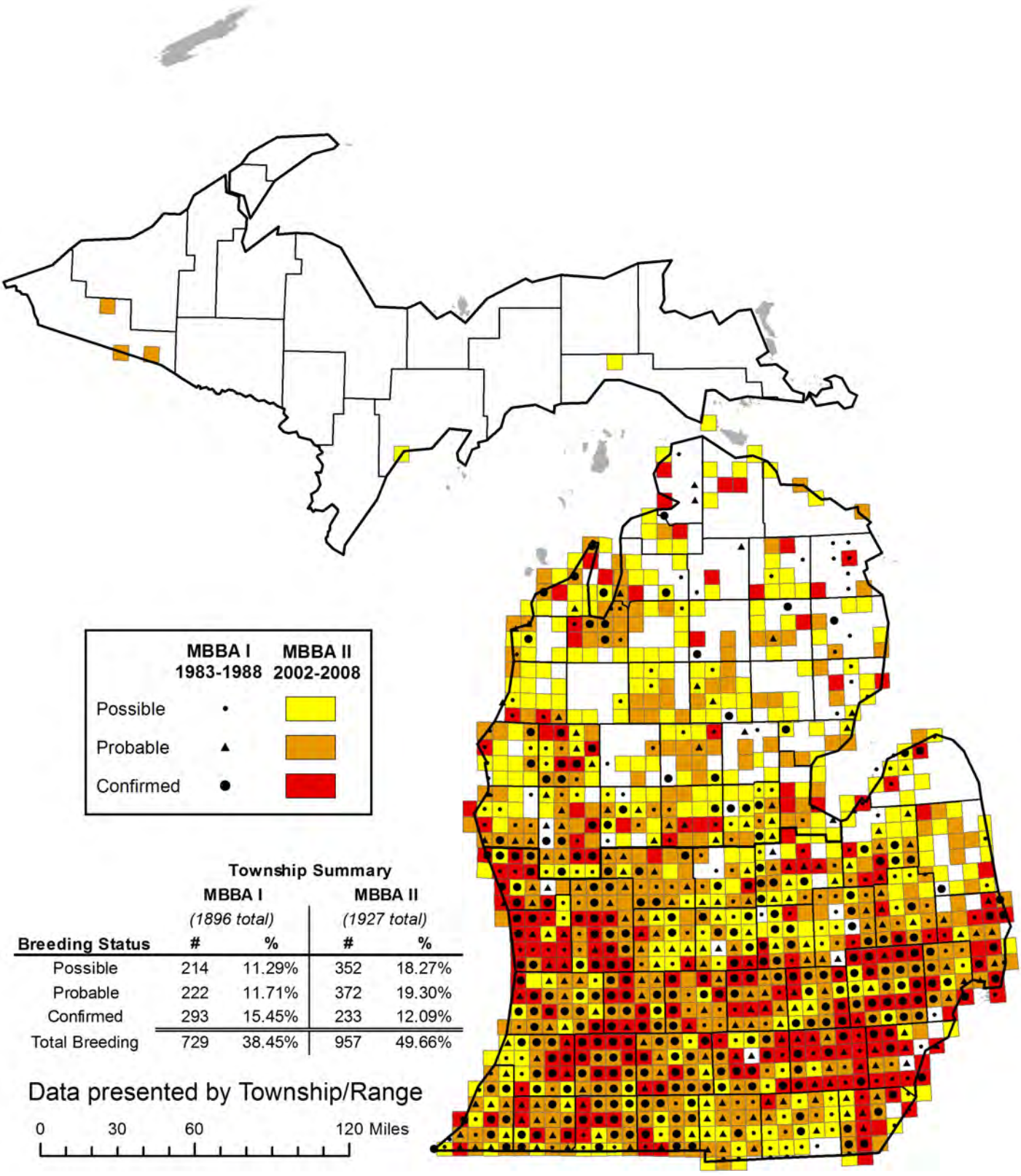
Since the initiation of the BBS, Michigan has seen a steady and significant increase in the titmouse population, at a rate of 3.4% per year (Sauer et al. 2008). Routes with reports increased from 19 during the 1966-79 period to 45 in 1980-2007. Second atlases for Ontario (Read 2007) and New York (McGowan 2008) had findings similar to Michigan. Both reported major changes in distribution, as titmice occupied more blocks and filled in the gaps. Winter records from the CBC provide additional population data for sedentary, year round birds like the Tufted Titmouse. In the 1960s, count totals ranged between 382 and 772, and in the 1970s, between 844 and 1,540. Numbers continued to climb in the 1980s, and by the end of that decade, annual counts were consistently over 2,000. The 1990s saw more increases and all counts between 1994 and 1999 exceeded 3,000 titmice with a high of 3,824 in 1995. Records from the year 2000 to present suggest numbers may be leveling off, with annual counts ranging from 3,831 in 2001 to 2,633 titmice in 2004 (National Audubon Society 2009). Titmice became scarce in Wayne County between 2003 and 2008, possibly due to the presence of West Nile Virus (A. Chartier, pers. comm.).

Conservation Needs

This spunky gray songbird has become a common Michigan resident over the past 100 years and is not a conservation concern. Breeding can be limited by nest-site availability, so it is important to leave trees with cavities. The next few decades will be an interesting period in the continuing saga. Has the Tufted Titmouse reached its northern limit in Michigan, or will climate change and other factors lead to establishment in the UP? MBBA III, along with BBS, CBC, and other data sources will help us answer this question.

Tufted Titmouse *(Baeolophus bicolor)*

Gail A. McPeek



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	214	11.29%	352	18.27%
Probable	222	11.71%	372	19.30%
Confirmed	293	15.45%	233	12.09%
Total Breeding	729	38.45%	957	49.66%

Red-breasted Nuthatch *(Sitta canadensis)* ***Julie A. Craves***



Darlene Friedman ©
Species sponsored in honor of: Julie Craves

The Red-breasted Nuthatch has long garnered affection. Audubon (1840-1844) admired the "activity and industry of this little creature." John Burroughs (1919) commented on one that spent the winter at his feeding table, noting "…his pretty form, and his engaging ways greatly endeared him to us." And Arthur Cleveland Bent (1948) could not resist a warmhearted description which concluded, "…the blue-gray, black, and tawny coloring makes a pleasing artistic combination, and the diminutive tail supplies a piquant effect."

Red-breasted Nuthatches breed in coniferous and mixed forests across Canada, the American west, New England, the Upper Great Lakes, and the Appalachians (Ghalambor and Martin 1999). This species winters mostly within its breeding range, but many move south in irruption years. These events are correlated with poor conifer cone production in northern areas, often in combination with a large cone crop the previous year that resulted in high densities of nuthatches (Koenig and Knops 2001). Irruptions generally occur every two to four years, but the number of Red-breasted Nuthatches that travel south is highly variable from year to year. This annual fluctuation was noted for Michigan even at the turn of the last century (Barrows 1912).

Distribution

Red-breasted Nuthatches are common residents of the UP and NLP of Michigan. Participants in MBBA I found this species preferred mixed forests in the UP, with coniferous and mixed forests used with the same frequency in the NLP. This supports Ghalambor and Martin's (1999) assessment that eastern populations are more tolerant of mixed habitats than western birds.

Barrows (1912) stated that Red-breasted Nuthatches were absent in the SLP, or at most occurred only as scattered pairs. Wood (1951) gave the summer southern range limit as Wexford County. Several decades later, Payne (1983) was able to cite at least a half-dozen summer records from the SLP. In MBBA I, this species was confirmed in six townships in six counties in the SLP. Confirmations roughly doubled in the SLP in MBBA II.

This pattern of increased frequency of southern nesting has also been found in the surrounding region. Red-breasted Nuthatches were historically absent from the southern part of Ontario, but are now only missing from the extreme southwestern portion of the province, with a marked southward expansion noted over the previous 20 years (Cheskey 2007). In Ohio, Peterjohn and Rice (1991) noted this species began to be found more frequently in summer during the 1970s, becoming annual nesters in the 1980s. In Ohio's first Atlas, Red-breasted Nuthatches were found in 12 counties and confirmed in four (Peterjohn and Rice 1991). In the first several years of Ohio's second Atlas, Red-breasted Nuthatches were recorded in 42 Atlas blocks and confirmed in seven, mostly in the northern third of the state (OBBA 2009, data provisional). Finally, although no Red-breasted Nuthatches were recorded in Indiana's first Atlas (Castrale et al. 1998), they were confirmed in one county and recorded as probable in another over the first four years of the state's second Atlas effort (USGS 2009, data provisional).

Breeding Biology

Pair bonds may form at any time during the year between individuals that are residents on the breeding grounds (Ghalambor and Martin 1999). Red-breasted Nuthatches are cavity nesters, excavating their own holes in soft wood, sometimes using existing holes, and occasionally utilizing nest boxes (Hamas 1991, Ghalambor and Martin 1999). Nests are lined with fine grasses, feathers, fur, shredded bark, or other soft materials, and throughout the nesting period both parents apply conifer resin to both the inner and outer surfaces of the entrance hole (Ghalambor and Martin 1999). This is thought to deter predators (although there is not consensus among researchers), and similar plastering behavior is found in other nuthatch species worldwide (Pasquet 1989). Egg laying occurs between April and July, and typically only one brood is initiated per year (Ghalambor and Martin 1999). Clutches are comprised of five to eight eggs although a typical clutch is six eggs (Ghalambor and Martin 1999). Only females incubate the eggs and the male brings food to the female when she is either on or off the nest (Ghalambor and Martin 1999).

Abundance and Population Trends

Estimating population trends for Red-breasted Nuthatches is hampered by a low abundance on BBS routes and their inconsistent numbers from year to year due to their irruptive habits (Ghalambor and Martin 1999). Nonetheless, some signs point to an increase in the numbers of Red-breasted Nuthatches in the state. BBS data show a significant annual increase of 4.4% in Michigan since 1983. They were found in more townships in MBBA II than in MBBA I, with a large increase in the SLP. The percentage of townships in which breeding evidence was found was up 30% overall from MBBA I.

Red-breasted Nuthatch *(Sitta canadensis)*

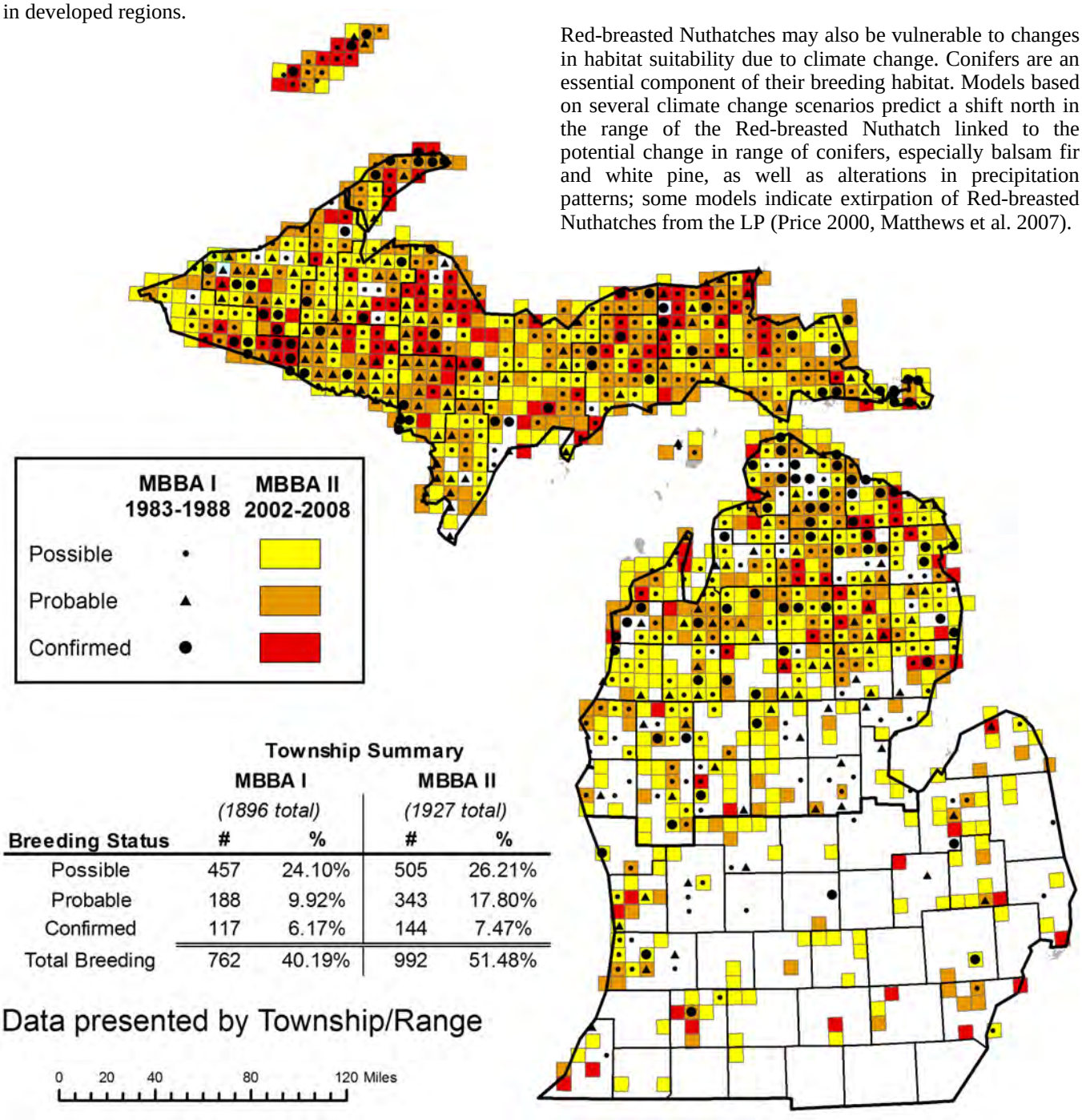
Julie A. Craves

More Red-breasted Nuthatches have been observed during recent Michigan winters as well. The number per party hour on Michigan Christmas Bird Counts during the period covering MBBA II was nearly double what was recorded for the years covering MBBA I (NAS 2009). Participants in Cornell's Project FeederWatch have reported elevated numbers of Red-breasted Nuthatches during winter in the Great Lakes region since 2003-2004 (Cornell Lab of Ornithology 2008). Because Red-breasted Nuthatches will nest in fairly urban settings such as residential areas and cemeteries (Cheskey 1990, Peterjohn and Rice 1991), perhaps birds lingering after winter boom years are responsible for the increase in southern nesting records even in developed regions.

Conservation

Although Red-breasted Nuthatches appear to be increasing in number and expanding their range in Michigan, there are aspects to their life history which may make them subject to declines. These nuthatches usually excavate their own nest cavities. They may be industrious, but they are tiny birds and rely on finding wood soft enough for them to be able to create nest holes. Snag management that diminishes the number of dead or dying trees could potentially limit nest sites and thus reproductive output. This species also prefers to nest in forests that have a wide array of tree species. Timber practices that reduce forest diversity could have negative impacts (Ghalambor and Martin 1999).

Red-breasted Nuthatches may also be vulnerable to changes in habitat suitability due to climate change. Conifers are an essential component of their breeding habitat. Models based on several climate change scenarios predict a shift north in the range of the Red-breasted Nuthatch linked to the potential change in range of conifers, especially balsam fir and white pine, as well as alterations in precipitation patterns; some models indicate extirpation of Red-breasted Nuthatches from the LP (Price 2000, Matthews et al. 2007).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	457	24.10%	505	26.21%
Probable	188	9.92%	343	17.80%
Confirmed	117	6.17%	144	7.47%
Total Breeding	762	40.19%	992	51.48%

Data presented by Township/Range

White-breasted Nuthatch *(Sitta carolinesis)*

Michael J. Hamas



Jerry McHale ©

Species sponsored by: Oakland Audubon Society
And also by: Kelly and Kristen DeWitt

Derived from the Greek, *Sitta* was used by Aristotle as a moniker for a bird that pecked at the bark of a tree. Indeed, with its tail up, the White-breasted Nuthatch maneuvers headfirst down the trunk of a tree as it gleans for insects and spiders in furrows of bark. Widespread throughout North America, White-breasted Nuthatches are typically associated with deciduous forests throughout the eastern half of the continent. As a cavity nesting species, the nuthatch often begins nesting well before leaf out, but surprisingly little is known about the bird's breeding biology. Most research on nuthatches has focused on non-breeding biology including nutrition in winter, foraging and caching, and mixed-species flocking behavior (Grubb and Pravosudov 2008).

Distribution

First documented shortly after Michigan achieved statehood (Sager 1839), the White-breasted Nuthatch has been among the most common breeding birds of southern Michigan since the late 1800s (Barrow 1912). North of the 45th parallel, however, Barrows (1912) considered the species rare, and Wood (1951) reported only scattered records for the UP.

White-breasted Nuthatches are widely regarded as denizens of mature deciduous forests, but in northern Michigan they may also inhabit mixed coniferous-deciduous woodlands. The species distribution in neighboring Ontario is similar to that in Michigan (Bavrlic 2007). Generally found nesting near forest edges or canopy gaps (Grubb and Pravosudov 2008), White-breasted Nuthatches do not appear to be affected by fragmentation, often occurring in residential neighborhoods, parks, and cemeteries. Consequently, it is not surprising that breeding evidence for the SLP remained remarkably similar for MBBA I and MBBA II, despite land conversion and habitat loss.

Breeding Biology

Having a pair bond that is maintained year round (Kilham 1972), male White-breasted Nuthatches vigorously defend their territories from other conspecific males (Kilham 1981). Courtship behavior is most common in March (Peterjohn and Rice 1991) but may begin earlier. Natural cavities and used woodpecker holes, typically high in a large tree, are used for nesting. Birds occasionally nest lower to the ground and may use nest boxes (Harrison 1975). A wide array of materials is used to line the nest (Grubb and Pravosudov 2008). A typical clutch consists of six eggs, and the female alone incubates (Ritchison 1981). Incubation is 12-14 days, and nestlings leave the nest 26 days after hatching, remaining with their parents for several weeks before they disperse (Ritchison 1981).

Abundance and Population Trends

Although data were not uniformly collected during the two atlas periods, populations of White-breasted Nuthatches in Michigan appear secure. Throughout the Upper Great Lakes, BBS data indicate that White-breasted Nuthatch populations appear to be increasing. Increased abundance may reflect enhanced survival due to birdfeeders or milder winters. Moreover, fragmentation of deciduous woodlands, particularly in the SLP, has created an abundance of edge habitat that may support more birds than during pre-settlement.

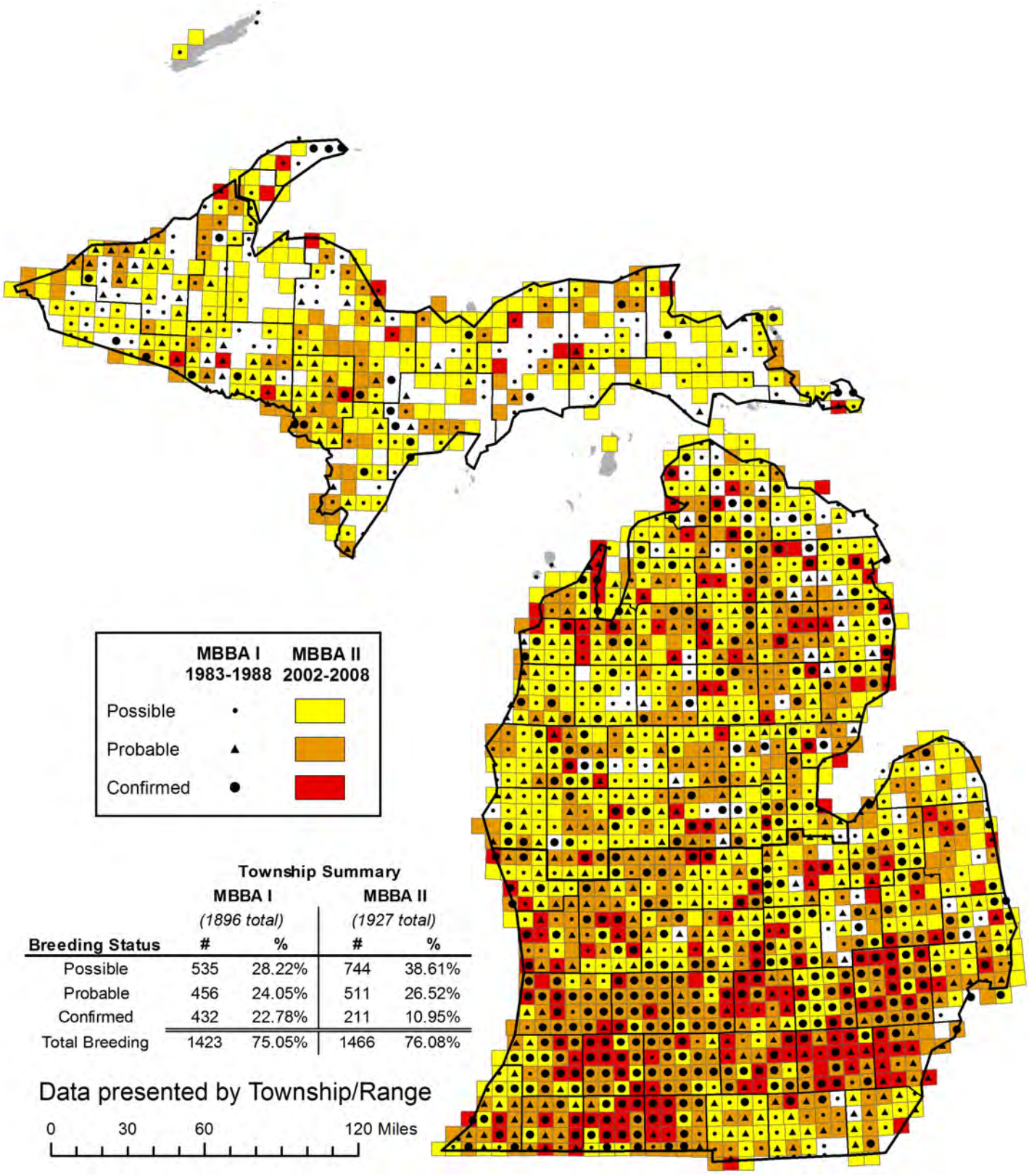
White-breasted Nuthatches were detected in every Michigan county in both MBBA I and MBBA II. While the percentage of townships with breeding evidence was very similar in both Atlas periods, confirmed breeding throughout the state was substantially less during MBBA II. Because they are early breeders, detection of nesting birds may have been overlooked during atlas surveys.

Conservation Needs

While no immediate action appears necessary to protect the White-breasted Nuthatch, the species' reliance on preformed cavities for nesting may limit population growth in some portions of the state. Sound forestry practices providing suitable nesting sites in snags or standing dead trees, and nut-producing trees that provide adequate winter food should ensure the continuing persistence of this common bird.

White-breasted Nuthatch *(Sitta carolinesis)*

Michael J. Hamas



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	535	28.22%	744	38.61%
Probable	456	24.05%	511	26.52%
Confirmed	432	22.78%	211	10.95%
Total Breeding	1423	75.05%	1466	76.08%

Data presented by Township/Range

0 30 60 120 Miles

Brown Creeper *(Certhia americana)*

Michael J. Hamas



Warren Whaley ©

Elusive, cryptic, and unobtrusive are just a few of the adjectives that describe the Brown Creeper. As the only representative of its avian family in North America, the Brown Creeper may be found in a wide array of forested habitats throughout the continent. From Alaska east to Newfoundland and south as far as Central America, the high-pitched call or melodious song of a creeper may be heard in closed canopy forests having an abundance of large dead or dying trees for nesting (Hejl et al. 2002). The species is likely to be heard before it is seen and, given its secretive behavior, its presence may be completely overlooked. While the Brown Creeper may be a year round resident throughout much of its breeding range, breeding abundance is low in most regions (Sauer et al. 2008). In Michigan, creepers occur locally in woodlands in the LP and UP throughout the year, although seasonal abundance can vary especially during migration.

Distribution

First listed for Michigan by Sager (1839), the first historic breeding records for Brown Creepers were noted by Cook (1893) and Barrows (1912). Barrows (1912) described the creepers as a likely breeding bird in every county of the state, and Wood (1951) summarized seasonal records from both the LP and UP.

Detection of Brown Creepers in the SLP exhibited little change between the two atlas periods despite an increase in the number of townships surveyed during MBBA II. Indeed, some of the same counties in which no birds occurred during MBBA I have remained uninhabited. In the UP however, evidence of breeding during MBBA II was 1.5 times greater than the number of creepers detected during MBBA I; the number of townships in which creepers were detected increased from 232 to 361.

Noticeably absent from agricultural areas of the LP, breeding creepers may also be limited by forest fragmentation, especially in the SLP (Hamas 1991). In northern Michigan, Brown Creepers typically occur in coniferous or mixed deciduous-coniferous woodlands. Forested floodplains, cedar swamps, and bogs provide additional nesting habitat for breeding birds.

Breeding Biology

Both adults select the nest site (Davis 1978) which is usually tucked beneath a loose shingle of bark peeling away from the main trunk of a dead or dying tree. Attached to the inner surface of the bark by cocoons and spider egg-cases (Hejl et al. 2002), the cupped nest is comprised of twigs, strips of bark, and vegetation fragments. Clutch size consists of five or six eggs that are arranged lengthwise in two rows (Davis 1978). Only the female incubates. Incubation period and nestling period are approximately 15 days each (Hejl 2002), and fledglings remain in a group associated with parents, sometimes for several weeks (Davis 1978).

Abundance and Population Trends

Agriculture, deforestation, and fragmentation have likely contributed to diminished populations of Brown Creepers in Michigan since European settlement, especially in the SLP. While there are no data on numbers of Brown Creepers in Michigan, the UP appears to be a stronghold for the species, and it is highly likely that numbers are greater than indicated due to the bird's secretive behavior and inaccessibility of some habitats. While confirmed evidence of breeding decreased in the NLP, the overall number of detections increased and several sightings occurred in townships where there was no evidence of breeding in MBBA I. Similarly, breeding evidence in the SLP occurred in several townships where creepers were not detected during MBBA I.

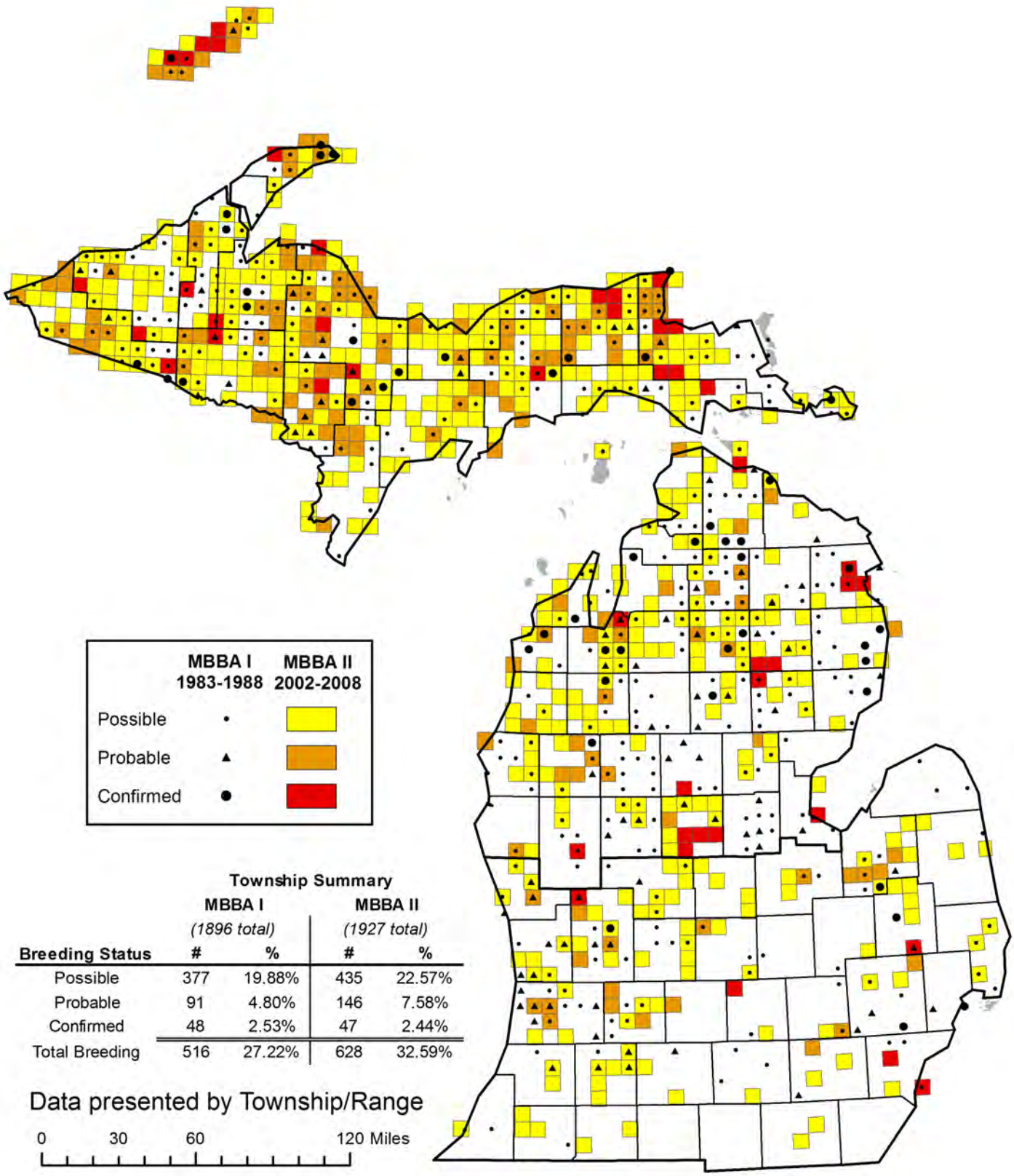
BBS data indicate that Brown Creepers have increased by more than 2% annually in the Midwest since 1983, and the number of birds detected per route in Michigan has been consistently higher than the number of birds detected on BBS routes elsewhere in the region (Sauer et al. 2008). Increased detection of breeding evidence in townships throughout the state during MBBA II suggests that populations in Michigan are secure. Nevertheless, Wiggins (2005) noted that data collection methods for creepers may not provide accurate assessments of abundance, and more accurate censusing methods are needed for this elusive species.

Conservation Needs

Brown Creepers are not currently species of conservation concern in North America. Nevertheless, they are known to be sensitive to forest management practices including logging and fragmentation (Wiggins 2005). Minimum size of suitable forest fragments for creepers can vary (Askins et al. 1987, Fowler and Howe 1987), but an abundance of mature and old-growth trees as well as high canopy cover appear to be key factors defining suitable habitat. Forests throughout Michigan, particularly in the UP, would be ideal for developing monitoring programs for creepers in order to assess the impact of active management and unmanaged natural areas on a species about which we know so little.

Brown Creeper *(Certhia americana)*

Michael J. Hamas



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	377	19.88%	435	22.57%
Probable	91	4.80%	146	7.58%
Confirmed	48	2.53%	47	2.44%
Total Breeding	516	27.22%	628	32.59%

Data presented by Township/Range

0 30 60 120 Miles

Carolina Wren *(Thryothorus ludovicanianus)*

Michael J. Hamas



Willie McHale ©

Even in Michigan, nothing could be finer than to hear the clear ringing song of a Carolina Wren in the morning, particularly after a harsh winter. Although they are resident species throughout their range, Carolina Wrens are vulnerable to extreme periods of cold but can survive if they find adequate food (Leberman 1976, Robbins et al. 1986). Sometimes northern populations decline markedly after severe winters, but gradually increasing winter temperatures over the last century may be responsible for the northward range expansion seen in the mid-1900s (Haggerty and Morton 1995). It is also likely that fragmentation, clearing of forests, and increased bird feeding activity have contributed to range expansion of the species as well as its ability to become established farther north. What was once a rare bird in Michigan is now being seen with ever increasing frequency.

Distribution

First listed for Michigan by Fox (1853), Barrows (1912) summarized continuous but sporadic records of Carolina Wrens in the SLP during the 1800s. Wood (1951) considered the species a rare resident north to Livingston and Barry counties, although there were isolated reports of birds occurring farther north. In both Wisconsin (Cutright 2006) and Michigan, Carolina Wrens are concentrated in the three southernmost tiers of counties. In neighboring Ontario, birds are found south of the Canadian Shield, especially near the shorelines of the lower Great Lakes (Read 2007).

Carolina Wrens' sedentary behavior is illustrated by their long term occupancy of townships in the SLP. Only eight townships in which birds occurred during MBBA I were vacant during MBBA II. Dispersal appears to be through river valleys (Smith 2008) where bottomland habitat may provide access to more reliable food resources, particularly during winter months. In addition, expansion of the species may be related to mild winters and feeders (Orton 1998). Since MBBA I, Carolina Wrens have exhibited a 755% increase in the number of occupied townships statewide.

Breeding Biology

Maintaining territories and pair bonds year round, Carolina Wrens may begin to lay eggs as early as mid-April in southern Michigan (Arnold 1956). Two clutches are typical but a third may be produced in a given year. Nesting sites are diverse: natural cavities, woodpecker holes, birdhouses, among the roots of upturned trees, stone walls, and nooks in human dwellings or outbuildings have been reported (Harrison 1975). Only females incubate, but both parents feed young. The family unit remains together after fledging unless the female initiates another clutch (Haggerty and Morton 1995). Breeding may extend into early autumn.

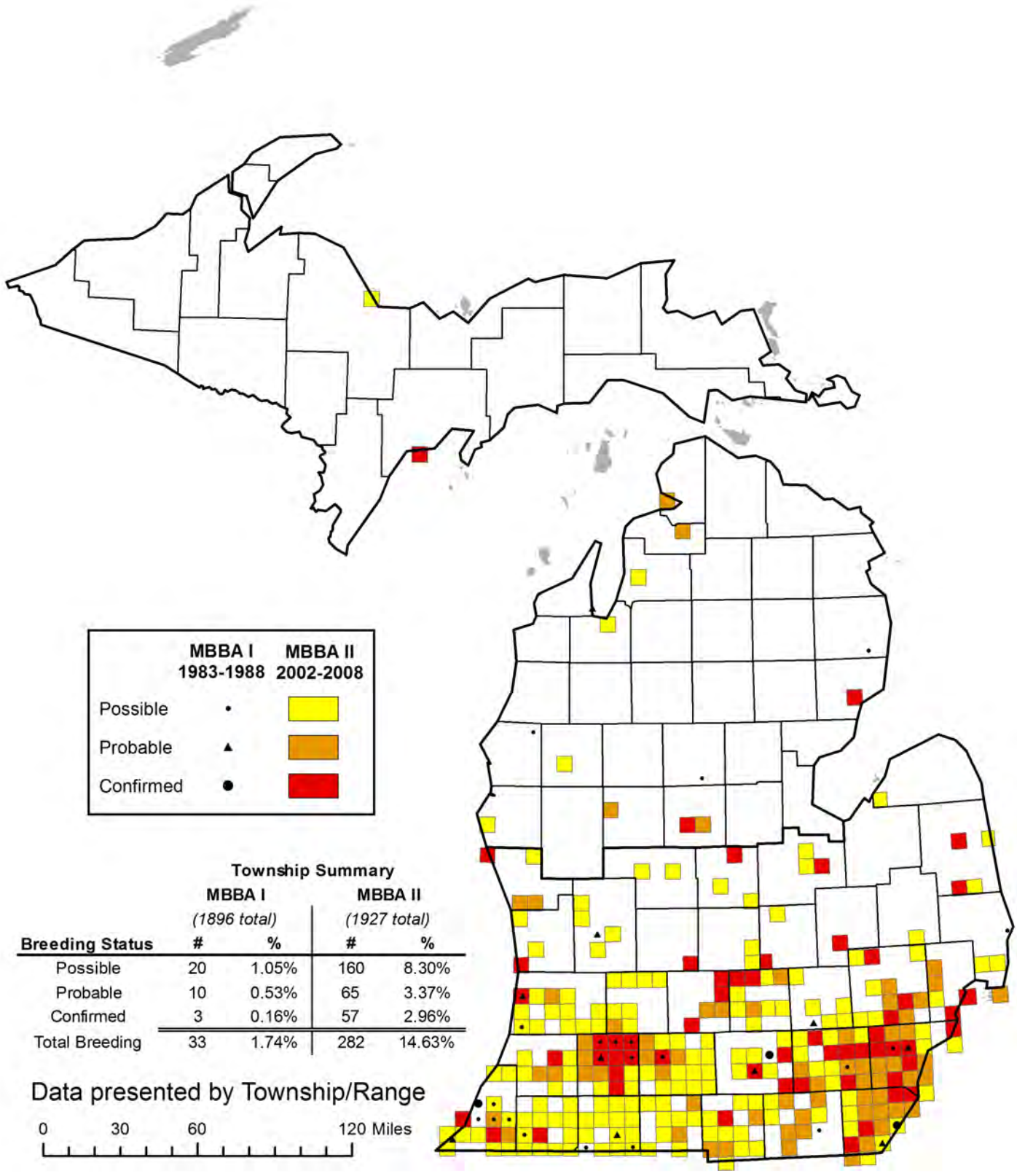
Abundance and Population Trends

Assessing year round status of the Carolina Wren throughout its range in North America has been enhanced by visualization tools developed by the Avian Knowledge Network (AKN) providing a graphic picture of not only distribution but also where the species occurs with highest frequency or not at all (Sullivan et al. 2009). Another measure of population trends includes BBS data which indicate that Carolina Wrens have increased by more than four percent annually throughout the Midwest as well as in Michigan since MBBA I (Sauer et al. 2008). Statewide, there was more than an eight-fold increase in percentage of occupied blocks during MBBA II, and confirmed breeding in the SLP increased by more than 70%. Carolina Wrens are not yet abundant, but populations are increasing, particularly in the three or four southernmost tiers of counties. There were 216 townships in which wrens occurred during MBBA II but not in MBBA I. There was breeding evidence in every township of Monroe County and in nearly every township in each of Washtenaw and Wayne counties. There was no confirmed breeding for the NLP during MBBA I, but confirmed records did occur in Iosco and Isabella counties during MBBA II. Evidence of breeding in the NLP has more than doubled since MBBA I. A single confirmed breeding record from Delta County was one of only two records for the UP; there were no records for the UP during MBBA I.

Conservation Needs

At the periphery of their range, Carolina Wrens in Michigan are likely to experience population fluctuations, particularly after winters characterized by severe cold, heavy snow, and lasting ice. Nevertheless, given the species' apparent ability to disperse and to colonize a wide array of habitats, conservation action is likely not warranted.

Carolina Wren *(Thryothorus ludovicianianus)* ***Michael J. Hamas***



House Wren *(Troglodytes aedon)*

Natalie Dubois



John Van Orman ©
Species sponsored in memory of:
Donald Corser Rhead

Both beloved and notorious, the House Wren's drab plumage belies its feisty nature and bubbling song. A common summer inhabitant of open, shrubby woodlands and forest edges, it easily makes its home in suburban areas and is frequently found nesting in backyard nest boxes. Perhaps the most studied passerine in North America, House Wrens have been the subject of extensive research ranging from aspects of physiology to behavior. Their propensity to puncture and remove eggs from the nests of other birds was the subject of a cantankerous debate in the 1920s over the "character" of the little bird (started by Sherman 1925a, 1925b, and followed by a number of accounts in *Bird-Lore* that same year). The behavior has been implicated in population declines in at least two other species: Bewick's Wrens (Kennedy and White 1996) and Eastern Bluebirds (Zeleny 1985).

Distribution

House Wrens breed from coast to coast, across a broad region extending from the Carolinas, central plains, and northern California northwards into the southern Canadian provinces, returning to the southern United States for the winter months. The historical breeding range likely included Michigan (Boies 1875, Gibbs 1880, Cook 1893) and areas further north (McIlwraith 1894), but began expanding southward in the late 1880s as fragmentation and clearing of intact forest increased the availability of suitable habitat (Johnson 1998). Distributions may be limited by temperature (Kendeigh 1963), which suggests the potential for breeding distributions to be impacted by warming temperatures due to climate change (Zuckerberg et al. 2009). In Michigan, breeding ranges remained fairly constant between MBBA I and MBBA II. House Wrens are widely distributed throughout the LP, being almost ubiquitous in townships across the southern portion of the peninsula and becoming patchily distributed towards the northern LP. Although less widely distributed in the UP, similar patterns are observed with occurrences primarily at lower latitudes in the southern counties adjacent to Wisconsin and restricted distributions further north. A preference for deciduous vegetation, smaller forest tracts, and open woodlands may account for lower frequency of occurrence in the northern LP and UP. During MBBA I, evidence of breeding was detected in 95% of townships in the SLP, 73% of townships in the NLP, and 26% of townships in the UP. In MBBA II, occurrences were 96%, 67%, and 35%, respectively. The atlas data suggest that distributions may have expanded slightly in the UP, but appear fairly stable in the LP based on the township level data.

Breeding Biology

In southern Michigan, male House Wrens arrive in mid to late April, and the first females arrive several days to a week later. Arrival dates may be slightly delayed further north. Upon arrival, males establish territories and begin constructing nests by placing a few to hundreds of small sticks in available cavities. Females select a single nest to line and typically lay a clutch of 5-7 eggs. Throughout their range in Michigan, House Wrens are frequently double-brooded. In Barry County, early season clutches were initiated in May and late season clutches in mid-June through July. Some males obtain second mates, and the occurrence of polygyny depends in part on a male's ability to defend territories containing multiple cavities (Johnson and Kermott 1991). Research on a Michigan population has shown that females mated to males with surplus cavities in their territories lay larger clutches consisting of proportionally more male offspring compared to females mated to males with a single cavity (Dubois et al. 2006). Genetic evidence from an Illinois population indicates that extra pair young (i.e., those sired by a male other than the female's social mate) can be fairly common (Soukup and Thompson 1997).

Abundance and Population Trends

Partners in Flight estimates a population size of 310,000 individuals in Michigan, or 1.6% of the total North American population (PIF 2008). The BBS trend map for the time period from 1966-2003 suggests that populations may have declined over this period in the NLP, but held steady or increased in the SLP and UP (Sauer et al. 2008). More recent BBS estimates from 1982-2007 from routes across Michigan show patterns similar to USFWS Region 3 as a whole, indicating small but significant increases in abundance of approximately 1% per year. Well distributed throughout the Great Lakes states and neighboring Canadian provinces, regional populations appear to be relatively stable. However BBS data indicate modest declines in the Northeast as well as in portions of Minnesota and northern Wisconsin (Sauer et al. 2008). Historically, changes in abundance have been associated with land use changes. House Wrens have likely benefited from widespread fragmentation and clearing of intact forests in the central and eastern U.S., but densities probably decrease in intensely developed areas. Conditions on the wintering grounds can also impact population abundance on the breeding range.

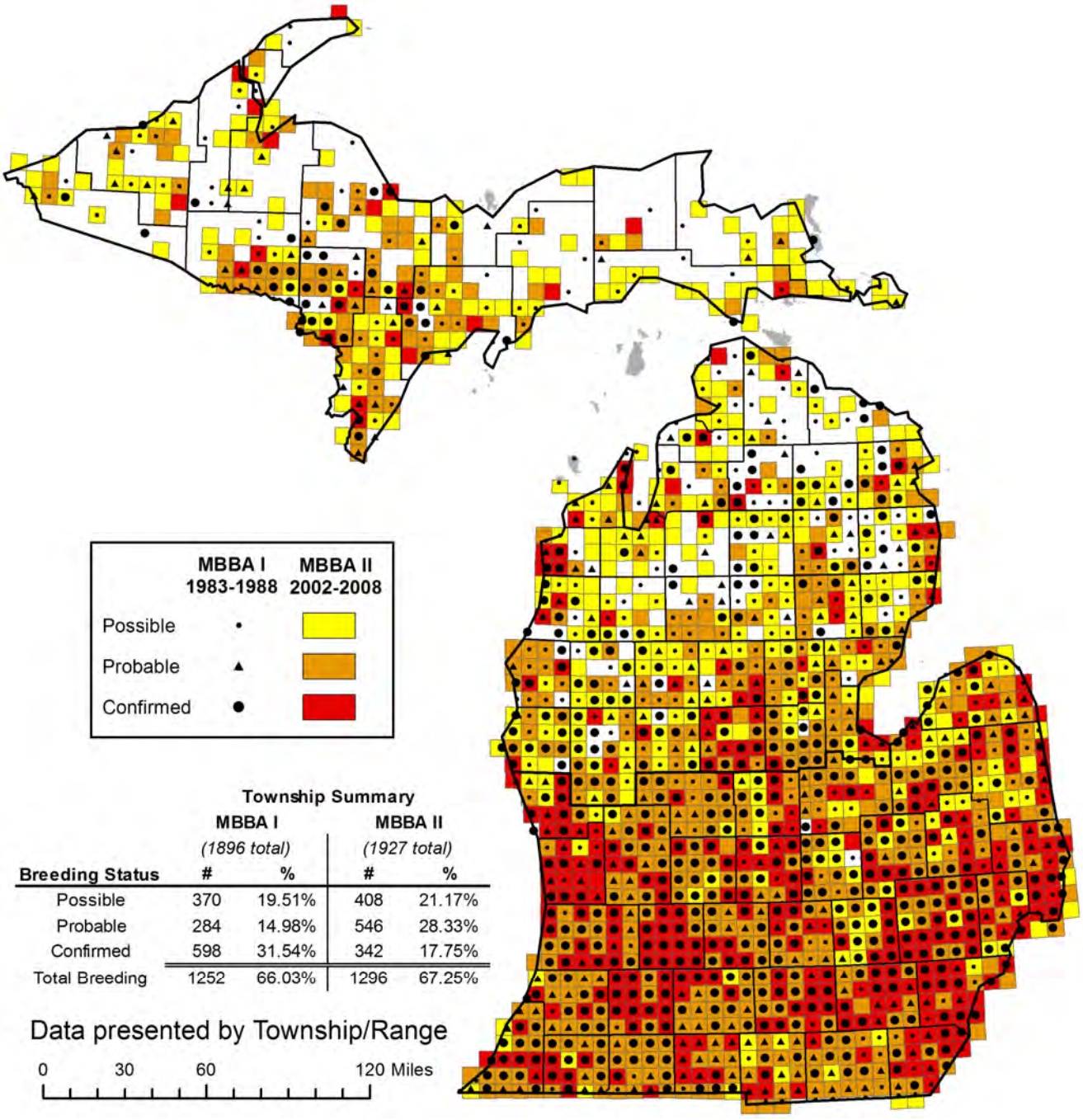
House Wren *(Troglodytes aedon)*

Natalie Dubois

Conservation Needs

Both the global and state status of this species is secure (NatureServe 2009). Populations appear to be stable or increasing throughout much of the species' range in Michigan and no specific management actions are planned at this time. Population size may be limited by cavity availability in some locations. Installation of nest boxes may increase numbers but may also increase interference with nesting success of other species.





Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	370	19.51%	408	21.17%
Probable	284	14.98%	546	28.33%
Confirmed	598	31.54%	342	17.75%
Total Breeding	1252	66.03%	1296	67.25%

Data presented by Township/Range

0 30 60 120 Miles

Winter Wren *(Troglodytes hiemalis)*

Skye Christopher G. Haas



Elizabeth Rogers ©

Sporting a voice larger than the bird itself, this charming sprite is a vocal acrobat with a dizzying song that rings out from moist, dark forests of the north. Arthur C. Bent (1948) was moved to describe this champion songster's utterances as: "Wonderful … charming … marvelous … startling … entrancing … copious, rapid, prolonged and penetrating, having a great variety of the sweetest tones, and uttered in a rising and falling or finely undulating melody…as if the very atmosphere became resonant … [a] gushing melody, which seems at once expressive of the wildest joy and the tenderest sadness". Prior to 2010 Winter Wren (*Troglodytes troglodytes*) included several subspecies, *T.t.hiemalis, T.t. pacificus, and T.t.alascensis*, before each group received full species status, and most data reflects this. Today the Winter Wren (*Troglodytes hiemalis*) has full species status, along with Pacific Wren (*Troglodytes pacificus*) in western North America, and the Eurasian Wren (*Troglodytes troglodytes*). Winter Wrens can be found from northeastern British Columbia and northern Alberta across Canada to Newfoundland, south to Minnesota east to New England and south in the Appalachians to northeastern Georgia (Chesser et al. 2010).

Distribution

There was probably very little change in the status and distribution of the Winter Wren in Michigan from the establishment of mature forest communities after the last glacial period until the mid-19th century, with birds residing over the northern 2/3 of the state, south to the tension zone. It is likely that densities were negatively affected by the extensive white pine harvest of the second half of the 1800s, although unharvested hemlock and cedar communities provided enough refugia to maintain a stable population (Brewer 1991). Barrows (1912) reported the species to be common in the UP and NLP, and nesting evidence was obtained south to Montcalm, Kent and Ottawa Counties. He also speculated that both nesting and wintering were possible in the lower tier of counties, although no conclusive evidence existed.

MBBA I shows a distribution similar to the one described by Barrows (1912). Widespread across the UP, BBS data showed the highest densities could be found in the unbroken forests of the Ottawa National Forest. Their range in the LP was primarily northern, stretching southwest from Lake Huron to the Manistee National Forest to along the tension zone into Muskegon County. Winter Wrens were mostly absent from around the agricultural lands of the Saginaw Bay, though small disjunct populations were found in Tuscola and Lapeer counties. Birds were also recorded from Allegan County; however, breeding was not confirmed in the SLP.

MBBA II showed a slight overall increase from MBBA I in the number of recorded townships (from 32% to 35%), but this increase was only visible in the UP, where the percentage jumped from 62% to 74%. The NLP showed a decrease from 35% to 34% and, in the SLP, the distribution was reduced from 3% to 1%. Breeding confirmation also retreated northward to the next tier of counties with the southernmost confirmed breeding occurring in Crawford and Ogemaw Counties. Confirmation is difficult for this secretive species, and there were only confirmed breeding records for 36 townships, despite being recorded in a total of 669 townships.

Conifer forests, particularly spruce bogs, cedar swamps and old growth pine/hemlock forests are favored habitats, though in northern Michigan, the species can be commonly found in moist mature/old growth mesic deciduous forests, as long as there is a water component (usually a forest stream that provides a cooler microclimate), dead-fall, a lush undergrowth and often glacial debris in the form of boulders and stone outcroppings. Winter Wrens require structurally complex forests, with much dead wood in the form of fallen trees with exposed root masses and are frequently associated with water, particularly streams, but also bogs, swamps and lake edges (Hejl et al. 2002). Also important are broken openings or edges in the forest, and heavily vegetated cover that includes shrubs, ferns, and mosses (Ewert 1991, Hejl et al. 2002).

Breeding Biology

Winter Wrens return to their breeding territories as early as late March, but more typically in early to mid-April (Nelson 1994). In years of substantial lingering snow cover, all birds may not be back on territory until early May. Males arrive first and build one to several nests, of which the female selects one and lines the interior (Hejl et al. 2002). The nest is often domed, and is usually placed within the root structure of an up-turned tree. Nests are also placed in or under creek banks, decaying logs, and mossy substrates and rarely on the branches of a standing or fallen tree (Hejl 2002). Egg laying can begin as soon as late April, and atlas observers in Wisconsin found fledgling young on the early date of 26 May (Wolf and Howe 2006). Clutch size is typically five to seven eggs which are incubated for 14-16 days. Young generally remain in the nest for 19 days, and

are fed by both parents, even after leaving the nest (Hejl 2002, Wolf and Howe 2006). One to two broods a summer are possible, not including renesting attempts (Hejl 2002).

Abundance and Population Trends

Partners in Flight (PIF 2007) estimates that there are 160,000 Winter Wrens in Michigan, and this represents 0.4% of the global population of all former *T.t.* spp. BBS data for eastern North America shows the highest percentage of birds in the Closed Boreal Forests, while some of the lowest numbers are in the Great Lakes Transitional zones (Sauer et al. 2008). National BBS data trends from 1966 to 2008 showed only a 0.9% increase with a more recent trend of a significant annual decrease of 3.7% from 2003-2008, though this dataset includes Pacific Wren (*Troglodytes pacificus*) (Ziolkowski et al 2010).

It is certainly a common bird in appropriate habitat in the UP, and one of the most abundant birds in summer on Manitou Island, Keweenaw County, where in June 2002, 35 were recorded on 21 of 22 point counts. This tiny bird migrates over Lake Superior and has been observed flying in off of the lake in the fall in Keweenaw County (Binford 2006).

Numbers of Winter Wrens seem to be increasing in the state, or at least a higher rate of detection has been established. It is possible that the increase in observations in the UP may be related to better atlas coverage in MBBA II rather than an actual increase in birds. However the obvious decline of birds in the LP, even as forests are reaching a level of preferred habitat maturation as farming practices are abandoned, is troubling.

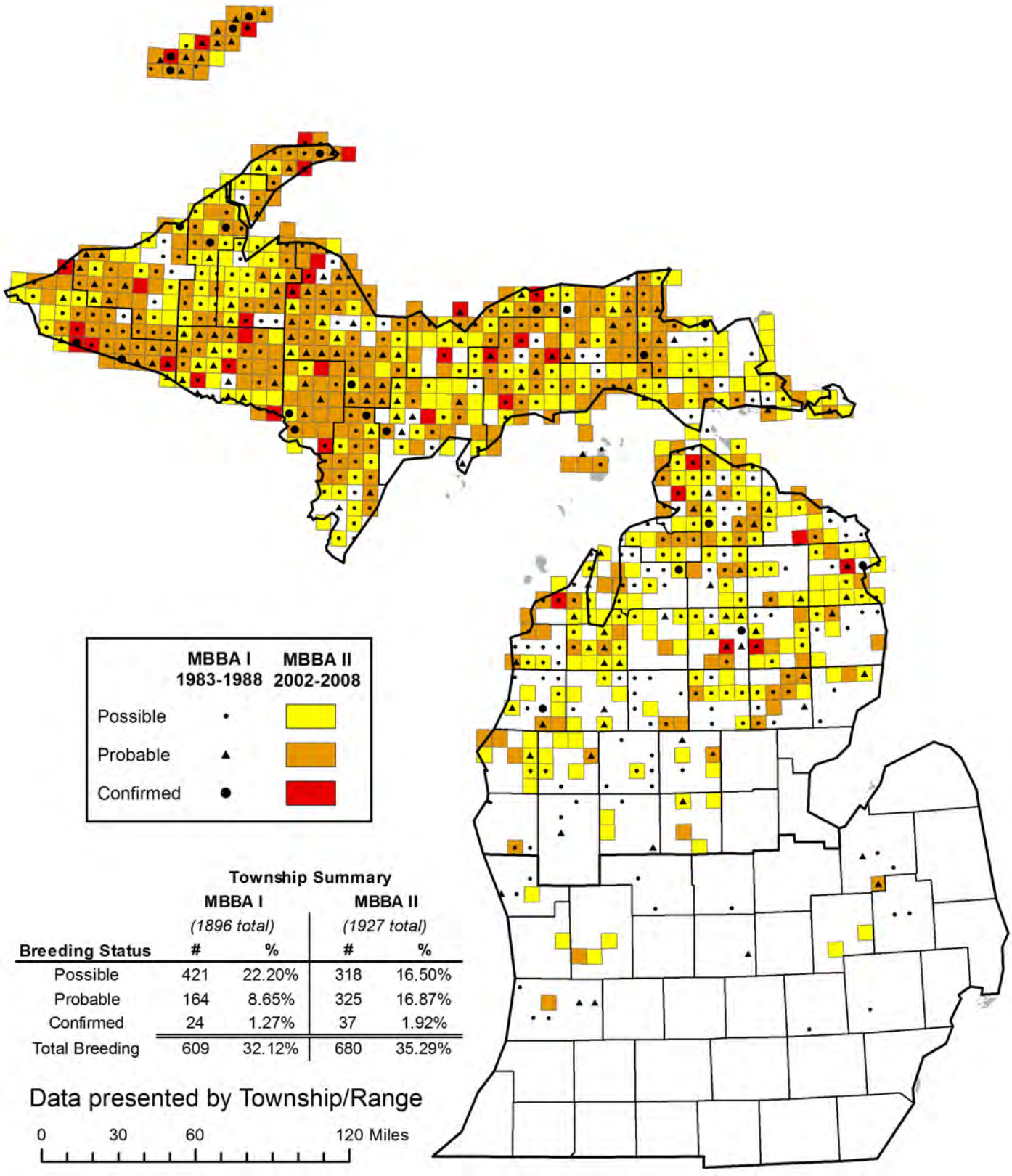
Conservation Needs

The absence of deer on Manitou Island, Keweenaw County, has demonstrated how ample evergreen shrubbery (e.g. yew) can benefit Winter Wrens (Binford 2006; pers. obs.). Deer herds on the mainland can over-browse cedar swamps and other favored Winter Wren breeding locations. Extensive logging also would negatively affect this species, especially in boreal habitat where Winter Wrens are primarily found in mature to old growth forest. Winter Wrens have been shown to be negatively affected by forest fragmentation, and this should be considered in any forest management plan (Hejl 2002, Wolf and Howe 2006).

As a species intrinsically tied to the boreal forests, the Winter Wren is another bellwether of the disappearance of this biome. A Winter Wren's habitat is as delightful as its song, and if both these spectacular joys of the north woods were to disappear, we will have lost much indeed.

Winter Wren *(Troglodytes hiemalis)*

Skye Christopher G. Haas



Sedge Wren *(Cistothorus platensis)* ***Brian Johnson***



Elizabeth Rogers ©

Diminutive in stature and seemingly loathe to fly, and then doing so in a laborious and fluttering fashion, the sprightly Sedge Wren is a rather secretive bird that generally keeps frustratingly out of view in lush vegetation. However, the species boasts a belligerent and energetic demeanor typical to other wrens, and it is very aggressive towards conspecifics and other grassland birds. Males sometimes simultaneously mate with two females (Crawford 1977, Burns 1982), and both sexes destroy the eggs of other Sedge Wrens and other species breeding nearby (Picman and Picman 1980). Although males usually sing from low, semiconcealed perches, they do so persistently, not only continuing later in the day than several other species, but their harsh, staccato rattle is frequently uttered during all hours of the night (and sometimes in a vigorous banter with their neighbors).

Although various nonmigratory subspecies reside in Central and South America, the single subspecies occurring north of Mexico breeds in southern Canada and the northern U.S., from Alberta east to Vermont and south to southern Illinois, with scattered records further east and south (Herkert et al. 2001). The highest densities occur from Manitoba and central North and South Dakota across Minnesota and Wisconsin to Lake Michigan (Sauer et al. 2008).

Distribution

As shown by both Michigan atlases, Sedge Wrens range widely across both peninsulas, though much of the NLP is relatively sparsely populated. Only two counties lacked records during MBBA II and six during MBBA I. The eastern SLP and large areas of the UP were poorly represented during MBBA I, but the species was distributed much more evenly during MBBA II. On a local level, populations demonstrate high motility and low site fidelity.

As its name reflects, the species is highly dependent on dense mats of tall, usually course-bladed grasses and sedges. Moist or ephemerally wet situations are another key requirement, and Sedge Wrens typically avoid arid soils even if the grass grows densely. Although they favor larger, contiguous habitats, area constraints are less important than appropriate vegetative conditions (Dechant et al. 2002). Appropriate natural environments include meadows and bogs, former beaver impoundments, fens, and the periphery of lakes and marshes, but Sedge Wrens eschew the cattail stands and deeper water favored by the Marsh Wren. A variety of native and exotic grasses are tolerated, and human-altered sites, such as hayfields, pastures, and fallow farmland, provide suitable habitat. The species is tolerant of scattered shrubs, but it avoids heavy woody cover. Habitat associates across most of Michigan include Swamp Sparrow, Wilson's Snipe, Savannah Sparrow, and Bobolink. In the UP, Le Conte's Sparrow is a regular cohort, while Willow Flycatcher and Henslow's Sparrow often occur within their home ranges downstate.

Breeding Biology

Sedge Wrens tend to exhibit a staggered arrival chronology and a prolonged breeding season. The earliest arrivals appear in the LP at the end of April, but most establish breeding territories during the second half of May. At Munuscong WMA in the eastern UP, solitary or scattered males arrive around the end of the first week of May. Several more appear during the last ten days of the month, at which time females also appear, but additional arrivals continue to establish territories into late June (B. Johnson, unpub. data). Walkinshaw (1935) located eight nests in June, but he found two in August and concluded that the overall season extended from May to September. At Munuscong WMA, fledglings appear at the end of June, but breeding continues into August (B. Johnson, unpub. data). As testament to the furtive habits of this species, breeding Sedge Wrens were confirmed from only 17 of 399 townships in MBBA I. This confirmation rate (4.3%) was one of the lowest from that effort, and the figure from MBBA II is essentially the same.

Continuing later than most other grassland birds, Sedge Wrens regularly sing into the first part of August at Munuscong WMA (pers. obs.), and Walkinshaw heard them singing during September and October, including at least five near Battle Creek on 22 October 1933 (Walkinshaw 1935). However, when they cease vocalizing, Sedge Wrens become difficult to find, so post-breeding activities are not well documented. According to Michigan Bird Survey records published annually in the *Jack Pine Warbler* (MAS 1945-1989) and in *Michigan Birds and Natural History* (MAS 1994-2009), the last individuals generally depart the state from late-September to mid-October

Abundance and Population Trends

Sedge Wrens readily colonize or vacate areas as conditions dictate (Kroodsma and Verner 1978). Seasonal precipitation, in particular, has a dramatic effect on the suitability of nesting areas, and as a result, Sedge Wrens may occupy certain areas in some years and be entirely absent in others. But even when suitable habitat persists, site fidelity still may be very low. At Munuscong, none of the 25 birds banded in 2006 and 2007 appeared during

subsequent years (B. Johnson, unpub. data). Densities, however, can be very high. In 1934, up to 35 or 40 were singing simultaneously in a 10-acre Calhoun County marsh (Walkinshaw 1935).

The confounding effects of patchy distributions, irregular patterns of arrival, and population shifts from year to year make discerning Sedge Wren population trends difficult. While populations have almost certainly diminished with the historical loss of grassland ecosystems, numbers appear fairly stable in existing regions of appropriate habitat. On a continental level, BBS data have indicated a slight increase of 1.5% annually from 1966 to 2007 and a 1.3% annual increase (with less reliability) from 1983 to 2007 (Sauer et al. 2008). While imprecise, Christmas Bird Count trends, adjusted for birds per party-hour, also revealed an increase over the same time frame (NAS 2009).

In Michigan, the species has been encountered on 30 BBS routes since 1983, which indicates a wide distribution, but with an average of less than one bird per route, the species occurs infrequently. Statewide BBS data reveals a non-significant decrease since 1966 and a non-significant positive trend since MBBA I (Sauer et al. 2008), but the paucity of detections places considerable doubt on these figures. During MBBA II, Sedge Wrens were found in a somewhat larger number of townships (7%), but some of those gains may correlate to greater observer effort. Increases were noted in all three zones, with the UP showing the largest gain, albeit concomitant with an increase in coverage. Whether corroborating poor site philopatry or indicating habitat changes, 181 of the 400 townships having Sedge Wrens during MBBA I (48 UP, 46 NLP, 87 SLP) also had them during MBBA II. Partners in Flight estimates the Michigan population at 43,000 birds, or about 0.7% of the total population north of Mexico (PIF 2007).

Conservation Needs

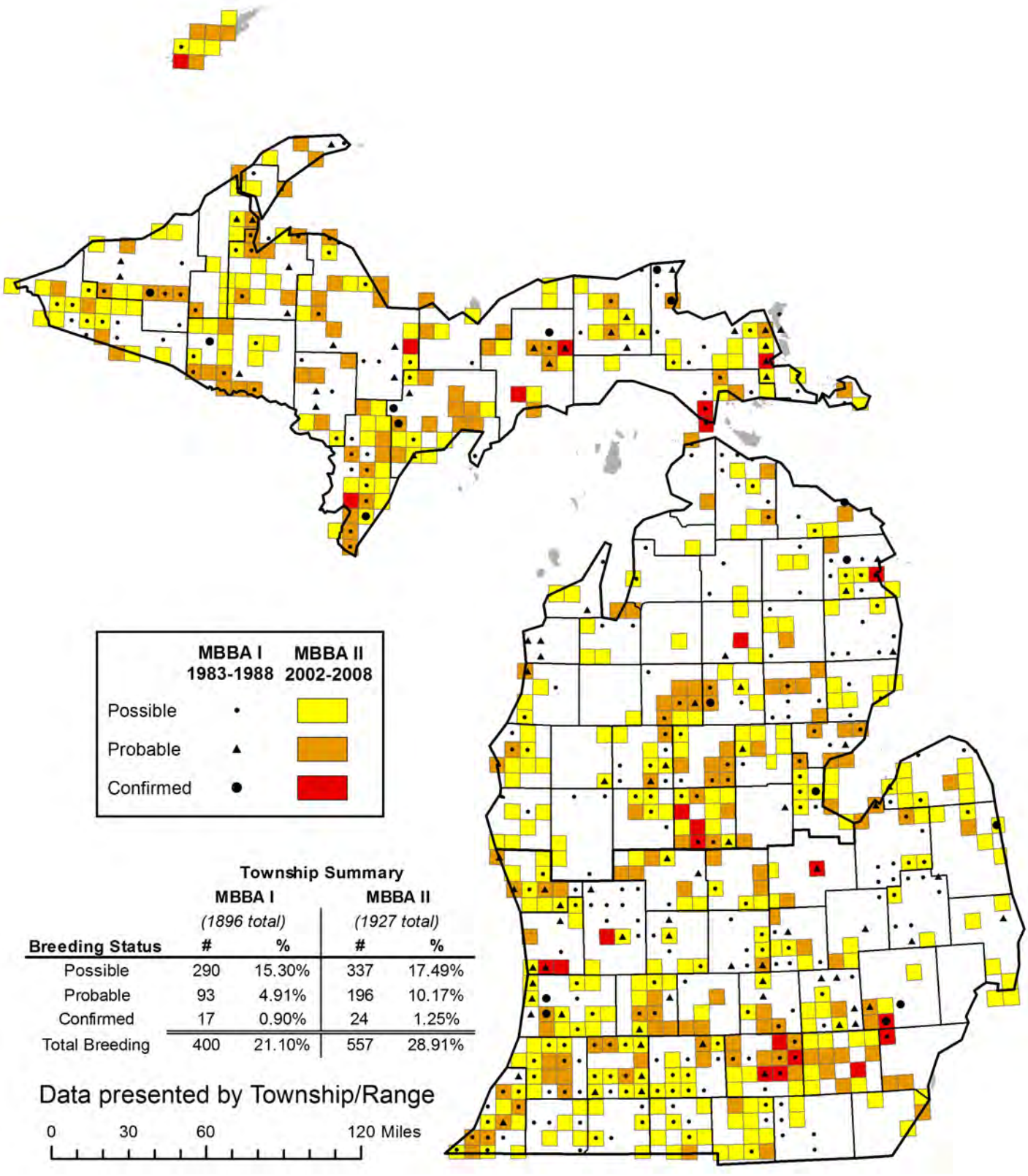
While adverse climatological effects (i.e. moisture conditions) may temporarily constrain population sizes, land practices that contribute to the continued loss and degradation of wet grasslands have a pronounced bearing on Sedge Wren viability. On a local or short-term scale, the effects of habitat alteration are probably minimal, since the species can readily shift to alternate breeding sites. However, sweeping changes, such as land conversion, wetland drainage, extended droughts, and plant succession, place severe restrictions on Sedge Wren densities.

Due to the relatively low numbers of Sedge Wrens and the scarcity of favored habitat, policies and practices that promote and preserve grasslands are vital for the conservation of this species. Relevant preserves and refuges should be managed to curtail the effects of succession and invasive plants, since uncontrolled woody encroachment will degrade nesting habitat within a few years. Periodic disturbances like grazing, mowing, and prescribed burning can be used to control woody and invasive plants and subsequently foster luxuriant growth of grasses and sedges.

Because the species readily uses hayfields and fallow fields, cooperation with private landowners also offers key benefits for the long-term security of this species. A substantial proportion of Sedge Wrens nest later in the season than other grassland species, so those that reside in hayfields are vulnerable to mowing. To reduce losses, harvesting could be postponed until as late as possible, or considering the small territories occupied by Sedge Wrens, the wettest parcels of the field could be left unmowed. Landowner incentives, such as the CRP program, can provide additional habitat for this and other grassland species (Dechant et al. 2002).

Sedge Wren *(Cistothorus platensis)*

Brian Johnson



Marsh Wren *(Cistothorus palustris)*

Thomas Getty

Status: *Special Concern (MNFI)*



Andy Johnson ©

The visually shy but vocally sassy little Marsh Wren stakes his territorial claim in large, open marshes using a highly variable, guttural song that ends in a mechanical chatter reminiscent of a sewing machine. Marsh Wrens breed across the northern U.S. and southern Canada, and along the Atlantic, Gulf and Pacific coasts. They are year-round residents in the Pacific and southern states; birds breeding in the north and east migrate to the southern and western coasts, Mexico, and as far as Central America for the winter months. Marsh Wrens continue to breed each spring and summer in wetlands across Michigan, but populations in Michigan have been gradually declining for decades, a trend that probably began when European settlers began draining Michigan's wetlands.

Distribution

Marsh Wrens continue to breed across their historical range in North America and Michigan. BBS data indicates that populations are holding steady or increasing in the Pacific Northwest and northwestern Great Plains, but are declining significantly in the east, a trend associated with increasing gaps within the eastern range, including Michigan. Publications from the late 1800s through the mid-1900s described Marsh Wrens as abundant in the southern LP and infrequently scattered across marshes in the northern LP and UP. During MBBA I, evidence of breeding was detected in 8% of the townships in the UP, 9% of the townships in the northern LP, and 26% of the townships in the southern LP. The pattern in MBBA II was 5%, 7% and 24%, respectively. These slight declines are not statistically significant, but the long-term trends in BBS data, described below, suggest that they are biologically significant.

Breeding Biology

Monfils (2006) provides an excellent overview of the breeding biology of this species. Marsh Wrens typically arrive in the LP in late April, reaching the UP in mid-May. Males build multiple domed nest "shells" of coarse vegetation in the cattails or reeds, typically over standing water; females select one to line with fine vegetation and feathers. The species is double brooded, with a typical clutch size of four to six eggs. The social breeding system is at least partially polygynous, with two or three females settling on some male territories. Some females engage in polyandrous behavior (i.e., copulating with more than one male), resulting in extra-pair fertilizations. Both males and females engage in the typically wren-like behavior of puncturing and tossing eggs, and even nestlings, from the nests of neighboring conspecifics and heterospecifics. This elicits vigorous aggression from neighboring blackbirds (Bump 1986), and disapprobation from some birdwatchers. Whether and how they might benefit from this behavior remains a matter of speculation and debate among scholars.

Abundance and Population Trends

The Partners in Flight Population Estimates Database uses BBS data to estimate that there are approximately 11,000 breeding adult Marsh Wrens in Michigan, about 0.1% of the estimated global population (PIF 2008). In comparison, the similar Sedge Wren is four times more abundant, and the familiar House Wren is 30 times more abundant.

The slight declines in township presence in Michigan described above, are not statistically significant. However, BBS data show a remarkably steady, gradual decline in USFWS Conservation Region 3, which accumulates to a very significant 8.8% annual decline from 1983 through 2007 (Sauer et al. 2008). The cumulative 9.8% decline in BBS counts in Michigan parallels the trend in Region 3 and it is probable that the trend is not statistically significant in Michigan only because of the small sample size (10 routes in MI vs. 81 in Region 3). Following MBBA I, the Michigan Natural Features Inventory (MNFI) listed Marsh Wrens as a species of Special Concern in Michigan. The number of confirmed sightings recorded statewide dropped by one-third (from 36 to 24) from MBBA I to MBBA II. Nationally, the BBS estimates a significant 3.75% increase in the breeding population over this 24 year period, with the biggest gains in the northern plains and eastern Rockies (FWS Region 6), where historically Marsh Wrens have not been abundant.

Conservation Needs

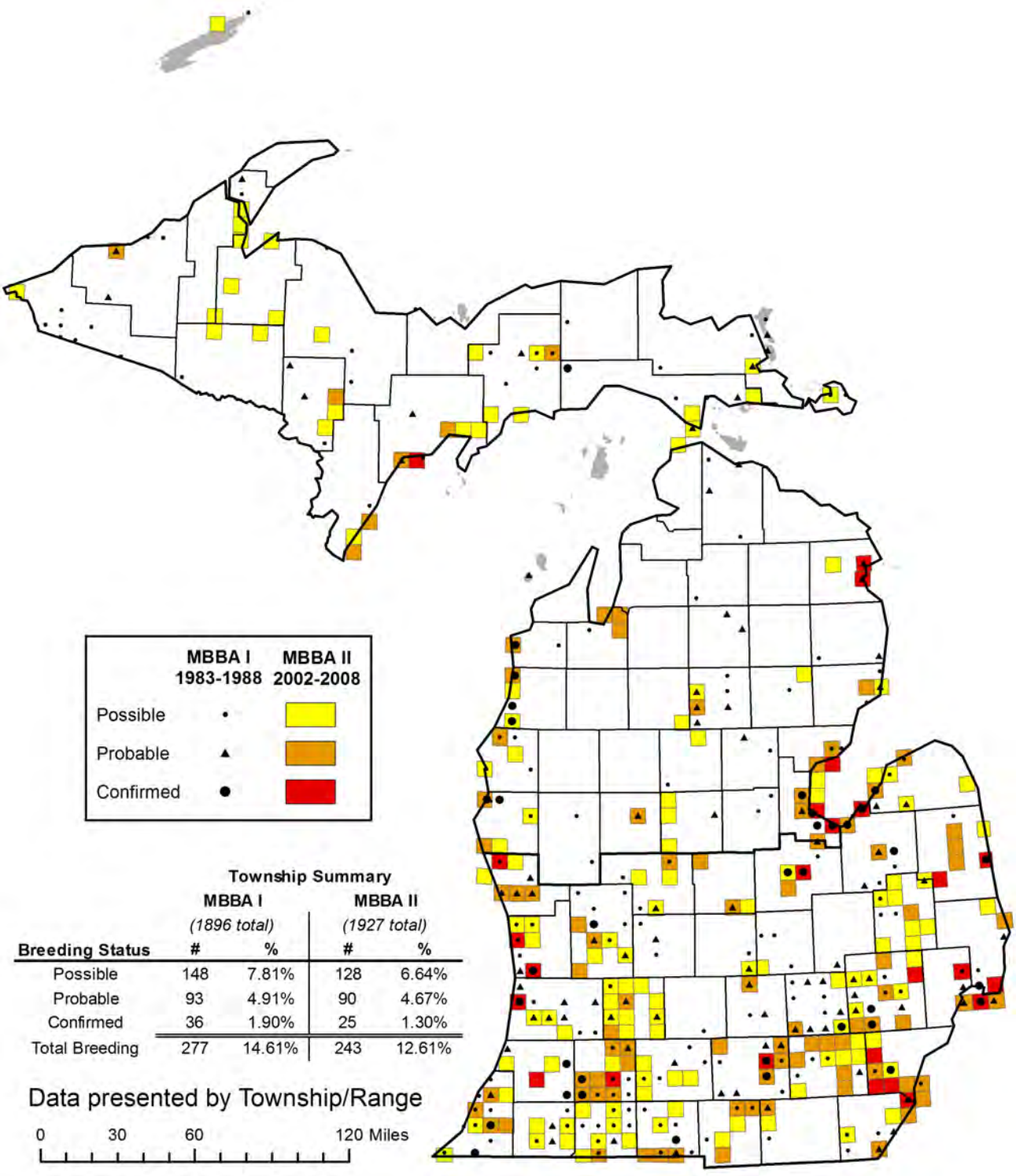
The gentle but relentless declines in BBS counts of Marsh Wrens in Michigan, USFWS Region 3, and the Mississippi flyway do not suggest any obvious dramatic causes. It seems most likely that the decline in the eastern U.S. is caused by breeding habitat loss and degradation. Nationally, marshland (freshwater emergent) habitat area has been relatively stable over the last decade (Dahl 2006). The main source of habitat loss in the Great Lakes has been due to urbanization and rural development. Suitable breeding habitat includes emergent vegetation, and the conversion of

Marsh Wren *(Cistothorus palustris)*

Thomas Getty

Status: *Special Concern (MNFI)*

sedge and cattail marshes to open water reduces Marsh Wren density (Linz et al. 1996). An additional concern is the extent to which invasive plants are degrading the breeding habitat quality of the remaining marshlands. One study found that in mosaics of cattails and invasive purple loosestrife, Marsh Wrens nested only in the cattails (Maddox and Wiedenmann 2005). The MNFI web site provides an excellent overview of the status of Marsh Wrens in Michigan (MNFI 2007). The USGS Northern Prairie Wildlife Research Center web site provides an excellent overview of what we know about the relationship between habitat management practices and Marsh Wren breeding densities and success (Zimmerman et al. 2002).



Golden-crowned Kinglet *(Regulus satrapa)* ***Zach Gayk***



Robert Epstein ©

Often heard but not seen, the Golden-crowned Kinglet's high-pitched *"tsee-tsee-tsee"* call pierces through the verdant, cool, dense spruce-balsam forests across North America. Wintering farther north than any other passerine bird species of its size, the Golden-crowned Kinglet is regularly found in winter from coastal Alaska, south through British Columbia and east through southern Saskatchewan, Manitoba, and into the Maritime Provinces as far north as southern Newfoundland. The heart of its winter range lies across most of the continental U.S., excluding the Mojave Desert region and peninsular Florida. In its breeding range, this species can be found in temperate, boreal and montane coniferous forests from Kodiak Island, Alaska, south through the Pacific Northwest states into central California, and across the Rocky Mountains into southern Arizona and New Mexico at high elevations. In the east, the Golden-crowned Kinglet ranges from the Hudson Bay Lowlands of Manitoba and Ontario through central Quebec and Newfoundland and south into the U.S. in northern Minnesota, Wisconsin, Michigan, New England, and the northern Appalachian Range. It should be noted that throughout coastal regions of its range previously described, the Golden-crowned Kinglet may be a year-round resident. Within Michigan, the Golden-crowned Kinglet is a fairly common breeder in boreal forests of the UP, and the northern quarter of the LP.

Distribution

Kumlien and Hollister (1903) identified this species as a breeder along the south shore of Lake Superior in Ontonagon County pine forests. Barrows (1912) reported Golden-crowned Kinglet as a "not uncommon nester" in the UP and probable nester in the NLP. It is likely that early 20th century distributions have remained similar to those in the 21st century, with the possibility of a range expansion over this time as second-growth coniferous forests matured after the heavy logging of the early and mid-1900s. In MBBA I, the Golden-crowned Kinglet was recorded as at least possibly breeding from 48% of UP townships, 12% of NLP townships, and in less than 2% of SLP townships. In MBBA II, Golden-crowned Kinglet was recorded as at least possibly breeding from 64% of UP townships, 11% of NLP townships, and less than 1% of SLP. While there is very little change to the NLP and isolated observations in the SLP, this corresponds to a 33% increase in UP townships in which Golden-crowned Kinglet was reported. Observers in MBBA II achieved a remarkable 113 township confirmations as compared to the 47 in MBBA I. Though widespread across the UP, the notable scarcity of atlas township observations in Ontonagon and Houghton Counties may be attributable to the abundance of unsuitable farmland and old field in this region. In the UP, confirmations of Golden-crowned Kinglet mirror distribution of mature coniferous forest: western Marquette and eastern Baraga Counties, the Pictured Rocks shoreline of Alger County southeast across Schoolcraft, Luce, Chippewa, and Mackinac Counties, the Keweenaw Peninsula and Isle Royale, and extreme western Gogebic and Ontonagon Counties. In the LP, 65 records were from the NLP, with the remaining eight from the SLP. Confirmations from Saginaw and Washtenaw Counties comprised the southernmost confirmations for this species.

In the UP, Golden-crowned Kinglet is most abundantly found in dense boreal forests of mature white spruce, balsam fir, and white birch, often mixed with scattered white pine (Binford 2006). Also occupied are white cedar-white spruce lowland forests, mixed mesic forests with a high percentage of mature eastern hemlock, and lowland black spruce forests (Galati 1991, Root 1942). Within extensive bogs in eastern Keweenaw County, Golden-crowned Kinglet is most often found along sand ridges of balsam fir and white pine, bisecting lowland black spruce; coastal Lake Superior forests of moist balsam fir, white pine, and white birch are also good habitat (pers. obs.). Less frequently, plantations of red pine, and white and Norway spruce may be inhabited. In the LP, habitat is similar to that in the UP, with pine and spruce plantations providing habitat in the SLP.

Breeding Biology

In Itasca State Park, Minnesota, nest building begins in early May, and the first clutch of eight to nine eggs is laid by 27 May; a second clutch is laid from 22 June-1 July, usually before the first brood fledges (Galati and Galati 1985). Records of adults carrying food to young on 9, 11, 14, 18, and 19 June in Keweenaw County give an indication of nesting dates, but it is uncertain whether these data represent attendance to first or second broods (Binford 2006). Nests are typically placed an average of 15.3 m up in balsam fir, white spruce, and black spruce, near the upper crown of the tree; the cup-shaped nest, which is composed of moss, lichen, cotton grass, and anchored with spider web, and fine white birch bark, is well insulated by overhanging foliage (Ingold and Galati 1997).

Abundance and Population Trends

According to the PIF Landbird Population Estimates Database (PIF 2007), the population of the Golden-crowned Kinglet is 30,000,000 individuals, of which Michigan's

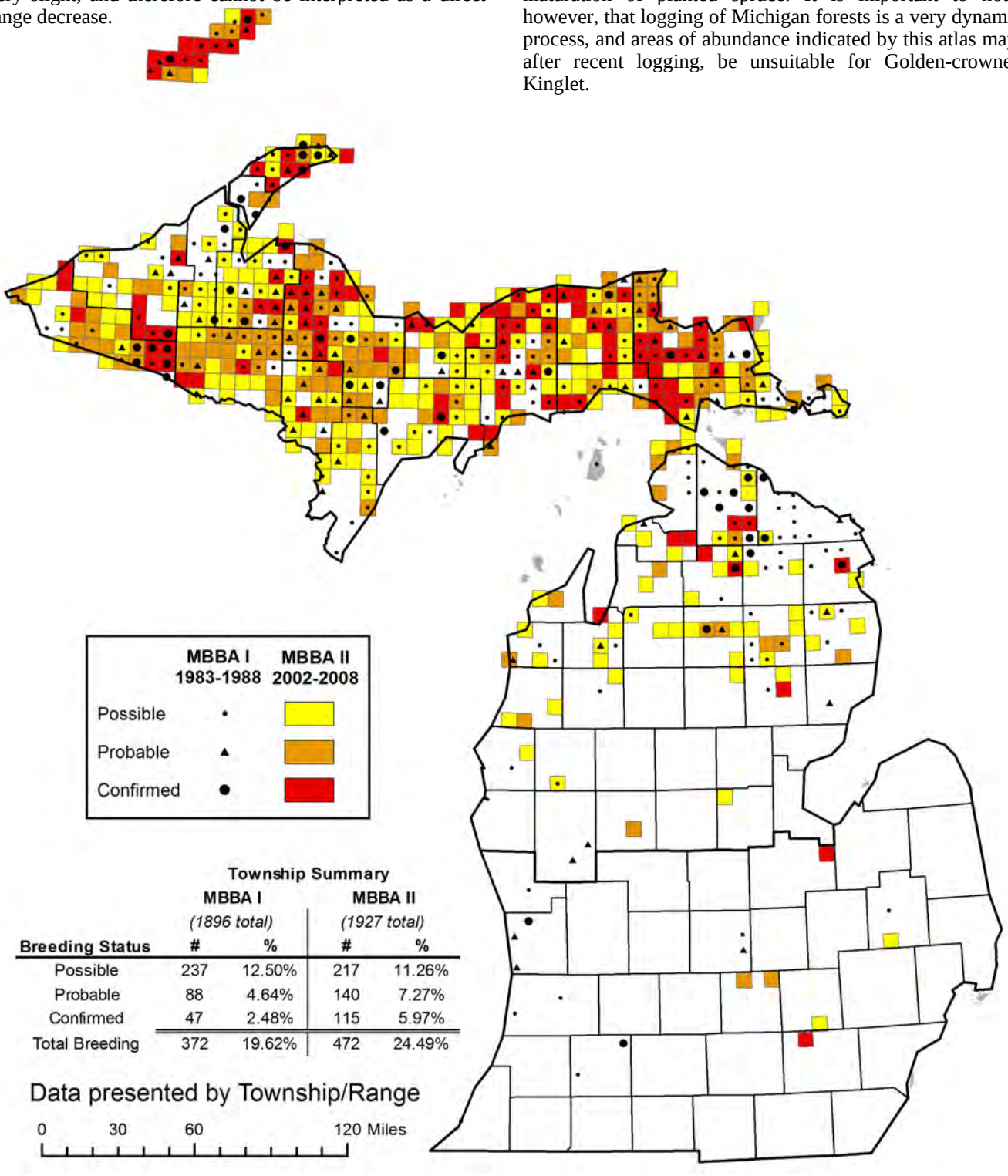
Golden-crowned Kinglet *(Regulus satrapa)*

Zach Gayk

90,000 comprise 0.3% of the total population. In MBBA I, breeding status was noted in 290 and 82 townships in the UP and LP, respectively. In MBBA II, there were 391 township detections in the UP and 73 township detections in the LP. Although these data support a range increase in the UP, this is probably attributable to increased observer coverage and access in the UP rather than a range expansion by Golden-crowned Kinglet. The range decrease in the LP is very slight, and therefore cannot be interpreted as a direct range decrease.

Conservation Needs

Golden-crowned Kinglet is heavily dependent on mature conifer forests, and thus is adversely affected by logging that does not favor retention of mature forest (Franzeb and Ohmart 1978). Additionally, it may require larger trees than other boreal and conifer dependent species. At present, the Golden-crowned Kinglet appears to be maintaining a stable population in Michigan or increasing slightly with the maturation of planted spruce. It is important to note, however, that logging of Michigan forests is a very dynamic process, and areas of abundance indicated by this atlas may, after recent logging, be unsuitable for Golden-crowned Kinglet.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	237	12.50%	217	11.26%
Probable	88	4.64%	140	7.27%
Confirmed	47	2.48%	115	5.97%
Total Breeding	372	19.62%	472	24.49%

Ruby-crowned Kinglet *(Regulus calendula)* ***Zach Gayk***



Willie McHale ©

A familiar migrant across North America in nearly any habitat, this diminutive hover-gleaner retreats to the cool, mosquito-infested bogs of northern Michigan during summer, where its piercingly rich song drifts down from the pointed spires of tall black spruce trees. Wintering across the southern U.S. from the Carolinas to California, and extending into southern Mexico, Ruby-crowned Kinglets may also winter as far north as southern Pennsylvania, Connecticut, and Illinois in the east and Midwest, and coastal Washington and Oregon in the west. The northern limit of its winter range appears to be strongly correlated with the -4ºC January temperature isotherm (Root 1988). In summer it extends from central Alaska south through British Columbia and Washington and into the Rocky Mountain states as far south as southern New Mexico and east across Canada, largely excluding the Prairie Provinces and states into northern Minnesota, Wisconsin, and Michigan, and New England. In Michigan, the Ruby-crowned Kinglet is an uncommon breeder in the UP and a rare breeder in the NLP.

Distribution

The historical breeding range of the Ruby-crowned Kinglet prior to the early 1900s remains largely unknown, but is assumed to be very similar to that of the present range. While Barrows (1912) did not classify Ruby-crowned Kinglet as a Michigan breeder, and the species was described as rare and local in Michigan by Zimmerman and Van Tyne (1959), these status classifications are most likely due to the fact that the Ruby-crowned Kinglet was easily overlooked in the remote boreal forests of its breeding grounds by early observers. In MBBA I, Ruby-crowned Kinglet was recorded as at least possibly breeding from 29% of UP townships and less than 3% of NLP townships, and was uncommonly recorded in SLP. In MBBA II, Ruby-crowned Kinglet was recorded as at least possibly breeding from 28% of UP townships and about 2% of NLP townships. Total atlas township detections remain at 10%. Statewide distribution remains similar between the two atlases, with the majority of confirmations and probable records coming from three distinct regions: the Michigamme Highlands of western Marquette and eastern Baraga Counties, the eastern UP's peatland region comprising northern Luce, Chippewa, and southern Mackinac Counties, and the Keweenaw Peninsula. There was a notable decrease in probable records from Dickinson County between MBBA I and MBBA II. In the LP, reported observations of Ruby-crowned Kinglet are largely clustered in the north central and northwest regions. In MBBA I, only one confirmation was reported in Cheboygan County, while a probable record from Clinton County in the southern LP constituted the southernmost atlas detection in both atlases. In MBBA II, the two sole reported LP confirmations were from Cheboygan and Charlevoix Counties.

In the UP, Ruby-crowned Kinglet is found breeding at highest densities in closed canopy black spruce bog, often mixed with tamarack and near water (Binford 2006). Less frequently, it may inhabit small conifer swamps of white cedar and white spruce, often along creeks, within unsuitable mesic deciduous or mixed forest (pers. obs.). While inhabited black spruce stands tend to be dense (Lance and Howell 2000), territories are often located at the edges of small unforested bog openings. Ruby-crowned Kinglets also appear to prefer mature spruce forests to younger stands in Saskatchewan (Hobson and Bayne 2000). In a survey of Bete Grise Preserve in Keweenaw County, 26 Ruby-crowned Kinglets were detected within the 1,104 acre tract; birds were most frequently found within dense 50-60 ft tall black spruce-tamarack forest with undergrowth of ericaceous plants such as Labrador tea, and blueberry along ridges bisecting unforested fens (Gayk 2008).

Breeding Biology

Pair formation is assumed to take place from late April to the first week of May (Swanson et al. 2008). There is a noted dearth of nest records for this species relative to its uncommon status that most likely is due to its treetop nesting habits. In Ontario, the earliest nest was found on 12 May, with an incubating female on 30 May (Swanson et al. 2008). Adults observed carrying food on 15 June (Houghton County), 24 June (Baraga County), and 2 July (Keweenaw County) in the UP were visiting active nests (Binford 2006). Eleven nests found in Algonquin Provincial Park, Ontario were located at an average height of 12.0 meters within black and white spruce with an average height of 16.0 meters, on limbs 1.7-2.5 meters from the trunk (Simon et al. 2003). The nest, which is located within clumps of dense, overhanging foliage, is constructed largely of mosses, lichens, grasses, and conifer twigs so as to allow for elasticity as the brood grows (Thaler 1976). Adult males may prefer tall extra-canopy spruce higher than the surrounding forest as singing locations (pers. obs.).

Abundance and Population Trends

The PIF Landbird Population Estimates Database estimates the global Ruby-crowned Kinglet population to be 70,000,000 individuals of which Michigan's estimated 40,000 comprise 0.1% (PIF 2007). In MBBA I, there were 177 township detections in the UP and 16 in the LP, with 14 of the LP detections from the NLP. In MBBA II, the UP had 180 township detections in the UP and 12 township detections in the NLP. This data indicates a slight range decrease in Michigan between MBBA I and MBBA II that may simply be attributable to differences in observer effort and coverage between the two atlases. BBS trend data, however, indicates a statistically significant 5.14% decrease

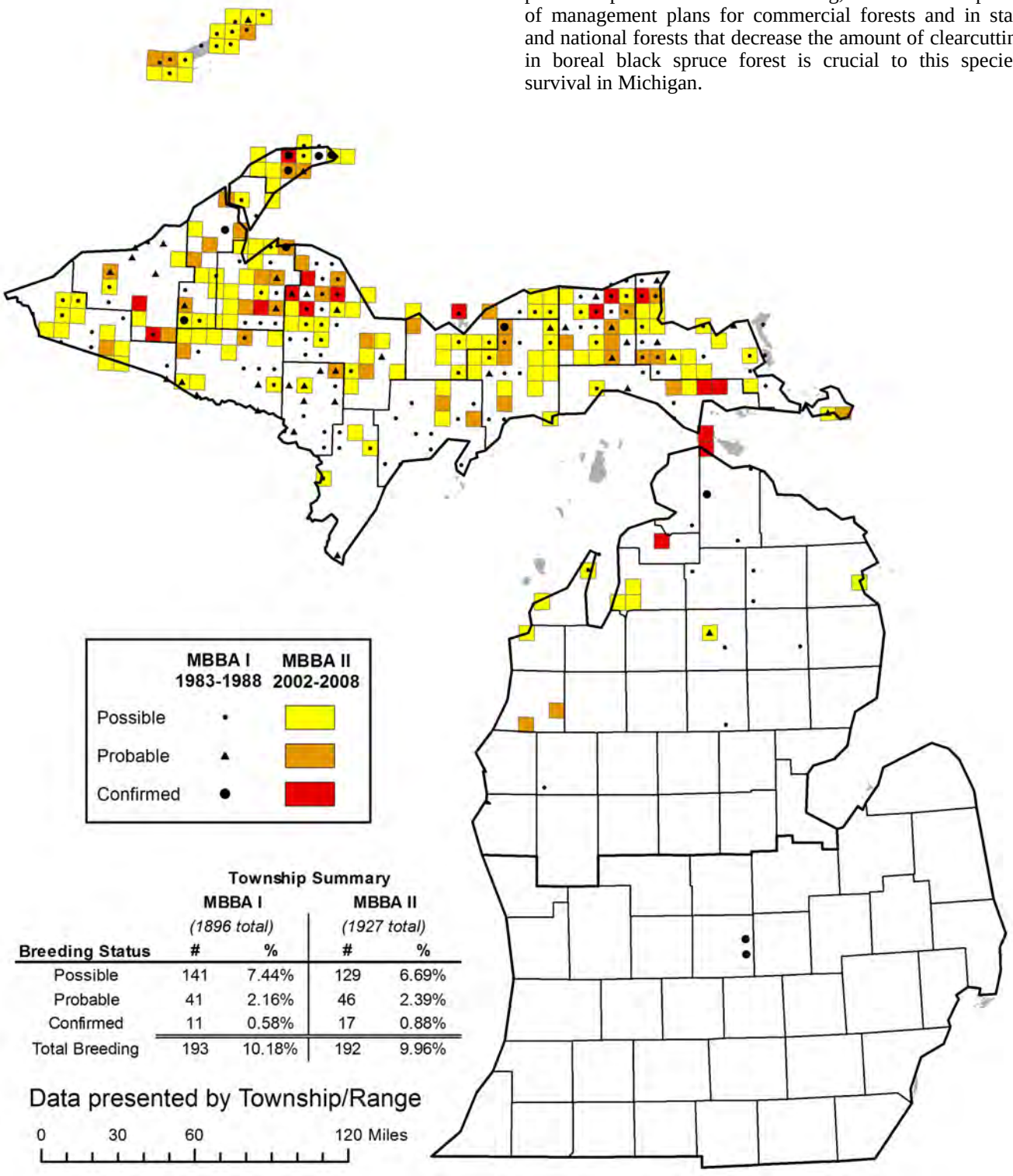
Ruby-crowned Kinglet *(Regulus calendula)*

Zach Gayk

in Ruby-crowned Kinglets reported on BBS survey routes in FWS Region 3, which comprises the Midwest, (Sauer et al. 2008). Because boreal and bog forests are not increasing in area in Michigan, it is likely that Ruby-crowned Kinglet is either remaining fairly constant or decreasing slightly in range and abundance in Michigan.

Conservation Needs

Like a host of passerine species closely tied to boreal forests in Michigan, the Ruby-crowned Kinglet's Michigan distribution and abundance is heavily dependent on the amount of mature, black spruce forest in Michigan. Timber harvest, which tends to consist of clearcutting in the black spruce forest habitat type, has adverse effects on Ruby-crowned Kinglets. The establishment of boreal forest preserves protected from clearcutting, and the development of management plans for commercial forests and in state and national forests that decrease the amount of clearcutting in boreal black spruce forest is crucial to this species' survival in Michigan.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	141	7.44%	129	6.69%
Probable	41	2.16%	46	2.39%
Confirmed	11	0.58%	17	0.88%
Total Breeding	193	10.18%	192	9.96%

Blue-gray Gnatcatcher *(Polioptila caerulea)*

Raymond J. Adams, Jr.



Darlene Friedman ©

In early May, travelers along southern Michigan rivers are sure to see banks lined with the rich rose hue of Redbud flowers as well as the Blue-gray Gnatcatcher. It is these riparian sites where this tiny, sleek, long-tailed gray and white bundle of energy is most common in Michigan. The gnatcatcher is uncommon in the NLP and rare in the UP. The frequent thin nasal call notes or less often the delightful song, a rolling series of thin wheezy notes interrupted by high chips (Sibley 2000), are usually the first indication of this summer resident. Once the sound source has been located, birds are often observed in pairs, calling back and forth while in constant motion looking for food or the best place to locate their tiny cup-shaped, lichen-covered nest. During the summer, the Blue-gray Gnatcatcher can be found from southeastern Canada, northeastern U.S., and the Great Lakes west irregularly to the Pacific Coast and then south to the Gulf Coast, Mexico, and Central America. The northern limit of its range has expanded dramatically in recent years (Ellison 1992).

Distribution

While the species map provides the approximate distribution of the Blue-gray Gnatcatcher in Michigan during the MBBA II period, this species is likely under- represented. This bird has one of the smallest effective survey detection areas for a Michigan passerine as a result of its relatively high weak voice, unremarkable coloration, and diminutive size. The challenge of surveying for this species is compounded by the fact that many birders lose the higher frequencies of their auditory range as they age. Consequently, gnatcatchers can be missed by birders relying only on sound.

This species occurs in a wide range of wooded habitat in Michigan including deciduous forest ranging from dry to wet and young secondary forest to mature forest, especially at forest edges and openings (Adams 1991). Habitat surveys in MBBA I suggest that beech-maple, oak and oak-hickory, elm-ash-red maple swamp, and silver maple-sycamore floodplain were commonly used forest types (Adams 1991). As in the previous Atlas, areas of extensive farmland with small woodlots and heavily populated human environments attract few gnatcatchers. The Blue-gray Gnatcatcher can also be found in pinion-juniper woodland elsewhere in its range, chaparral in the west, and in subtropical scrub, pine woodland, pine savanna and juniper scrub in Mexico and Central America (Ellison 1992).

This inquisitive bird can be found throughout the SLP. However, it occurs sporadically in extensive farmland in the Thumb and Saginaw Bay watershed as well as Monroe and Lenawee Counties, and the urban settings in Wayne County. A comparison between MBBA I and II reveals a trend of northwards range expansion. A similar trend has been documented in Wisconsin (Harriman 2006). In the NLP, the Blue-gray Gnatcatcher is now regular but uncommon north to the northern border of Mason County and east to the north end of Saginaw Bay with a few scattered records north to Leelanau and Alpena counties. Some of the expansion in the NLP appears to follow the Lake Michigan and Lake Huron shorelines. Inland, expansion seems to be associated with lakefront and riparian habitat. In the UP, it appears that the Blue-gray Gnatcatcher has been moving northward from Wisconsin into southern Menominee and Dickinson Counties. There also was a single confirmed record in Delta County. Elsewhere in the UP, the few records were scattered with no probable or confirmed breeding records noted.

At the beginning of the twentieth century, the Blue-gray Gnatcatcher's range in Michigan centered on the three southern tiers of counties (Barrows 1912), but by 1950 it was a summer resident ranging north to Huron and Newaygo Counties (Wood 1951). Northward expansion accelerated between the 1950s and the 1980s when it had become uncommon in the UP and a regular transient at Whitefish Point (Zimmerman and Van Tyne 1959, Payne 1983). During the 1930s it had reached southeast Minnesota and in the 1940s it expanded in the northeastern U.S. (Ellison 1992). The northward expansion of the breeding range in New York was associated with several migratory over flights during the 1940s to the early 1970s (Bull 1974, Ellison 1992).

Breeding Biology

The Blue-gray Gnatcatcher returns to Michigan on average from late April in the LP to early May in the UP (Chartier and Ziarno 2004). In recent years it has become common to find this species before 20 April and it has been seen as early as 30 March. With the advance in spring arrival, the nesting season has advanced similarly. Where Barrows (1912) wrote "nesting chiefly in late May and the first half of June," it is not uncommon today to observe nest building in early May or even late April in the SLP. Re-nesting and second broods extend nesting into the middle of July. Clutch size is typically three to five eggs which hatch in 13 days, on average, with young fledging in about 13 days (Ellison 1992). Cowbird parasitism is noted frequently but varies widely over the gnatcatcher's range.

Abundance and Population Trends

Population estimates for this gnatcatcher are 110,000 birds in Michigan with a continental population of almost 43,000,000 (PIF 2007). MBBA II surveys recorded 3,381 pairs. The percentage of townships in which this species was found increased in all three regions within the state

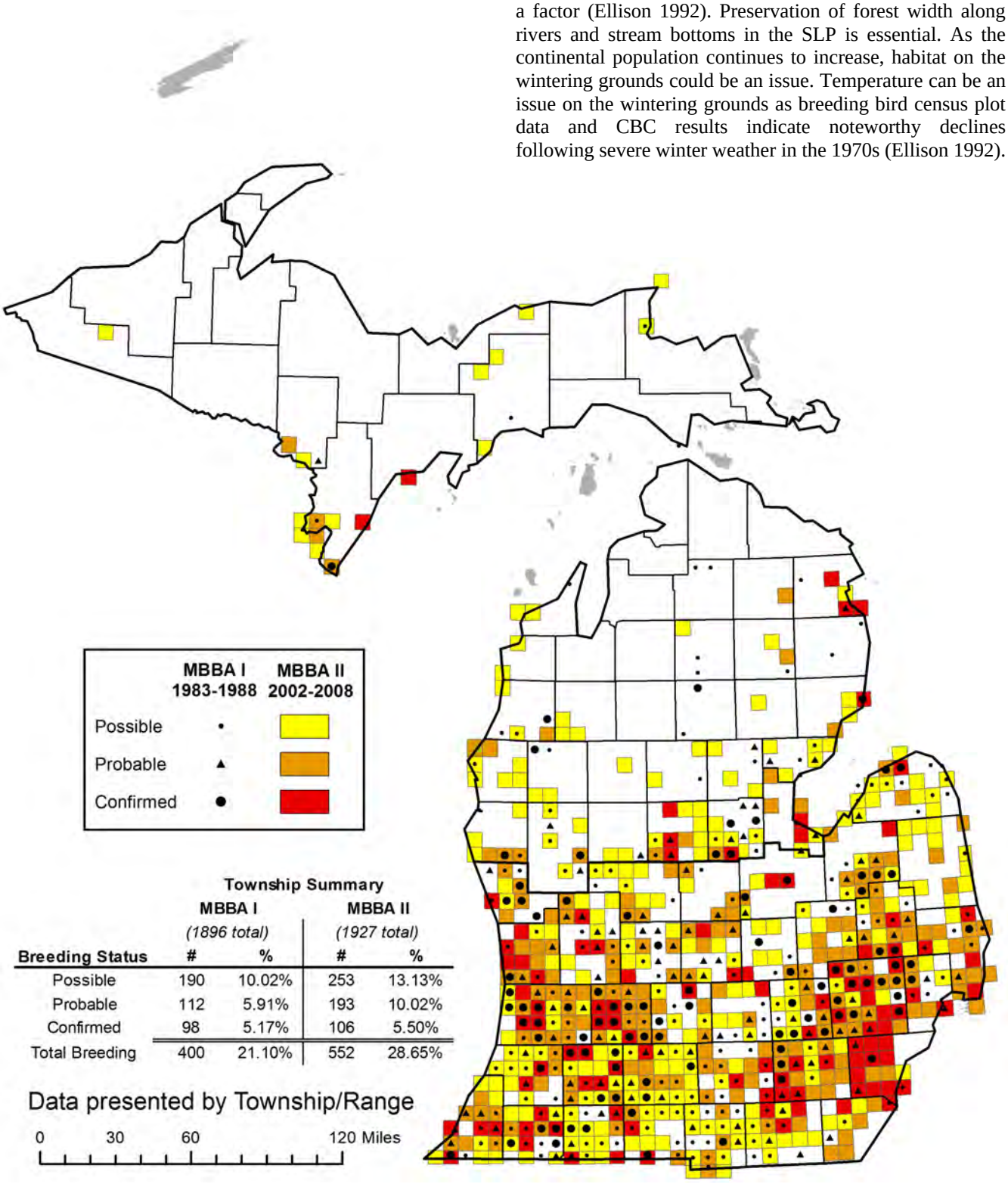
Blue-gray Gnatcatcher *(Polioptila caerulea)*

Raymond J. Adams, Jr.

between MBBA I and MBBA II, from 21.1% of total townships to 28.6%. BBS population trend data from 1966 to 2007 show a statistically significant annual increase in Michigan of about 4%, with mostly stable regional and national trends during the same period (Sauer et al. 2008).

Conservation Needs

The Blue-gray Gnatcatcher should benefit from global warming as Michigan is at the northern limit of its range, and appropriate habitat is plentiful through the NLP and UP. While protection of extensive tracts of forest is considered to be important for the gnatcatcher (Robbins et al. 1989), recent research suggests that microhabitat conditions may be a factor (Ellison 1992). Preservation of forest width along rivers and stream bottoms in the SLP is essential. As the continental population continues to increase, habitat on the wintering grounds could be an issue. Temperature can be an issue on the wintering grounds as breeding bird census plot data and CBC results indicate noteworthy declines following severe winter weather in the 1970s (Ellison 1992).



Eastern Bluebird *(Sialia sialis)*

Ben Pinkowski



Jim Ridley ©

Species sponsored in honor of: Virginia Tisdale

One of our most popular and often-watched songbirds, the Eastern Bluebird is a fairly common summer resident around open woodlands and fields, especially where nest box projects have been placed for its benefit. Winter occurrence in the state is unpredictable and largely dependent on fruit supplies and the severity of the season. The bubbly, cheery song of colorful male bluebirds during March is generally regarded as an unmistakable sign of spring. By mid-April or May the females have settled into incubation duties, and soon both adults are busy feeding young. Multiple broods are common, so the entire bluebird nesting season can be lengthy and pairs can be found with nests from March until late August, a period spanning nearly half a year. In reality, both the bluebird's early arrival and its long nesting season are rooted in intense competition with other hole-nesters for limited nesting cavities, and the bluebird's ability to survive other forms of environmental adversity. Indeed, the species' current broad distribution through Michigan represents a welcomed recovery from low population levels throughout its range in eastern North America during the mid-1900s.

Distribution

Before the late 1800s, Eastern Bluebird distribution was generally believed to be limited to tree-fall and fire-maintained mature oak-pine openings in the eastern deciduous forests (Pinkowski 1977, Gowaty and Plissner 1998). Although bluebirds require relatively open habitats containing few scattered trees and shrubs for breeding, fruit-bearing shrubs such as sumac are important early in the nesting season and during non-breeding times.

Historically, bluebird breeding numbers across the state were probably highest during post-lumbering times in the early 1900s, but dropped markedly after nest cavity competitors such as the European Starling and House Sparrow arrived. Changes in agricultural practices, especially widespread use of pesticides in the mid-1900s caused further decline, which persisted until nesting box projects became popular in the 1960s and 1970s. The continued popularity of nest boxes is generally thought to be responsible for the bluebird's current abundance, although natural cavities created by woodpeckers in dead or diseased woodlands may contribute locally (Pinkowski 1976).

Foraging bluebirds utilize fences, wires, and exposed tree limbs as perches to locate their prey, which is typically seized on the ground. Short, sparse ground cover vegetation is preferred, and extensive areas with tall agricultural crops lacking perches are always avoided. Large nesting territories are needed to locate adequate food supplies, especially in early spring when insects are inactive and sudden cold spells may cause mortality.

Although bluebird sightings during the non-breeding period are often sporadic and vary with winter weather and availability of suitable fruit (Pitts 1979), the species has been more common in Michigan winters during recent years as shown by CBC data. If winter survival is followed by larger numbers of breeding adults (Gowaty and Plissner 1998), then recent mild winters might be expected to favor increased bluebird populations. As noted in MBBA I and again in MBBA II, the greatest breeding numbers overall occurred in the southern LP, where milder winters and more open woodlands are generally most favorable. Overall, breeding numbers showed the greatest increase from MBBA I to MBBA II in the SLP and remained virtually unchanged in the UP.

Breeding Biology

The Eastern Bluebird breeding period begins in late March or early April in the southern parts of Michigan but is delayed a month or more in the north. Weather permitting, multiple broods are the norm, especially in the south where given pairs may raise two broods, rarely three, per season and 8 to 10 or more fledged young are not infrequent (Pinkowski 1979). Only a single successful nest is the norm in the UP and northern LP, but much variation occurs: weather combined with available nesting sites are important factors influencing annual productivity.

Four or five (rarely six) eggs are laid early in the season, and this number is reduced as the season advances from mid-spring into summer (Pinkowski 1979). Both parents feed the young, though male involvement usually begins to decline during July and especially August. The nestling period is long, sometimes reaching up to three weeks if the nestlings are undisturbed. Bluebird family groups are more likely than most other species to stay together after the young reach independence, and the young from early nests are sometimes seen feeding siblings at later nests.

Abundance and Population Trends

Partners in Flight estimates Eastern Bluebird BBS numbers throughout North America at 8.2 million, roughly 80% of its estimated global numbers (PIF 2007). These values far

exceed those of its western relatives, the Mountain Bluebird (5.2 million global) and the Western Bluebird (1.4 million global) and attest to the eastern species' adaptability to different habitats.

In states neighboring Michigan, bluebird BBS data showed an increase of 3.2 percent per year in New York during 1980-2005 (McGowan and Corwin 2008), similar to an increase of 2.6 percent per year across its range (Sauer et al. 2008). Wisconsin and Illinois BBS data show distinct upward trends, with numbers nearly doubling in both states from 1980 to 2000. An even larger increase of 5.7% annually was reported for Indiana (Castrale et al. 1998). The mean number of BBS birds reported in Region 3 since 1983 (5.12) was nearly double that for Michigan (2.56); though the difference has decreased in recent years, both regions show statistically significant increases (Sauer et al. 2008).

In Michigan, both MBBA I and MBBA II data showed the largest numbers of bluebirds in the SLP, especially in the southwestern parts of the state, where sandy soils resulting in more open terrain and milder winters due to the proximity to Lake Michigan are thought to be favorable factors. Overall numbers decrease to the north, but proportional numbers per block and township did not vary much between the two atlas projects. Among township blocks, the SLP region showed a sizeable 12% increase in total reports from MBBA I to MBBA II (only 1% for blocks), while other regional totals remained virtually unchanged.

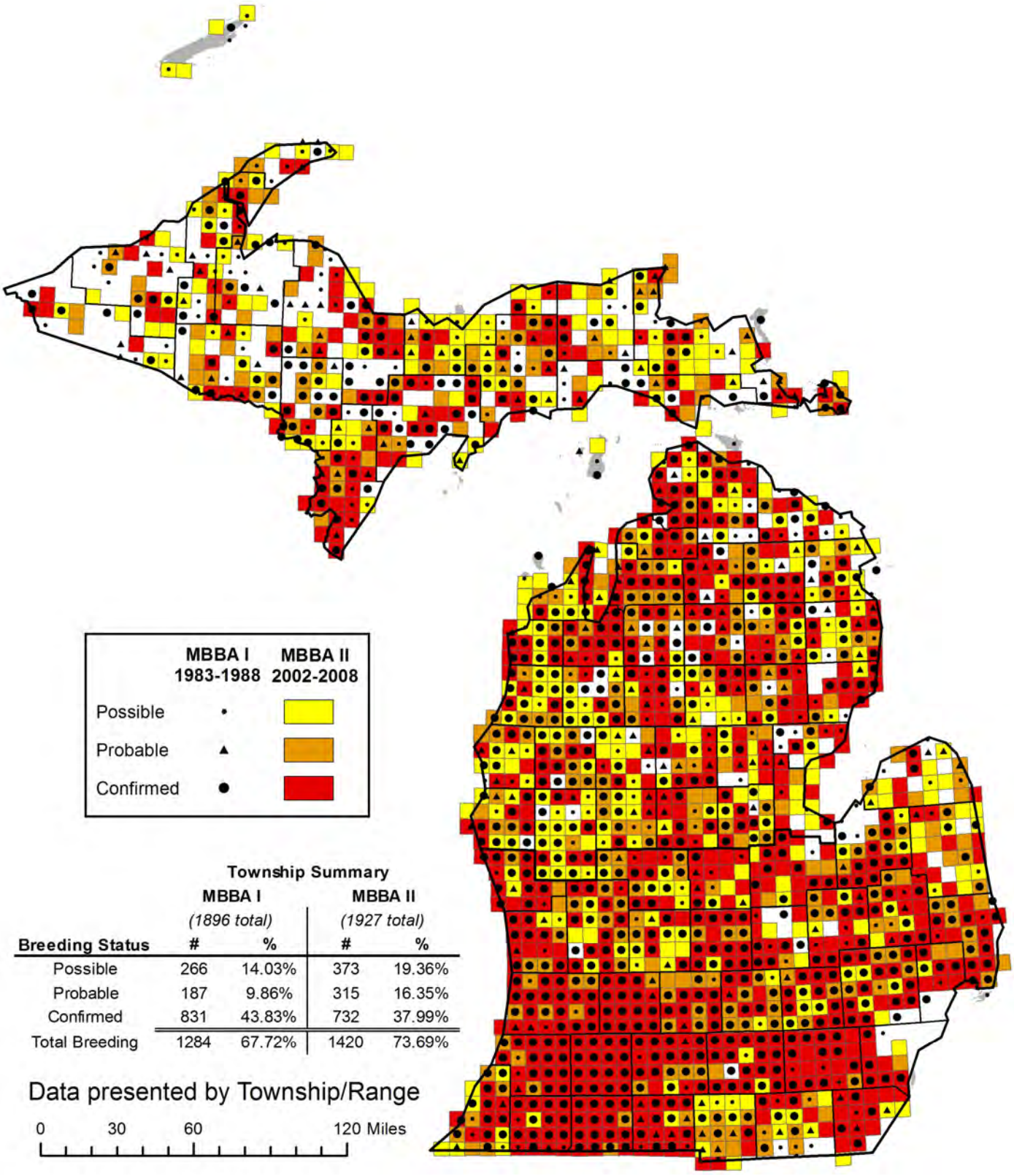
Conservation Needs

Most bluebirds now nest in boxes and their success is closely tied to the availability of nesting boxes (Pinkowski 1976). Local clubs need to continue promoting nest box trails in appropriate habitat while discouraging use of these boxes by House Sparrows. Recent evidence (Gowaty and Plissner 1998) suggests that predation at nest boxes may increase by as much as 11% on the first day after human visits, so measures to reduce human scent that attracts predators may be required. Urbanization and pesticide use continue to pose local detriments to bluebird populations.

Education regarding nest box conservation projects has been largely responsible for the restoration of the Eastern Bluebird across Michigan in the last 25-30 years. The continued well-being of this popular songbird is dependent on our continuation of this very important effort.

Eastern Bluebird *(Sialia sialis)*

Ben Pinkowski



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	266	14.03%	373	19.36%
Probable	187	9.86%	315	16.35%
Confirmed	831	43.83%	732	37.99%
Total Breeding	1284	67.72%	1420	73.69%

Data presented by Township/Range

0 30 60 120 Miles

Veery *(Catharus fuscenscens)*

Mike Bishop



Darlene Friedman ©

The otherworldly, "descending-spiral" song of the Veery is often the only evidence one has of this common, but elusive, forest breeder. Nesting in dense thickets of damp forests and wooded marsh edges, male Veeries rarely expose themselves on conspicuous perches to sing even when defending a territory (Bevier et al. 2005). Their breeding range extends over much of southern Canada and the northern U.S. following both the Appalachian and Rocky mountain ranges south at altitudes generally above 900 m. Veeries winter in a relatively small region of south central and southeast Brazil (Remsen 2001).

Distribution

Other than population losses in the SLP due to urbanization and agriculture, Veery distribution throughout the state has changed little since before European settlement (Winnett-Murray 1991). Veeries can still be found in most wet, wooded areas in Michigan. While the southern border of the state roughly conforms with the southern border of its breeding range, the lower frequency of detections in this part of the state are just as likely attributable to human alteration of habitat as to latitudinal changes in the ecosystem.

Since Veeries prefer second growth forests with a well-developed shrub layer, they are amenable to the abundant regenerating forests found throughout Michigan. However, because they are area sensitive, many of the smaller, fragmented woodlots throughout the SLP are inadequate for breeding purposes (Bevier et al. 2005). Consequently, they are best represented in the more extensive forest tracts of the NLP and UP.

Breeding Biology

Veeries arrive in the LP by mid-May and the UP by late May. Breeding occurs between late May and late July, and fledging is completed by late July. Veery nests usually are found on or near the ground deep within thickets providing cover and reducing detection. This is supported by the fact that breeding confirmation was reported for just 3% of townships surveyed. Migration of adults begins around mid-August, reaching its peak in mid-September.

While confirmed breeding evidence was difficult to obtain, probable and possible breeding evidence was abundant due to their easily detectable song. Of the townships surveyed, 22% gave probable evidence of breeding and 34% gave possible evidence. Due to these factors, it is likely that the estimates of breeding confirmation fall short of the actual number of breeding birds.

Abundance and Population Trends

BBS data show that Veeries are in decline throughout their geographic range, with two states being exceptions. Michigan is one of these (West Virginia the other), with BBS data for Veery showing an increase since 1966, though markedly slowing from 1980 to 2007. A closer look at BBS data during 1966-1996, using the estimating equations procedure (Link and Sauer 1994), shows the SLP, the tip of the mitt and the eastern UP exhibit a population increases of greater than 1.5% per year while the western UP and the central and western NLP exhibit a decrease of greater than 1.5% per year (Sauer et al. 2008). Reasons for Michigan's statewide trends in Veery populations as reported by the BBS are not obvious. For the state of Michigan as a whole, there is not a significant population trend during the two atlas periods and intervening years (1983-2007) (Sauer et al 2008).

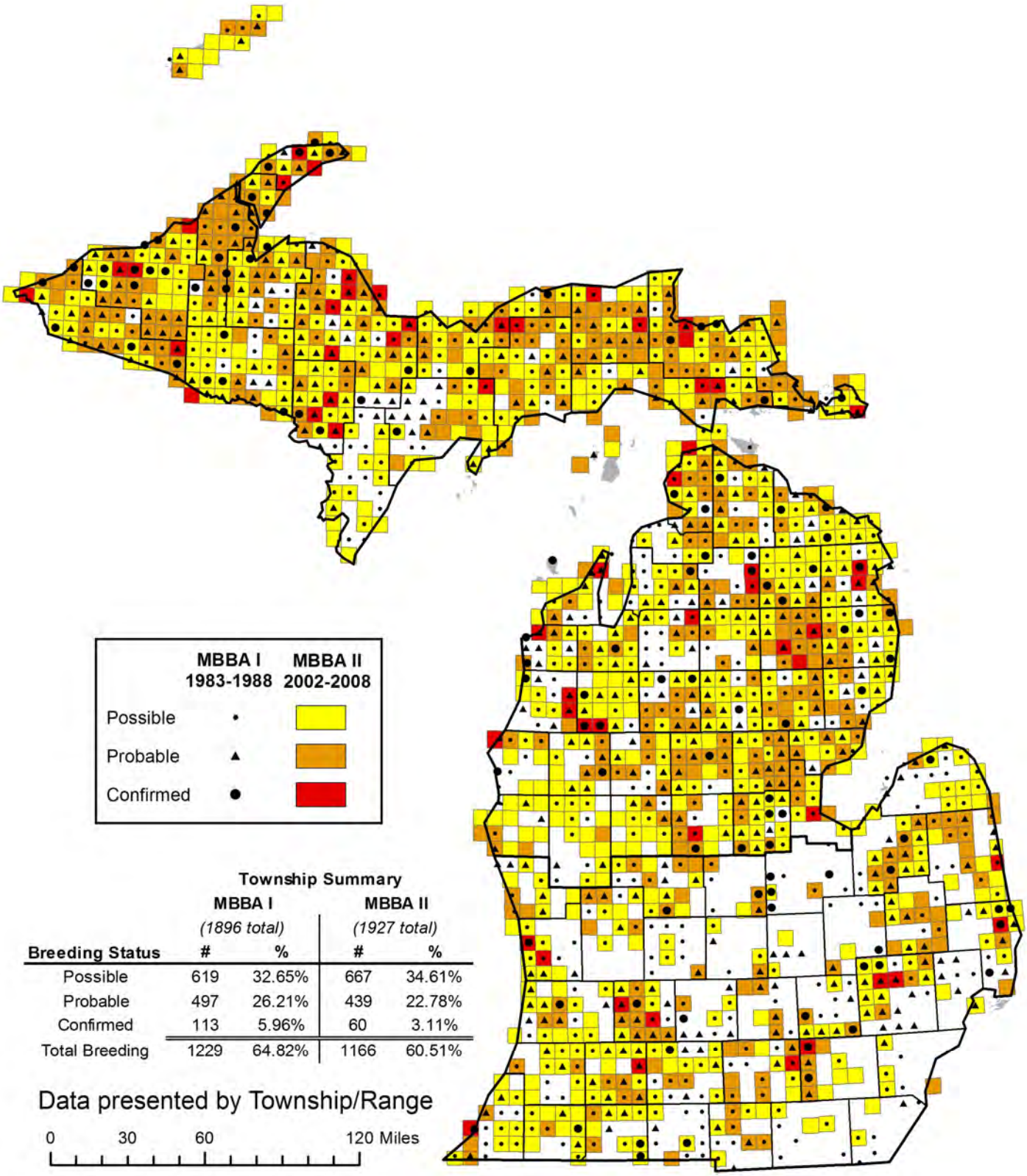
MBBA II data shows a 6% statewide shift downward in detections from MBBA I. The NLP and UP had relatively small changes in detection compared to the SLP which dropped from 52% to 40% of townships. The second Ontario, and the New York breeding bird atlas efforts also found fewer detections in their second project. The Ontario breeding bird atlas showed consistent declines throughout the majority of the survey area (Friesen 2007). Similarly, BBS data for New York during 1966-2005 demonstrated a 1.5% per year decline in Veery populations (Lowe and Hames 2008).

Conservation Needs

Like many other forest breeding birds, Veeries are an area sensitive species. Therefore, fragmentation of breeding habitat will continue to pose a threat to population stability (Bevier et al. 2005). Fragmentation also results in increased pressure from nest predators and nest parasites (e.g. Brown-headed Cowbird), both likely sources of pressure on breeding populations. Furthermore, impacts on the quality of the wintering grounds will also affect Veery numbers. Finally, as with all nocturnal migrants, collisions with buildings, cell towers, and wind turbines, all of which are increasing in number, will continue to pose a threat to Veery abundance (Taylor 1972, Shire et al. 2000, Erickson et al. 2001).

Veery *(Catharus fuscenscens)*

Mike Bishop



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	619	32.65%	667	34.61%
Probable	497	26.21%	439	22.78%
Confirmed	113	5.96%	60	3.11%
Total Breeding	1229	64.82%	1166	60.51%

Data presented by Township/Range

0 30 60 120 Miles

Swainson's Thrush *(Catharus ustulatus)*

Julie A. Craves



Robert Epstein ©

The Swainson's Thrush is a quintessential bird of spruce-fir forests across boreal North America. There are two distinct populations. A "rufous-backed" population is found along the Pacific coast, the Cascades, and the northern Sierra Nevada Mountains. The "olive-backed" continental population nests from interior Alaska throughout boreal Canada, the Rocky Mountains, northern New England and far northern Michigan, Wisconsin, and Minnesota (Mack and Yong 2000).

In addition to coloration and some other subtle structural distinctions, these populations follow different migratory routes and winter in different locations (Ruegg and Smith 2002). The Pacific population winters in southern Mexico and throughout much of Central America, while the continental population winters in Panama through northern South America (Ruegg and Smith 2002, Smith et al. 2005). It is the continental population that migrates through and nests in Michigan. A Swainson's Thrush banded in southeast Michigan in late August 1982 that was found in Boyacá, north-central Colombia, in early November of the same year helps confirm the continental population's more southerly wintering range (Craves 1996).

Distribution

There has been little change in the distribution of breeding Swainson's Thrushes in Michigan over the last century. Barrows (1912) noted that it nested regularly in the UP, with low numbers nesting in the NLP. Prior to MBBA I, Payne (1983) listed it as a common summer resident in the UP. Breeding Swainson's Thrushes are rarely observed in the NLP (Murray 1991). The same pattern was apparent in both Michigan Atlases.

For the LP, there was a smattering of records in MBBA I, with confirmation in two townships in Montmorency County in the NLP. In MBBA II, there were no confirmations in the LP, with about the same number of records assigned possible or probable as in MBBA I.

LP records should be considered with caution. Unlike many songbirds, a proportion of adult Swainson's Thrushes undergo their fall molt away from the breeding areas while at a migratory stopover site (Wassenaar and Hobson 2001). Fourteen percent of the adult Swainson's Thrushes banded at the Rouge River Bird Observatory in southeast Michigan consist of these "molt migrants" (J. Craves unpub. data). The earliest fall arrival date at this location is 20 July, while the typical spring departure date is 3 June (Craves 2007). Early June and mid-July dates for southern Michigan were also noted by Kelley (1978) and Schinkel (1994). Considering this evidence, it seems likely that migrants could occur farther north any time during the breeding season. With few confirmed nesting reports, details of the status of breeding Swainson's Thrushes in the LP remain unclear.

Swainson's Thrushes were widespread across the UP in both MBBA I and MBBA II, with most records concentrated in the northern tiers of townships. In general, the continental population of Swainson's Thrushes prefers to nest in forests comprised of spruces and firs, especially with a mostly-closed canopy and a fairly dense understory (Mack and Yong 2000). Participants in MBBA I found thrushes in northern hardwood stands which contained tracts of spruce, fir, tamarack, or cedar. Alcona County's first nest was located in a forest dominated by balsam fir along with white and black spruce (Petrucha 1998).

Swainson's Thrushes were restricted to the northern counties of Wisconsin (Harriman 2006), and 80% of the locations included a conifer component. In Ontario, this species was found in coniferous and mixed forests, but was also recorded in pure hardwood stands in the southern portion of their provincial range (Friesen 2007).

Breeding Biology

Males arrive on breeding grounds before females. Females construct bulky, well-concealed nests of twigs, moss, bark and leaves (Friesen 2007). Most frequently nests are located in the forest understory, particularly in thickets of deciduous shrubs or conifer saplings (Mack and Yong 2000). Generally only one clutch of eggs is laid per season, and clutches can vary from one to five eggs but typically consist of four blue or greenish blue speckled eggs (Mack and Yong 2000). The female incubates the nest while the male sings from a nearby perch (Mack and Yong 2000).

Abundance and Population Trends

Swainson's Thrushes were recorded in virtually the same number of townships in MBBA I as MBBA II. BBS trends indicate modest positive, but non-significant, population trends in both the Midwest (USFWS Region 3) and Michigan over the last 24 years (Sauer et al. 2008). Additionally, Swainson's Thrushes are very common migrants in Michigan.

Conservation Needs

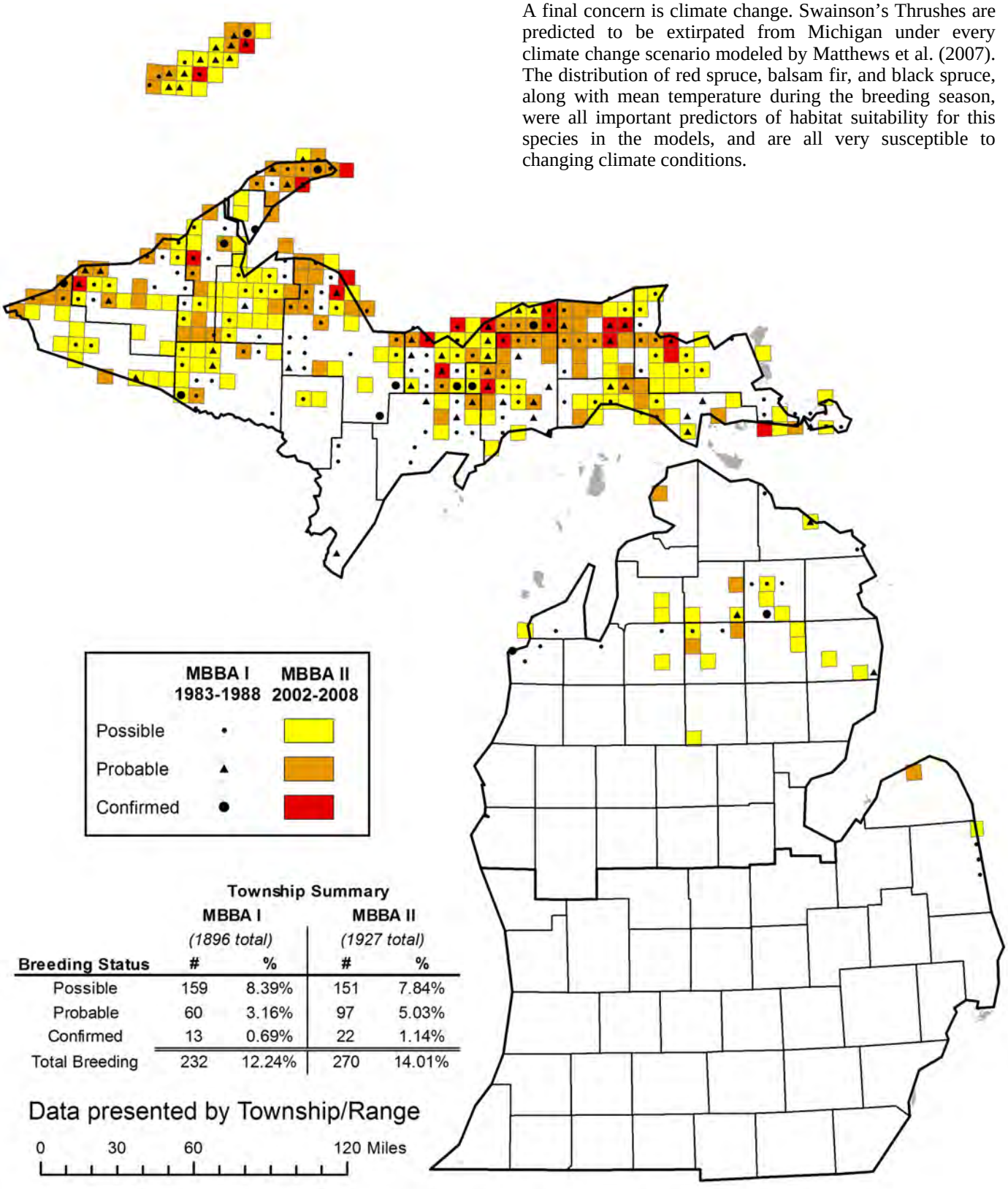
Swainson's Thrushes are estimated to be the most abundant spotted thrush in North America (PIF 2007). While the continental population seems secure, it may prove vulnerable given the life history of this group. During fall migration, the westernmost breeding individuals, such as those from central Alaska, fly east across much of the continent before turning south towards their wintering areas (Ruegg and Smith 2002). This long journey could make

Swainson's Thrush *(Catharus ustulatus)*

Julie A. Craves

them susceptible to loss of habitat along the migratory route in addition to the typical hazards of traveling such distances. Swainson's Thrushes are most common in winter in mature second growth and primary forest, usually at intermediate elevations, in Colombia, Venezuela, Ecuador, Bolivia, and Peru (Smith et al. 2005), exposing them to the effects of tropical deforestation.

A final concern is climate change. Swainson's Thrushes are predicted to be extirpated from Michigan under every climate change scenario modeled by Matthews et al. (2007). The distribution of red spruce, balsam fir, and black spruce, along with mean temperature during the breeding season, were all important predictors of habitat suitability for this species in the models, and are all very susceptible to changing climate conditions.



Hermit Thrush *(Catharus guttatus)*

Julie A. Craves



Darlene Friedman ©

Species sponsored by: Martha Collins

Native American legend has it that birds received their songs based on how high they flew, with the bird that reached the highest point being awarded the most beautiful song. This was how the Hermit Thrush obtained its superb melody – except that this goal was achieved by stealing a ride on the back of an eagle. Returning to earth, the Hermit Thrush felt guilty, and retreated into the deep woods to live a hermit's life, singing his incredible song.

Indeed, this retiring bird is seen less frequently than would be expected given its large range and abundance. The Hermit Thrush is one of the most widely distributed migratory birds in North America, breeding over much of Canada and the western and northeastern U.S. A hardy species, it is the only *Catharus* thrush that winters mostly in the United States (Jones and Donovan 1996). A few individuals winter in northern states, including Michigan.

Distribution

Hermit Thrushes nest in a wide variety of forested habitats, in Michigan favoring dry coniferous forest and mesic mixed forests. A century ago, Barrows (1912) noted the species as a common breeding resident in the UP, only rarely nesting in the SLP. Wood (1951) and Payne (1983) also noted summer residency in the northern two-thirds of the state. Not much has changed since then. Hermit Thrushes are most common in the UP and the NLP, to about 44° N latitude. The distribution was very similar in both MBBA I and MBBA II. Perhaps the most notable change was the increase in the number of records of Hermit Thrushes in the SLP, although none were assigned a level higher than possible.

A southern shift in the nesting distribution of Hermit Thrushes has been detected elsewhere in the region. Ontario's second Breeding Bird Atlas found that the Hermit Thrush had significantly increased its distribution since the completion of the first Atlas 20 years previously, except in the southwestern region which is largely agricultural (Friesen 2007). In the rest of southern Ontario, the nesting range of the Hermit Thrush expanded south and east, partly due to maturation of pine stands and reversion of farmland to forest. Forest maturation might also be a factor in the increasing observations of Hermit Thrushes in the SLP of Michigan.

Likewise, Hermit Thrushes were detected in only five blocks during Ohio's first Atlas (Peterjohn and Rice 1991). Yet, in the first three years of Ohio's second Atlas effort, they were detected in a total of 27 blocks and confirmed in seven (OBBA 2009, data provisional). These records mostly represent slowly increasing populations of thrushes found in mesic hemlock forests in several parts of the state where they have been found in small numbers for many years (Peterjohn and Rice 1991).

In contrast, Hermit Thrushes are fairly common breeders in northern Wisconsin, again mostly north of 44 or 45° N latitude, but there are very few breeding records from the southern part of the state (Van Stappen 2006). They were not reported breeding in Indiana or Illinois (Castrale et al. 1998, Kleen et al. 2004, BBA Explorer 2009).

Breeding Biology

Hermit Thrushes place open-cup nests on the ground or low in a tree or shrub; the latter is more common west of the Rocky Mountains. Nest concealment by vegetation is important in nesting success as depredation is the most common cause of nest failure (Flaspohler and Temple 2000). This species is sometimes double-brooded, especially if the first nesting attempt fails (Jones and Donovan 1996).

Abundance and Population Trends

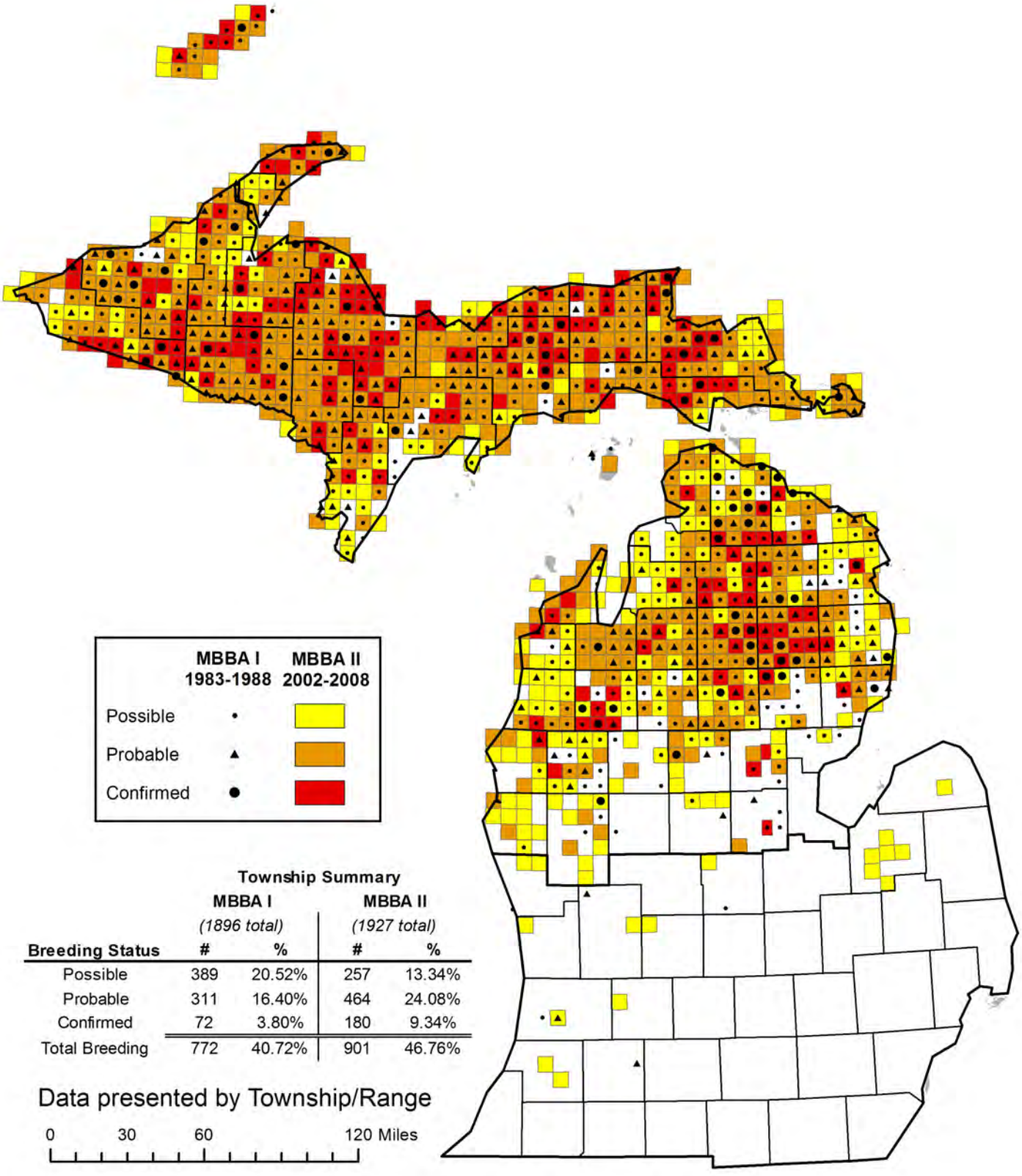
BBS trends indicate significant increases of a little over 1% annually in the Midwest (USFWS Region 3) and nearly 3% annually in Michigan since MBBA I. There was a small increase in the number of townships in which Hermit Thrushes were found between MBBA I and MBBA II. In Ontario, Hermit Thrush populations have remained stable, according to BBS trends, and Ontario's second Breeding Bird Atlas indicated that this species is still scarce and local in southwestern Ontario, probably due to the region's lack of substantial forest cover (Friesen 2007).

Conservation Needs

Hermit Thrushes are fairly wide-ranging in their choice of nesting habitat, breeding in a variety of coniferous or mixed forests. They also favor internal edges such as those created by disturbance and some types of logging. These factors should have a positive influence on the persistence of Hermit Thrushes in Michigan, at least in the short term. However, long-range habitat suitability models based on several climate change scenarios predict a strong range contraction in the eastern U.S. and near-extirpation in the NLP (Matthews et al. 2007). A secure future for this retiring bird with a song that Bent (1949) said "steals upon the sense of an appreciative listener like the quiet beauty of a sunset" should not be taken for granted.

Hermit Thrush *(Catharus guttatus)*

Julie A. Craves



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	389	20.52%	257	13.34%
Probable	311	16.40%	464	24.08%
Confirmed	72	3.80%	180	9.34%
Total Breeding	772	40.72%	901	46.76%

Data presented by Township/Range

0 30 60 120 Miles

Wood Thrush *(Hylocichla mustelina)*

Julie A. Craves



Willie McHale ©

In introducing the Wood Thrush painting in his *Birds of America* series, John James Audubon stated: "Kind reader, you now see before you my greatest favourite of the feathered tribes of our woods. To it I owe much. How often has it revived my drooping spirits…" (Audubon 1840-1844). Audubon's sentiment is a popular one, as the Wood Thrush is a favorite bird of many. It nests in deciduous and mixed woods in the U.S. east of the Mississippi, except for southern Louisiana and peninsular Florida, as well as southeastern Canada (Roth et al. 1996). This species winters primarily from Mexico to Panama.

Distribution

Wood Thrushes can be found in nearly any upland mesic woodland, but several characteristics are especially attractive to them. These include tall trees (greater than 16 m, or 50 ft), a high diversity of deciduous tree species, a moderately dense shrub layer, and fairly open forest floor with moist soils and decaying leaf litter (Roth et al. 1996). In MBBA I, Wood Thrushes were located breeding in wet and mesic forests, were less common in dry woodlands, and were absent in coniferous forests.

Over the last century, the distribution of Wood Thrushes in Michigan has not changed substantially. Barrows (1912) considered it most abundant in the southern and middle parts of the state. Wood (1951) noted it as common in the LP, though irregular in northern counties, and rare and local in the UP, a status echoed by Payne (1983). This pattern held in MBBA I.

MBBA II data is in agreement as well, showing that Wood Thrushes are concentrated in the southern two-thirds of the state. Wood Thrushes were found in considerably fewer townships in the UP in MBBA II than in MBBA I, but the number of confirmations was very similar. The distribution of Wood Thrushes was also similar in Ontario's two Atlas efforts (Friesen 2007).

Breeding Biology

Wood Thrushes build cup-shaped nests, often adorned with strips of plastic in urban areas, in concealed, shady spots in trees or shrubs. Nests are typically lower than 6 m, and the density of surrounding vegetation at the height of the nest is often higher than that of nearby locations at the same height (Roth et al. 1996). Wood Thrushes usually attempt two broods per season, and on rare occasions will reuse a nest (Roth et al. 1996, Craves 1998). First broods are generally initiated during the month of May and second broods are laid in June and July (Roth et al. 1996). Eggs are a uniform turquoise-green and three to four eggs comprise a typical clutch (Roth et al. 1996).

Abundance and Population Trends

Wood Thrushes are often used as an icon of neotropical migrant declines. Many authors note a population slide, based on BBS data, over much of the species' range since the mid-1960s. Considering just the span between the two Michigan Atlas periods (1983 to 2007), survey-wide BBS trends indicate a significant decline of 1.4% annually, but trends vary geographically. In the Midwest (USFWS Region 3), there was a significant annual increase of 1.2%. The trend over the same period in Michigan was also positive (1.5%) and near-significant (Sauer et al. 2008).

A different analysis by the U.S. Forest Service (USDA 2004) looked at relative abundance in Midwestern states (all states represented in USFWS Region 3 except Ohio) from 1970 through 2000. It described a region-wide increase of 34%, but changes depended on geography ranging from decreases of 100% to increases of 950%. For the southern part of Michigan, where Wood Thrushes were most common in MBBA II, this assessment indicated increases in relative abundance except in the Thumb and counties bordering Lake St. Clair. In contrast, Atlas data showed little change in the number of townships recording Wood Thrushes in the Thumb area between the two Michigan Atlas periods.

Conservation Needs

The Wood Thrush is on the National Audubon Society's 2007 WatchList of declining birds; it is considered a priority species in the Boreal Hardwood Transition physiographic area, which includes the UP and NLP, by Partners in Flight (PIF 2008); and it is listed as a species of greatest conservation need in Michigan's Wildlife Action Plan (Eagle et al. 2005).

Habitat fragmentation is considered a major cause of Wood Thrush population declines. Although apt to nest in small woodlots and even residential areas, Wood Thrushes are considered area sensitive (Roth et al. 1996). Nests in small or fragmented tracts are frequently unsuccessful due to high rates of parasitism by the Brown-headed Cowbird (*Molothrus ater*) and heavy predation (Weinberg and Roth 1998). Predation and especially cowbird parasitism rates are

Wood Thrush *(Hylocichla mustelina)*

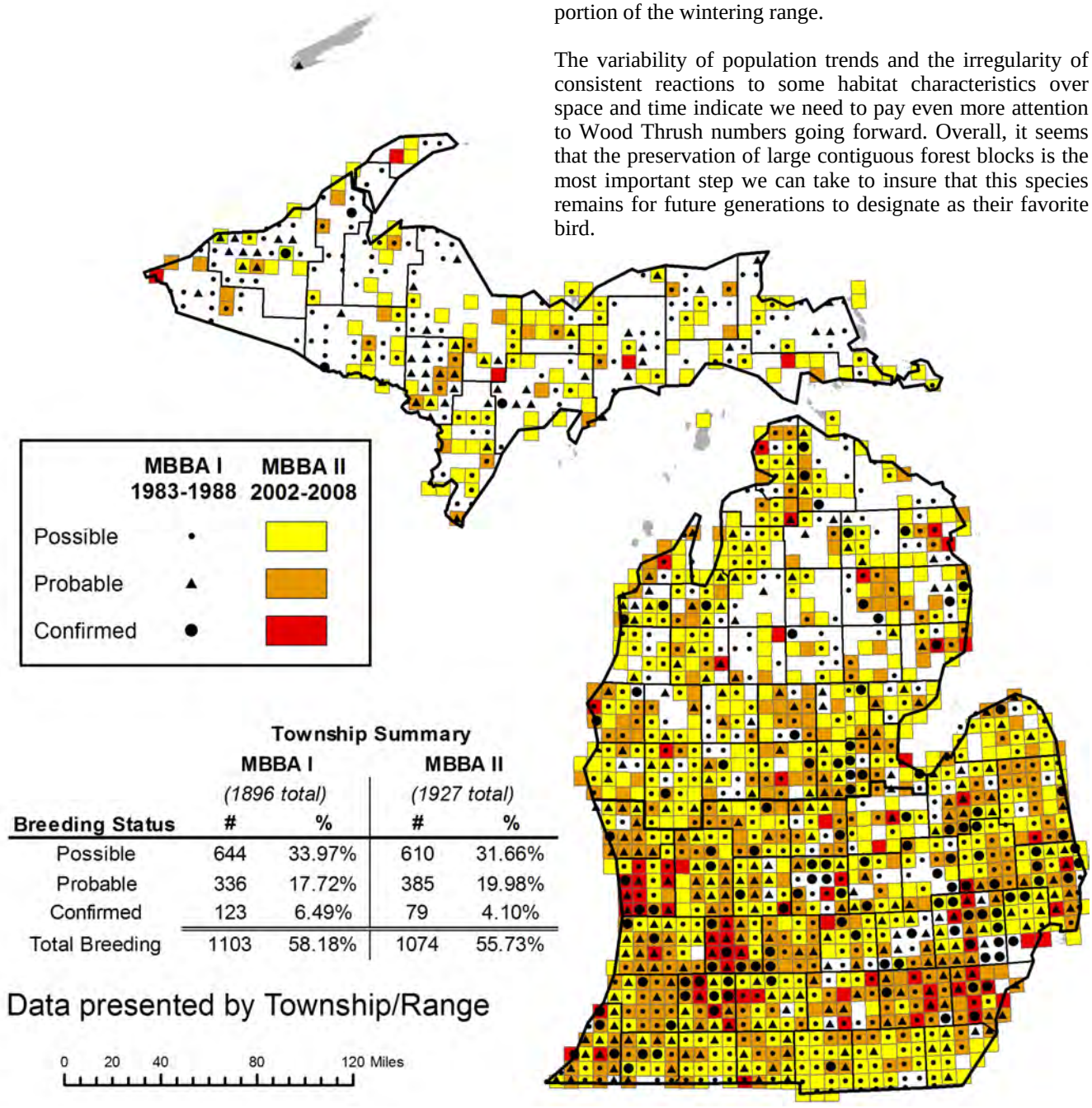
Julie A. Craves

extremely variable geographically. These rates are often tied to the degree of fragmentation, since the most important variables for successful Wood Thrush nesting include the amount of core habitat and total forest cover in the larger landscape and the distance from the nest to a forest edge (Driscoll et al. 2005).

Wood Thrush nesting success has been well studied in the Great Lakes region. In the western Great Lakes in particular, the twin threats of cowbird parasitism and predation can result in few Wood Thrushes fledging young in small woodlots or forest fragments (Robinson 1992, Donovan et al. 1995). In Ontario, some studies suggest that small woodlots are not as detrimental to Wood Thrushes (Friesen et al. 1999, 2005). The Rouge River Bird Observatory (RRBO) followed the reproductive success of Wood Thrushes for seven years on the campus of the University of Michigan-Dearborn, a small, fragmented urban forest. Over 70% of the nests suffered from predation. However, cowbird parasitism was light (13%), and half the nests that were parasitized fledged both Wood Thrushes and cowbirds (RRBO, unpub. data).

Wood Thrushes may be vulnerable to tropical deforestation, as they are most abundant on their wintering grounds in primary and mature second-growth woodlands (Roth et al. 1996). Rappole et al. (1994) documented a substantial reduction in forested habitats and corresponding declines in numbers of Wood Thrushes in the late 1980s in the northern portion of the wintering range.

The variability of population trends and the irregularity of consistent reactions to some habitat characteristics over space and time indicate we need to pay even more attention to Wood Thrush numbers going forward. Overall, it seems that the preservation of large contiguous forest blocks is the most important step we can take to insure that this species remains for future generations to designate as their favorite bird.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	644	33.97%	610	31.66%
Probable	336	17.72%	385	19.98%
Confirmed	123	6.49%	79	4.10%
Total Breeding	1103	58.18%	1074	55.73%

Data presented by Township/Range

0 20 40 80 120 Miles

American Robin *(Turdus migratorius)* ***Gail McPeek***



Jerry McHale ©
Species sponsored in memory of: Rose Craven.

Michigan is one of three states which adopted the American Robin as its state bird. This large, red-breasted thrush is widely distributed and abundant across nearly all of North America. In Michigan, it is a common summer resident and migrant, with lesser numbers overwintering in southern portions of the state and occasionally farther north. Even though some robins stay for the winter, many people consider this bird to be the official "harbinger of spring." Beginning sometime in March, a steady stream of northbound migrants descends upon Michigan. Despite lingering snow, robins seem anxious to return to breed and serenade us with their "*cheerily, cheer-up*" song.

Distribution

What Barrows (1912) described as, "probably our most abundant, best known and generally best loved native bird," still rings true today. The American Robin is number one on the most-reported species list, found in more townships than any other bird. Not surprisingly, results were nearly identical for MBBA I and MBBA II, with robins recorded in 93% of townships. Likewise, both atlases documented a similar statewide distribution across the three major regions (SLP, NLP and UP). Occurrence only drops off slightly from south to north, and even our northernmost land, Isle Royale, has breeding robins in all townships.

Obvious from the atlas map is the ease with which participants could confirm breeding (67%). The adaptable, opportunistic robin coexists well with humans, providing ample opportunity to discover nests and observe the stubby-tailed, speckle-breasted, newly-fledged young.

Robins breed in a wide range of habitats across the state, including mature and early successional forests, open woodlands, parks, orchards, farms, and residential areas. During the breeding season they are especially attracted to short-grass areas which offer an abundance of earthworms and soft-bodied insects. Who hasn't been entertained by a lawn-bobbing robin tugging a reluctant worm from the soil? In foraging studies, Eiserer (1980) found an overwhelming preference for short grass over long, and discovered that mowing increased foraging time as robins exploited temporarily vulnerable prey.

Also important to robin distribution is the presence of fruit-producing trees and shrubs. In spring and summer, cherries, blackberries and mulberries are commonly eaten. Robins consume fruits year-round, but they become an increasingly greater proportion of their diet in fall and winter. During lab feeding trials at Hope College in Michigan, Lepczyk et al. (2000) found that robins prefer sugar-rich fruits because of their simple and fast rate of digestion, but that lipid-rich fruits become more important by autumn.

Breeding Biology

Robins announce their arrival and establishment of breeding territories with persistent song. They are one of the first species to sing in the morning, and one of the last heard in the evening. Both sexes sing (Wauer 1999), and though similar in appearance, males tend to have blacker heads. Robins are strongly philopatric, meaning adults return to the same area year after year, even the same nesting spot. Offspring also exhibit site fidelity, returning to their natal area the following year.

The heavy, mud-lined nest requires a sturdy tree branch or other strong support. Human structures are frequently used, making it easy to observe nesting activities. A large ladder stored under our deck has become prime robin real estate, providing ample opportunity to glimpse the 4-5 robin-blue eggs, the incubating female, and the open-gaped mouths of hungry nestlings. Soon after the young fledge, the female is back in action constructing her second nest at the other end of the ladder.

Early arrival to the breeding grounds allows for 2-3 broods per season. The earliest recorded egg date for Michigan is 23 March. More typically, first nests are in April to mid-May with second nests in June to mid-July. The male parent cares for the first brood while the female incubates the second clutch. Incredibly, second broods can fledge five weeks after the first.

Abundance and Population Trends

Atlases do a good job of mapping where species breed, but do not give us much information on abundance. More effort was made in MBBA II to gather numbers of individuals during block surveys. These observations show a general pattern of greatest abundance in the SLP, with progressively lesser numbers northward. In the SLP, approximately 40% of the townships had counts ranging from 46-200+ robins/block. In the NLP, most block totals were in the 1-45 range, with a small percentage in the 46-200 range. In the UP, the majority of blocks had 1-16 robins recorded.

To get an overall impression of just how abundant the American Robin is in Michigan, we can look at the PIF Landbird Population Estimation Database. Using BBS counts from the 1990s, and extrapolating to total land area,

American Robin *(Turdus migratorius)*

Gail McPeek

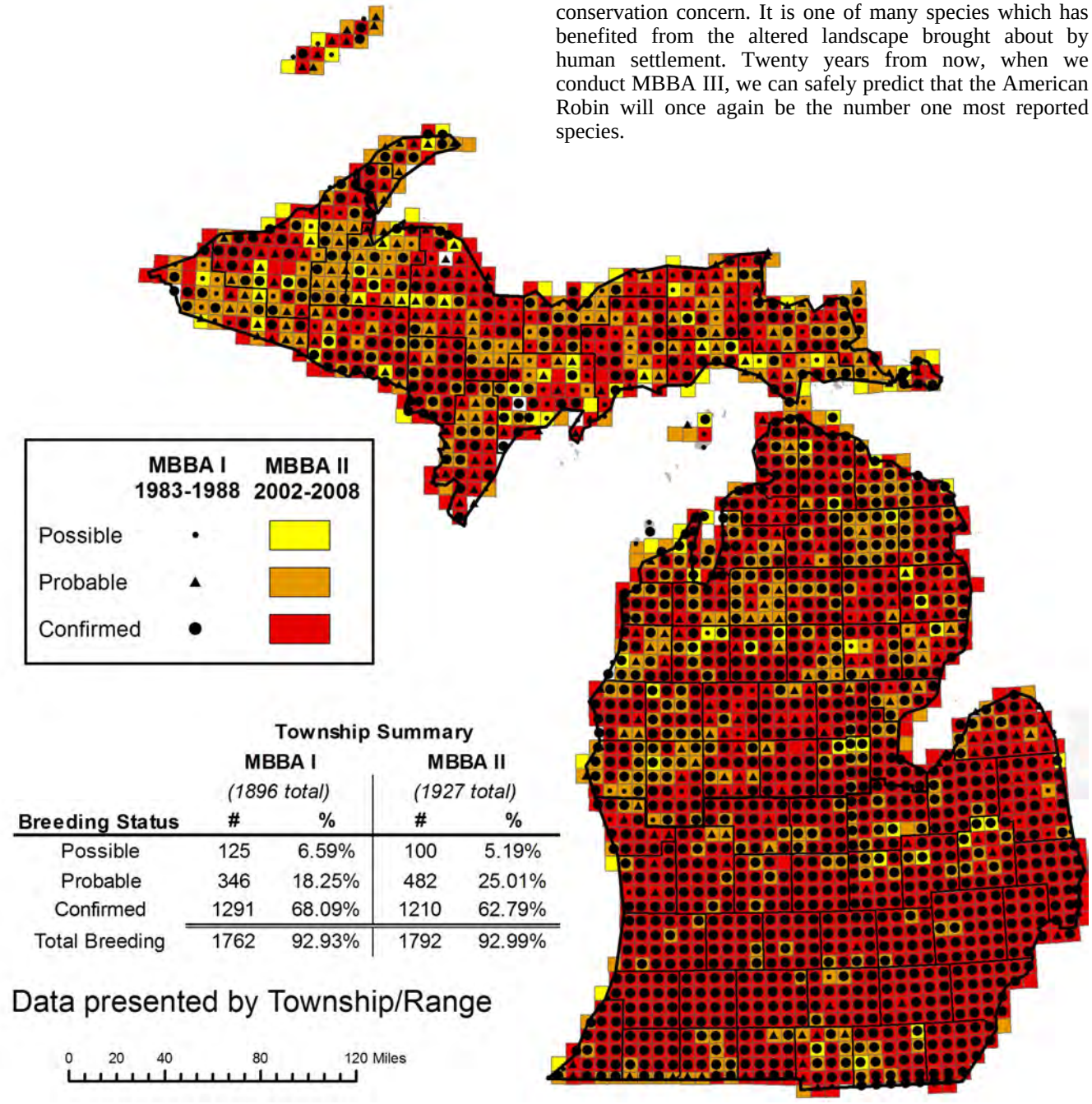
the Michigan population estimate for the robin is 5,900,000 (PIF 2007). Compare this to 3,600,000 Red-winged Blackbirds and 3,400,000 European Starlings, the next two highest species. Even with cautious interpretation of these rough estimates, it is clear that the American Robin is Michigan's most abundant breeding bird.

Since the inception of BBS routes in 1966, American Robins have shown a significant continuous increase across the continent (Sauer et al. 2008). In Michigan, route analysis for the 1966-85 period also found statistically significant increases (Adams et al. 1988), from an average of 45 robins/route in 1966-70 to 54 robins/route in 1981-85. Data since 1985 show a gradual continuation of this trend through the 1990s, and during MBBA II, robins averaged more than 60 birds/route in four of the six years (Sauer et al. 2008).

Wood (2006) reported similar annual increases in Wisconsin, and our eastern neighbor, Ontario, found a similar distribution between its two atlases and a stable to slightly increasing population (Burke 2007). Further east in New York, second atlas results showed essentially the same distribution of robins and a stable population (McGowan 2008).

Conservation Needs

With its widespread abundance, the robin is not a conservation concern. It is one of many species which has benefited from the altered landscape brought about by human settlement. Twenty years from now, when we conduct MBBA III, we can safely predict that the American Robin will once again be the number one most reported species.



Gray Catbird *(Dumetella carolinensis)*

Julie A. Craves



Willie McHale ©

The catbird is named, of course, for its mewing, cat-like call which is often given from a dense hedgerow or other impenetrable shrubbery. This behavior is also reflected in the generic name *Dumetella*, which comes from the Latin root "dumus," or thicket. Gray Catbirds are found in old fields, shrub-scrub, and similar successional habitats across the U.S. and southern Canada east of the Rockies (Cimprich and Moore 1995). Catbirds winter along the Atlantic and Gulf Coasts, in the West Indies, and Central America.

Distribution

Barrows (1912) stated that the catbird was one of the most familiar birds throughout the state, "too well known to need careful description," although it was noted this species was only found sparingly in the UP. Catbirds were deemed "less common" in the UP by Wood (1951) and Eastman (1991) maintained that MBBA I results indicated that catbirds had become much more common in the UP and NLP than historically reported. The distribution of catbirds has remained much the same since MBBA I. In MBBA II, catbirds were found statewide, but generally less densely in the UP and northernmost NLP. Catbirds were most concentrated in SLP, where they were found in nearly every township in both Atlas periods.

The MBBA I habitat survey indicated that Gray Catbirds in Michigan favored shrub wetlands. Throughout their range they are generally uncommon in coniferous habitats (Cimprich and Moore 1995). Logging in northernmost Michigan over the last century probably allowed catbirds to utilize these areas and may account for their northward spread.

Breeding Biology

The Gray Catbird arrives on its breeding grounds in Michigan during the last 10 days of April through the first week in May (Eastman 1991). The Gray Catbird is a persistent singer and can be heard singing from dawn until late morning and then again in the early evening (Curry 2007). It also has a lengthy breeding season in which it often raises two broods (Curry 2007). The Gray Catbird is flexible in its choice of nest location, placing its nest in a variety of shrubs, trees, vines and forbs. The female generally constructs the nest although the male will assist by bringing nesting material. Gray Catbirds will occasionally construct an unlined nest which is never used (Cimprich and Moore 1995). Only females incubate eggs and males stand guard over the nest while the female is away (Cimprich and Moore 1995).

Abundance and Population Trends

In MBBA II, there was a slight decline in the percentage of townships throughout the state in which Gray Catbirds were found compared to MBBA I. There was a substantial decline in the number of townships where they were confirmed or probable in the NLP, although that may be attributed, at least in part, to decreased effort in that region during MBBA II. Declines in some regions of Ontario were attributed to forest maturation and changing agricultural practices that have eliminated hedgerows and thickets (Curry 2007), and this may also explain reduced numbers found during MBBA II. BBS trends for both the Midwest (USFWS Region 3) and Michigan since 1983 were statistically significant and positive, but modest (Sauer et al. 2008).

Conservation Needs

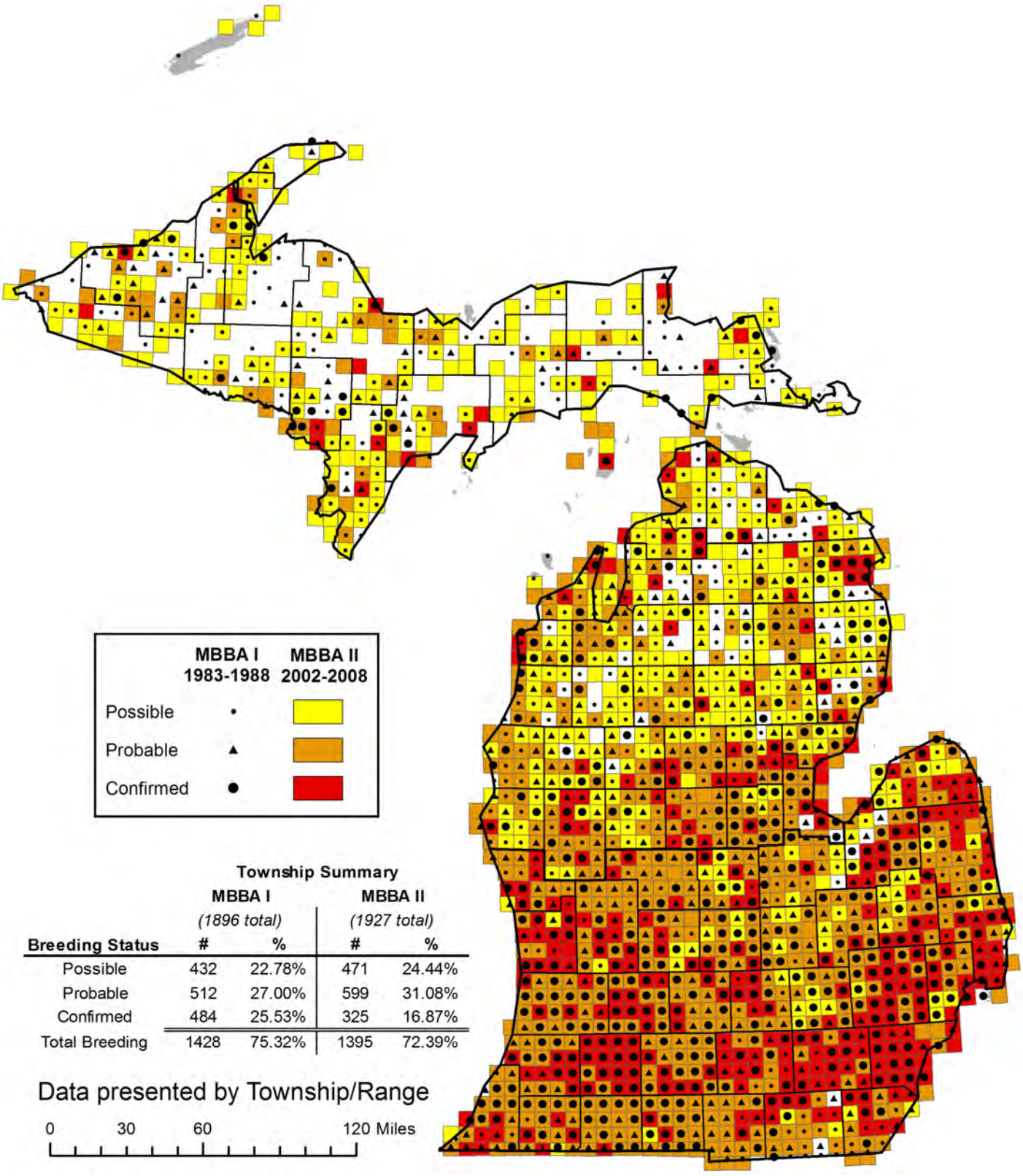
Gray Catbirds remain an abundant component of Michigan's avifauna. Brown-headed Cowbirds do not pose a substantial threat, as catbirds are one of only a handful of species that learns to recognize cowbird eggs and ejects them when they are laid in their nests (Cimprich and Moore 1995).

Gray Catbirds have been found to be favored hosts of *Culex* mosquitoes, which are primary vectors of West Nile virus (Molaei et al. 2006). Catbirds typically are found to have a high prevalence of virus antibodies, indicating infection (McLean 2006, Loss et al. 2009), yet they experience very low mortality and there has been no impact from this disease on their numbers (LaDeau et al. 2006).

Continued succession of old field habitats might be expected to decrease numbers of catbirds in Michigan in the future. Perhaps the most serious threat to catbird distribution in the state is climate change. Price (2000) indicates that Gray Catbirds are a species whose Michigan range may contract under certain climate change models. Matthews et al. (2007) project a substantial northward range contraction for catbirds under several different climate models that could result in far fewer catbirds being found in Michigan in the next century.

Gray Catbird *(Dumetella carolinensis)*

Julie A. Craves



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	432	22.78%	471	24.44%
Probable	512	27.00%	599	31.08%
Confirmed	484	25.53%	325	16.87%
Total Breeding	1428	75.32%	1395	72.39%

Northern Mockingbird *(Mimus polyglottos)*

Deaver D. Armstrong



John Van Orman ©

The Northern Mockingbird's incredible ability to not only imitate but also remember up to 200 different "songs" is well known (Kroodsma 2005). This remarkable bird uses songs of other bird species and non-bird species and even copies sounds of mechanical devices like telephones and sirens. Historically, the species was captured and caged for this very ability and many early records in Michigan were discounted as being attributed to escaped pets (Sprunt 1948, Barrows 1912).

The Northern Mockingbird regularly breeds as far north as the southern part of the eastern provinces of Canada west to Ontario and then only casually north of a line drawn west across the U.S. from the southern half of Michigan. There are scattered reports of the species breeding as far north as Alaska (Sibley 2000, National Geographic Society 2002). It nests as far south as southern Mexico (Derrickson and Breitwisch 1992). In Michigan it is a rare but regular breeder in the southern and western part of the LP and rare but regular during the breeding season in the UP (Binford 2006, Hickman 2008). Except for one 1954 record of a bird wintering at a feeder in Marquette, in late winter the Northern Mockingbird is found only in the LP where it is rare to casual (Zimmerman and Van Tyne 1959, Chartier and Ziarno 2004).

Distribution

The Northern Mockingbird was first listed in Michigan by Sager (1839). Barrows (1912) called it a rare summer visitor to southern Michigan and attributed at least some of the reports to escaped caged birds. Wood (1951) mentioned a total of seven nest records between 1910 and 1934, all in the SLP in counties which have records in both Atlases and most other historical accounts (Zimmerman and Van Tyne 1959, Payne 1983). Zimmerman and Van Tyne (1959) added records from Clare and Cheboygan Counties in the NLP. Payne (1983) added 16 more counties to the list of those reporting Northern Mockingbirds in the breeding season. Most of these newly added counties were in the NLP and the western UP. Binford's records of Northern Mockingbird nests in the Keweenaw Peninsula in 2005 and 2006 are the northernmost nesting records for the species in the state and the first ever for that region of the UP (Binford 2006). Statewide, most of the birds recorded during both Atlas periods were in the fruit producing counties in the southwestern part of the state and around Grand Traverse Bay. Southeastern counties in the lower two tiers and southwestern counties in the lower three tiers have the most records. Elsewhere in the state, observations of breeding birds are scattered though there appears to be some increase in numbers in the very center of the LP from the first to the second atlas. Few birds were found in the eastern part of the UP in MBBA I, and they were not present at all during MBBA II. Despite being at the northern edge of its range, Michigan's Northern Mockingbird population seems to be expanding slightly in both the LP and UP.

Breeding Biology

Most Mockingbirds in Michigan are migratory though a few are always found on Christmas Bird Counts (NAS 2009). Successful nesters who do migrate tend to return to their previous year's breeding territory and re-pair (Derrickson and Breitwisch 1992). Mockingbirds prefer cultivated lands or gardens and their nests are usually built in shrubs or small trees (Sprunt 1948, Derrickson and Breitwisch 1992). The four eggs are incubated for about 12 days. Birds will have two, sometimes three broods, sometimes beginning a new nest while still caring for young of the previous brood. (Derrickson and Breitwisch 1992, Smith and Poon 2007). The earliest reported date for a Michigan nest is early June, but Ontario birds have been found to be on nests as early as mid-April and Wisconsin birds were seen nest building in early May (Dziepak 1991, Harriman 2006, Smith and Poon 2007).

Abundance and Population Trends

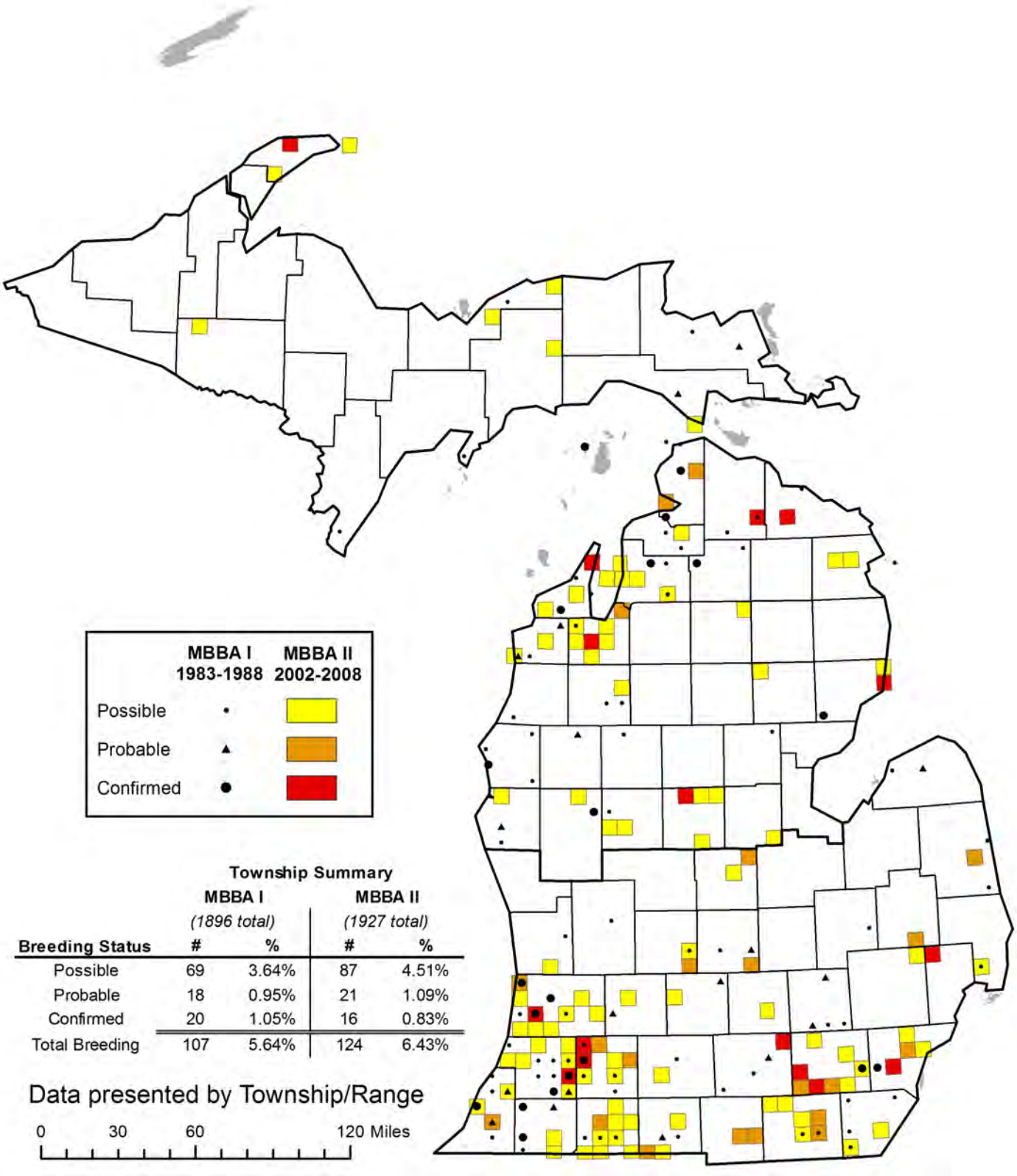
While the southernmost states in USFWS Region 3 (OH, IN, IL) have by far the region's largest population estimates for Northern Mockingbird (approximately 160,000 per state), the northern states in the region, including Michigan and Wisconsin, have estimates of only 900 and 300 individuals respectively, and Minnesota did not detect any (PIF 2007). A comparison of the township summaries between the first and second Atlas periods shows some obvious increases in the number of records in the SLP. BBS data also show an increasing trend statewide between MBBA I and MBBA II, but in Michigan and adjacent states, none of these are significant. The USFWS Region 3 trend shows a slight increase of 0.96% per year (Sauer et al. 2008).

Conservation Needs

Because the Northern Mockingbird is at its northern range limit in Michigan, populations will likely continue to be small and there are no current specific management plans for this species. However, documentation of its range expansion by Binford (2006) and others calls for careful observation and reporting to the Michigan Audubon Society of all potentially nesting individuals, especially those in the UP.

Northern Mockingbird *(Mimus polyglottos)*

Deaver D. Armstrong



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	69	3.64%	87	4.51%
Probable	18	0.95%	21	1.09%
Confirmed	20	1.05%	16	0.83%
Total Breeding	107	5.64%	124	6.43%

Data presented by Township/Range

0 30 60 120 Miles

Brown Thrasher *(Toxostoma rufum)*

Raymond J. Adams, Jr.



Darlene Friedman ©
Species sponsored by:
Audubon Society of Kalamazoo

Anyone familiar with the Brown Thrasher during the breeding season is well aware of its pugnacity. This colorful mimid presents a fierce demeanor when threatened by potential nest predators, as I learned at an early age. The Brown Thrasher readily throws itself at humans, dogs, snakes and other birds (pers. obs.). This thrasher is easily identified as few species are similar in appearance. There are a handful of thrushes with comparable patterns, but all lack the long graceful tail and yellow eye. The only species which might cause confusion is the similar Long-billed Thrasher which overlaps with the Brown Thrasher in south Texas. The Brown Thrasher breeds from the East Coast to the Rocky Mountains and from the Canadian Prairie Provinces and the south edge of the boreal forest to the Gulf Coast. In winter it retires to the southern third of the United States with a few birds overwintering each year into the northern U.S. This species breeds throughout Michigan, although it is less common in the Upper Peninsula and rare on Isle Royale.

Distribution

On careful examination of the Michigan atlas map for the Brown Thrasher, this species is widespread in the LP, reported from 73% of the townships with a near universal distribution in the southwestern counties. The prevalence of thrashers in southwestern Michigan is associated with their preference for deciduous-mixed shrub upland, shrubby old field, and shrub wetland (Eastman 1991). In addition, this area of the state has extensive farmland bordered by hedgerows and tree-lined fencerows, which provide alternative nesting cover. Elsewhere in the LP, the Brown Thrasher is fairly uniform in distribution. In the eastern third of the LP from Lenawee and Monroe counties all the way to the Straits of Mackinac, there is a north/south corridor where this species is sometimes absent. The causes for these gaps in occurrence are not obvious from looking at a map. During MBBA I, the Brown Thrasher was present in every township in Oakland and Livingston counties. In MBBA II, this species was unrecorded in 21 townships in these same two counties. Urbanization, human population increases, and the accompanying loss of habitat likely explain losses of Brown Thrasher in these two counties (and effort decreased there from 1,739 hours in MBBA I to 901 hours in MBBA II). But distribution gaps away from large population centers are more difficult to explain.

In the Upper Peninsula, the Brown Thrasher was recorded in 270 blocks and 221 townships in MBBA I, but only 228 blocks and 186 townships in MBBA II. The overall distribution in the UP in MBBA II has changed little from the previous survey. This bird is widely distributed north of Wisconsin, especially in Menominee, Dickinson, Marquette and Iron counties. Elsewhere in the UP, the distribution is clumped with large regions where the species is apparently absent, presumably because the "earlier shrub stages of plant succession" they require are missing (Eastman, 1991).

Breeding Biology

The adage "timing is everything" is certainly relevant when surveying for the Brown Thrasher. Males typically return before females, by mid-April or earlier in the SLP (Bent 1948), to establish territory. On arrival, they may counter sing with other males in close proximity. Singing continues from the tallest available perch to attract females as they begin to arrive. The song period is not long in duration (Cavitt and Haas 2000), but at this time the species is easy to locate, especially when multiple males are present. Interestingly, males sing less frequently when competition is lacking (pers. obs.). Brown Thrashers renew singing prior to the second brood or following an initial nest failure. Once nesting starts the male helps incubate and feed the young (Cavitt and Haas 2000) and the Brown Thrasher becomes much less conspicuous. It is not until the young fledge and begin following the adults around for food that the thrasher again is more easily located. Clutch size ranges from 2 to 6 eggs and may vary seasonally and regionally.

Abundance and Population Trends

The Brown Thrasher was likely present in Michigan well before the time of European settlement. It was present when Sager published the first state bird list in 1839 and was listed by each of the authors throughout the rest of the 19th and 20th centuries. It undoubtedly benefitted from the increase in human settlement and lumbering as suggested by Gibbs' report that it "breeds in all half-cleared localities in LP" (1879). Most of the comments regarding abundance are vague. Whether you read Barrows (1912), who said "summer resident of all parts of the state…most abundant in the southern half" or Payne (1983) who described it as "common in the Lower Peninsula, more local and less common in the Upper Peninsula", exactly how common was it?

It probably reached its peak abundance in the late 1800s following forest clearing. There is little data on actual numbers in Michigan during the early 20th century, but in Illinois the Brown Thrasher declined 74% from 1909 through 1958 (Cavitt and Haas 2000). With the increased use of pesticides following World War II, there is every reason to expect that trend continued. Federal BBS routes from 1966 through 2007 indicate a decline of more than 80% of Brown Thrasher numbers in Michigan (Sauer et al. 2008), while Kalamazoo County BBS surveys suggest an 86% drop from 1970 through 2006. Michigan Breeding Bird

Brown Thrasher *(Toxostoma rufum)*

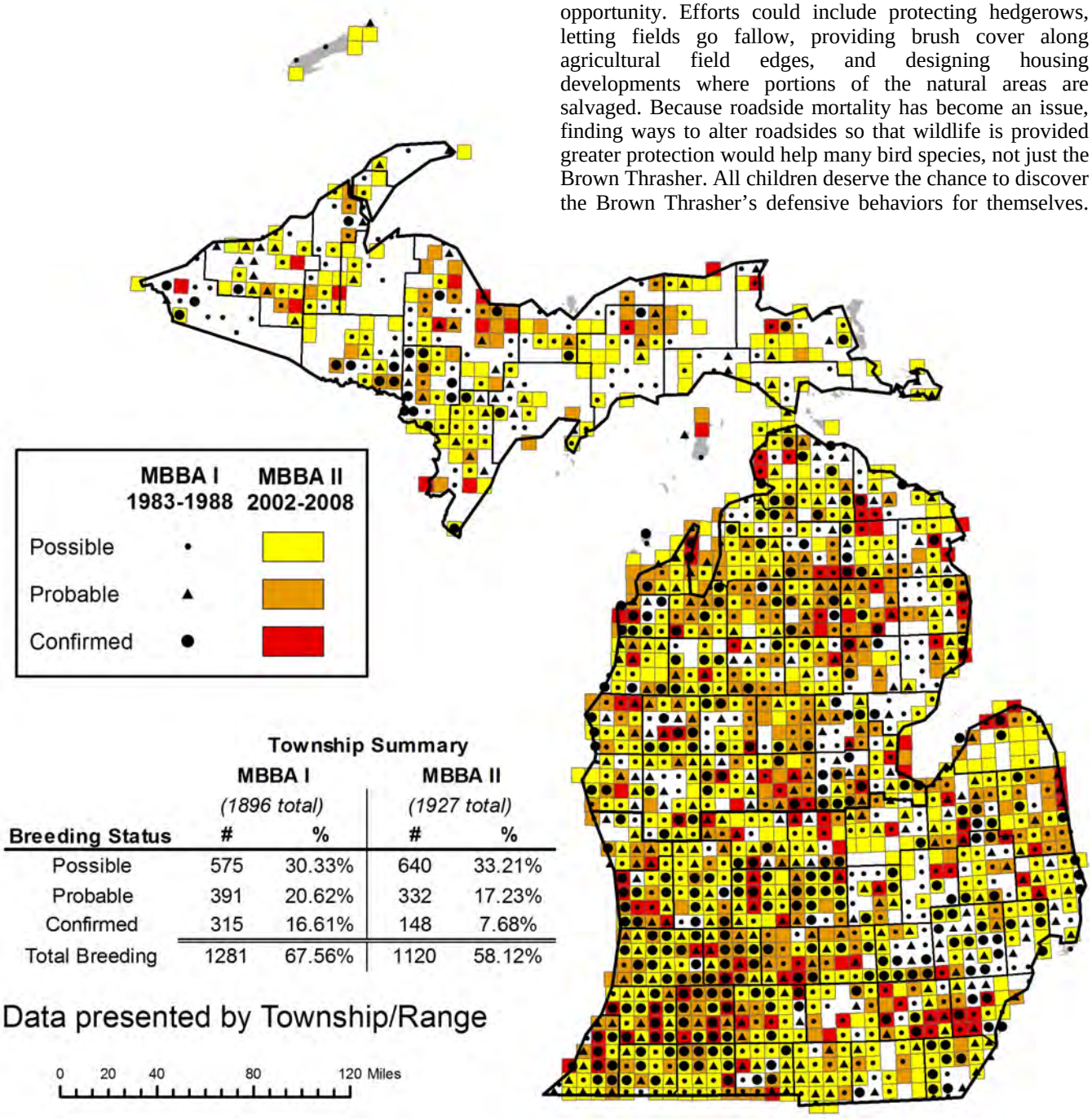
Raymond J. Adams, Jr.

Atlas data from 1983-2008 also indicate a decline. During MBBA I, there were nearly 4,100 pairs found in over 2,500 blocks, while the MBBA II results total about 3,500 pairs in 1,845 blocks. Clearly, the Brown Thrasher is on a downward trend.

Conservation Needs

While the Brown Thrasher is neither threatened nor endangered, the rapid population decline over the past 50 to 100 years is cause for alarm. As with other declining species which occupy similar habitat or rely on similar food, a number of hypotheses have been proposed for the causes. Following the expansion of pesticide use after World War II, the Brown Thrasher suffered increased visible mortality as well as indirect mortality in and around agricultural operations (Cavitt and Haas 2000). This no doubt continues today. Collisions are known to be another serious mortality factor. While stationary objects such as towers and windows are well known obstacles, automobiles and trucks cause heavy mortality. During Atlas surveys in southwestern Michigan, Brown Thrasher road kills including young were noted on occasion (pers. obs.). Because this bird is a short distance migrant, it is less likely to be exposed to severe weather in migration. Harsh winters in the south have been known to cause major impacts. Habitat degradation and loss may be the greatest problem of all.

Habitat protection may be the most important management opportunity. Efforts could include protecting hedgerows, letting fields go fallow, providing brush cover along agricultural field edges, and designing housing developments where portions of the natural areas are salvaged. Because roadside mortality has become an issue, finding ways to alter roadsides so that wildlife is provided greater protection would help many bird species, not just the Brown Thrasher. All children deserve the chance to discover the Brown Thrasher's defensive behaviors for themselves.



European Starling *(Sturnus vulgaris)*

Emma B. Pitcher & Allen T. Chartier



John Van Orman ©

The European Starling, a native of Europe and western Asia, was introduced into North America in 1890 and 1891 when approximately 100 birds were set free in New York City (Cabe 1993), though sightings hundreds of miles from release sites prior to 1890 suggests multiple release sites (Ardia 2008). By 1970 it had reached Alaska (Cabe 1993). A very adaptable, gregarious bird, starlings are tolerant of humans, consume a wide range of foods, and can utilize a wide variety of nesting sites. The result is that it is now found year-round across North America, often in very large numbers. Starling sexes are similar in appearance with stocky bodies, glossy black plumage with purplish and greenish iridescence, squared tail, pointed wings and long bill. A yellow bill in spring helps differentiate starlings from North American blackbirds, and males develop a pale blue patch at the base of the lower mandible while females develop a pinkish patch (Pyle 1997). Starlings forage actively for invertebrates, seeds, fruit and plant material in urban areas, mown farm fields and pastures, garbage dumps, and at livestock feeding sites (Cabe 1993). Starlings are found in large numbers throughout North America. Common residents of disturbed urban and agricultural areas, they are found in slightly smaller numbers in deep woods and in the forested and mountainous areas of the west. Migration patterns in North America are complex, as they are in Europe. Millions of starlings migrate to the southern U.S., particularly juveniles, but large numbers also over-winter at the northernmost reaches of its range (Cabe 1993).

Distribution

The European Starling was first observed in southwestern Michigan in 1924 (Beebe 1925), and it had spread into the UP by 1931 (Wood 1951). Human agriculture has provided more open habitat as well as nesting sites on human structures in addition to food sources based on certain crops. This has improved their ability to survive to the point that they are now considered an agricultural pest, as well as competing with native cavity-nesting species (Cabe 1993).

Starling populations are denser around cities and towns where enormous, noisy, congenial groups forage and roost together. During MBBA I, starlings were recorded in 80% of all townships statewide, with 55% of UP, 86% of NLP, and 97% of SLP townships occupied. Results of MBBA II show a decrease to 73% statewide, 42% in the UP, 78% in the NLP, and 96% in the SLP. In the UP, where the greatest change was noted, starling distribution is now less extensive in the westernmost portions, including much of Baraga, Iron, Houghton, Ontonagon, and Gogebic counties, and in parts of Luce, Chippewa, and Mackinac counties in the eastern UP. Despite these changes, the European Starling continues to be one of the most widespread birds in the state.

In surrounding states, first atlas efforts found European Starlings in 81% of all quads in Wisconsin (Temple 2006), 90% of all blocks in Illinois (Kleen et al. 2004), 98% of all blocks in Indiana (Keller and Castrale 1998), and in 100% of all blocks in Ohio (Peterjohn and Rice 1991). Ontario noted similar overall distribution between their two atlases. But they found a 13% decline in probability of observation, apparently correlated with a decline in open and agricultural habitats as forests have filled in former farmland and other open areas, thus reducing available habitat (Cadman 2007). New York reported a decrease from 87% total blocks occupied in their first atlas to 85% in their second (Ardia 2008).

Breeding Biology

Because of the noise, large numbers, crop damage, risks to human health, and the aggressive usurping of available cavities as well as nests of other bird species, starlings are considered an undesirable nuisance (Cabe 1993). The economic importance of European Starling, both in its original range and in the U.S., has resulted in it being studied more extensively than almost any other bird species, and therefore has increased our general knowledge of avian biology.

Starlings are generally monogamous. In late winter after establishing nesting territories, males attract mates by singing. Females choose mates and may make choices based on male song (Cabe 1993). Both sexes develop brood patches. Males closely guard established mates during nest building, egg laying, and early incubation periods. Nests are placed within natural and man-made cavities, including buildings, billboards, nest boxes, cliffs, burrows, cavities usurped from woodpeckers, and natural cavities in trees. These cavities are filled with slovenly nest cups 5-7 cm deep lined with grass, feathers, rootlets, and a wide variety of discarded human refuse (Cabe 1993).

Females spend more time than males incubating eggs and brooding young, and are exclusively on nests at night. Males help in feeding young. Clutches containing five eggs are common. Young are usually fledged at 21 days. Second broods are attempted in many areas when first clutches

Emma B. Pitcher & Allen T. Chartier

fledge early, but not attempted north of 48 degrees latitude (Cabe 1993).

Abundance and Population Trends

In its native range, the European Starling is declining. From a strictly numeric perspective, the introduction of the starling to North America is one of the most successful of any bird species, increasing from the original 100 individuals to more than 200 million in less than a century (Cabe 1993). This increase has had negative effects on native bird populations, as well as negative economic effects to human agriculture. BBS data indicate that the Upper Midwest east to Ontario and New York, has the highest density of European Starlings in North America (Cabe 1993, Cadman 2007, Sauer et al. 2008). Continent-wide, range expansions appear to have slowed and population trends are no longer rapidly increasing but instead appear to have stabilized (Sauer et al. 2008).

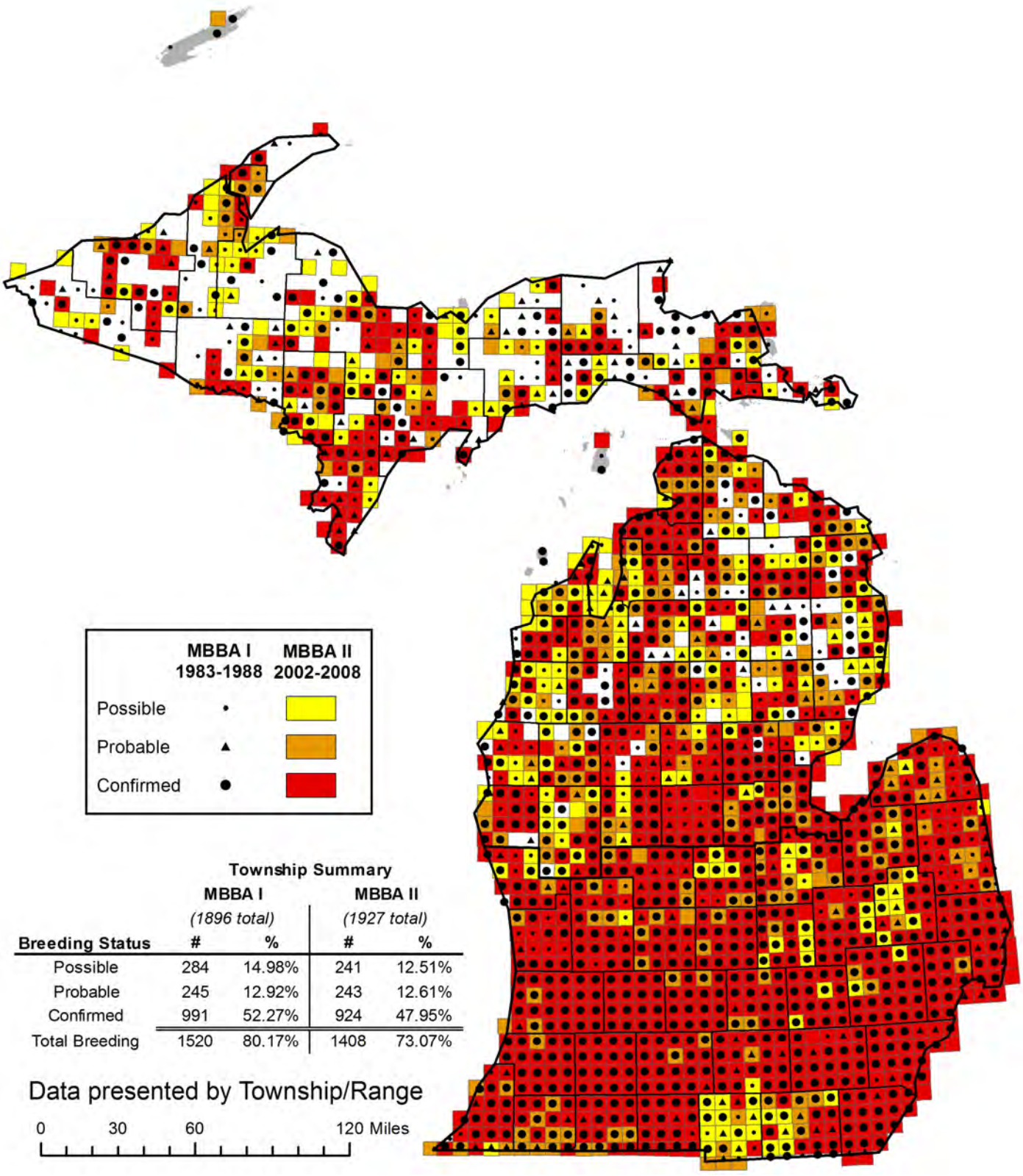
Michigan cities and towns report abundant numbers of resident starlings, especially in the SLP where at least five counties confirmed breeding populations in every township in both atlases. Local bird counts consistently list starlings as the most abundant species. Highest densities were observed in the most urbanized regions. BBS trends for Michigan show a slight, non-significant decline in populations similar to the stabilization noted within the region, and the continent as a whole (Sauer et al. 2008). Reforestation of open areas in the coming decades may slightly reduce suitable habitat for European Starlings.

Conservation Needs

As a non-native bird species, the European Starling is not protected in Michigan, nor anywhere else within the U.S. The main problem large starling populations present to Michigan's avifauna is their intense competition for tree cavities and nesting boxes with native species such as moderate sized woodpeckers, Eastern Bluebirds, and Great Crested Flycatchers, although a thorough analysis of this only confirmed negative effects on the Yellow-bellied Sapsucker (Ardia 2008). This suggests that impacts may be less than previously thought, or that more detailed study is needed. The fact that European Starlings are parasitized by Brown-headed Cowbirds though infrequently, and can successfully raise cowbird young in addition to their own is an additional, though likely insignificant, impact on native bird populations. Damage to human food crops, and human health hazards from droppings in urbanized areas, are well known and often significant. In both urban and agricultural settings, repeated efforts to reduce unwanted populations (e.g., shooting, trapping, use of pesticides) have had limited short-term success (Cabe, 1993).

European Starling *(Sturnus vulgaris)*

Emma B. Pitcher &
Allen T. Chartier



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	284	14.98%	241	12.51%
Probable	245	12.92%	243	12.61%
Confirmed	991	52.27%	924	47.95%
Total Breeding	1520	80.17%	1408	73.07%

Cedar Waxwing *(Bombycilla cedrorum)*

Gail McPeek



Jim Ridley ©

Species sponsored by: Deborah Remer

Even the most novice bird watcher will recognize that the Cedar Waxwing has a unique look. Its sleek feathers blend as one, a look that naturalist Donald Stokes describes as "the appearance of a skillfully painted carving" (Stokes and Stokes 1983). During banding studies at Kalamazoo Nature Center, I had the good fortune to view, in hand, this songbird's silky earth-tone plumage, velvety black mask, yellow-tipped tail, and trademark waxy red drops decorating the wings.

You can find the Cedar Waxwing throughout most of North America. Its breeding range includes southern Alaska, the southern half of Canada, and the northern half of the Lower 48 states. Its winter range is similar but does not extend as far north and stretches south to northern South America and the West Indies.

Distribution

The Cedar Waxwing is a common breeding bird throughout the state but its occurrence from year to year and place to place can be quite variable. This species is highly social and its flocking tendencies, together with the patchiness of its food supply, play a major role in determining distribution. Cedar Waxwings travel in flocks year-round, even during breeding when adults leave their nests to feed with the flock.

Barrows (1912) described the Cedar-bird as an abundant summer bird but also noted it was "erratic in its nesting." He indicated it to be one of the most abundant and characteristic late summer birds about the cedar and tamarack swamps in the northern part of the state. A century later, the Cedar Waxwing remains one of Michigan's most common summer birds. It ranked 10th on the list of most recorded species for MBBA II. The map shows a widespread distribution in all counties with no noticeable change since MBBA I. Data comparisons for the SLP, NLP, and UP also show essentially the same distribution. The Cedar Waxwing is easily detected by its frequent, high-pitched *"Seee"* calls and conspicuous foraging activity. Nests, on the other hand, are not so easy to find and the majority of atlas records were of probable breeding evidence.

This species nests in a variety of open forest and forest edge habitats, particularly those near water, orchards, gardens, and grasslands which provide an abundance of food. Wet mesic forest, mixed mesic forest, and shrub upland were among the more preferred habitats reported during MBBA I (Eastman 1991). Knowledge of the waxwing's diet is the key to understanding its distribution. Fruit makes up 84% of its diet, followed by 12% insects and 4% flower parts (Witmer 1996a). From October to April, they feast almost exclusively on fruits, particularly cedar berries. Flowers are added in spring and from May to September insects are consumed, but fruit remains the main fare.

Various studies have documented the Cedar Waxwing's preference for high-energy, sugary fruits (Witmer et al. 1997). Serviceberry, mulberry, strawberry, cherry, raspberry, and red-osier dogwood are among those fruits eaten during the breeding season. Come winter, its fondness for sugary fruits can sometimes lead to alcohol intoxication. Consumption of fermented fruits can cause birds to fly erratically and fall out of trees. Diet has also been linked to the occasional Cedar Waxwing with orange-tipped rectrices instead of yellow. Research has found that ingestion of exotic honeysuckle fruits during molt can cause this color change (Brush 1990, Witmer 1996b).

Breeding Biology

The Cedar Waxwing is one of our latest spring migrants, typically arriving in the later part of May in southern Michigan to mid-June in the UP. Pairs have already formed by the time they reach the breeding grounds. Pay close attention to late winter, nomadic flocks and you may witness the side-hopping, berry-passing ritual between male and female.

Witmer et al. (1997) label the Cedar Waxwing as one of North America's latest nesting birds. In Michigan, most nesting occurs from mid-June through August. Second broods are common and can extend the nesting season into September. A late egg date for Michigan is 23 September (KNC 2004). The female incubates the 4-5 eggs for 14 days, during which time the male brings her food. The young waxwings fledge from the nest 15-16 days after hatching (Witmer et al. 1997). Juveniles can be recognized in their family flocks by their streaked breast plumage.

Waxwings are more social than territorial, even in the breeding season. Nests can be in close proximity, a kind of loose colony. It is not uncommon for individuals to pinch nesting material from nearby waxwing nests. Rothstein (1971) offers a good description of a colony in Cheboygan County, Michigan. In July 1969, he discovered 20 nests in a 2.3-acre (0.9 ha) white pine plantation, but rather than being spaced throughout the woodlot, nests were clustered at the two edges, close to neighboring fields with rich food supplies.

Cedar Waxwing *(Bombycilla cedrorum)* ***Gail McPeek***

Abundance and Population Trends

Although Atlas data show the Cedar Waxwing to be common and widespread in the state, patterns of abundance are not so clear cut. Block counts with 18 or more waxwings compared to those with 10 or fewer do pinpoint some areas with greater abundance. In the SLP, these higher totals (18 or more) were more prevalent in the southwestern counties and a small number of southeast counties. Blocks with 10 or fewer recorded were more the norm in the central and thumb counties. BBS route averages support these observations. In the NLP, the central and western counties tended to have higher counts; in the UP, higher block totals were recorded more consistently near the Great Lakes or inland lakes. Lower counts were in more interior blocks, including those counties bordering Wisconsin. Again, BBS route averages support these general patterns.

Cedar Waxwing populations have increased throughout North America from 1966 to 1989 (Robbins et al. 1986, Droege and Sauer 1990). In Michigan, there was a significant increase of 6.35 birds per route (1966-70) to 12.83 per route (1981-85). Adams et al. (1988) attributed this to the bird's liking for secondary growth habitats which were increasing at that time.

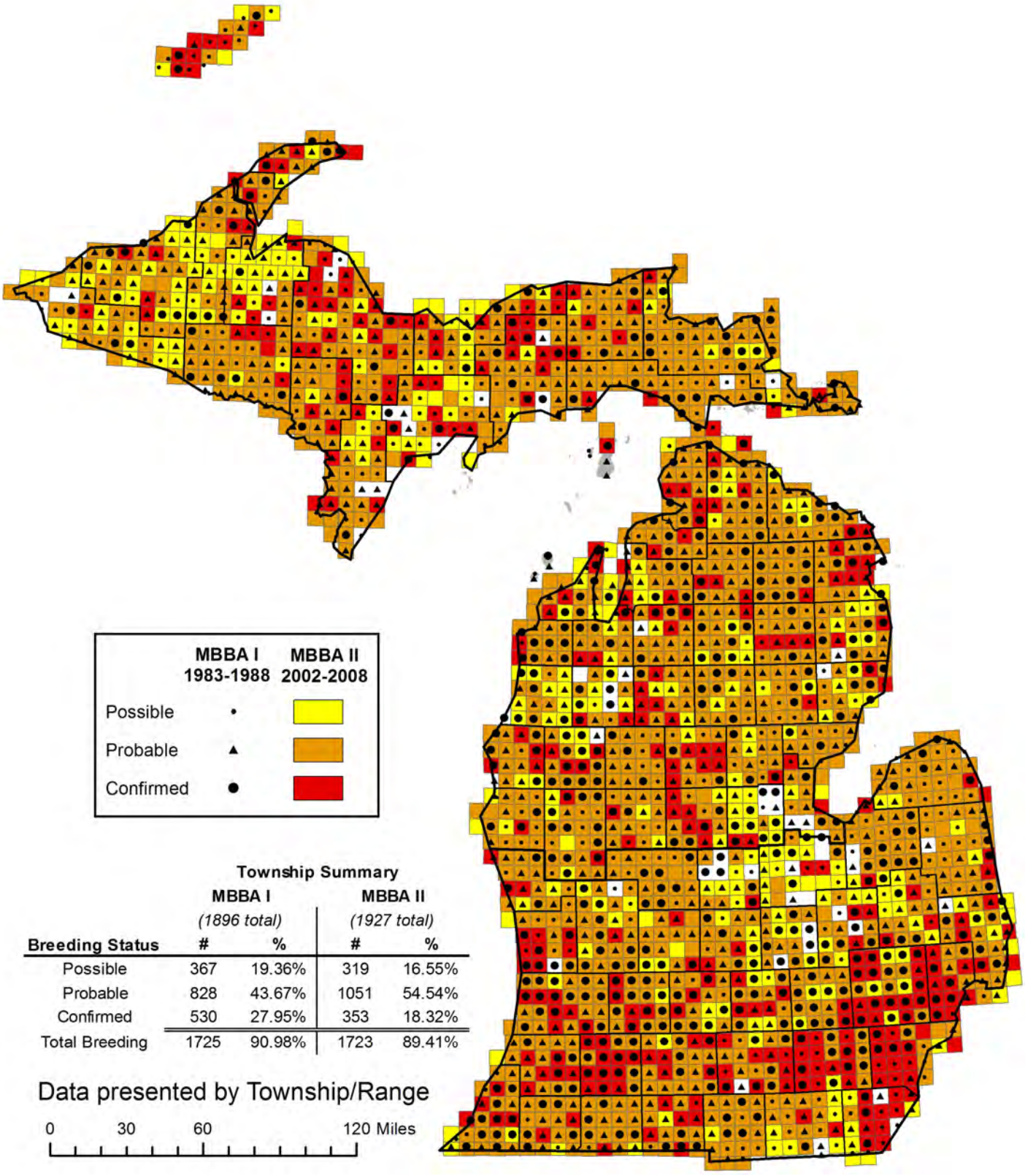
Examination of BBS data since 1985 shows that annual state averages have varied from a high of nearly 18 waxwings/route to a low of 10 waxwings/route, but the overall trend has been one of slight decline (Sauer et al. 2008). Perhaps this reflects the maturation of many secondary growth habitats. Similar recent declines were detected in Ontario (Kits 2007). New York experienced a slight decline in the 1980s, with numbers stabilizing in the last 15 years (Witmer 2008).

Conservation Needs

The Cedar Waxwing is among those birds which have benefited from human land-use changes, resulting in an abundance of second-growth habitats and fruit-bearing trees and shrubs. Consequently, it is not a species of conservation concern. Continued long-term monitoring is helpful since this fruit eater is vulnerable to pesticide poisoning. In the waxwing's favor is the low rate of cowbird parasitism. Even though forest edge habitat is prime for cowbirds, the late timing of nesting is less conducive to cowbird parasitism. Rothstein (1976) showed via experimentation that waxwings reject cowbird eggs in the early part of incubation, either by ejecting them from the nest or, more frequently, by nest desertion.

Cedar Waxwing *(Bombycilla cedrorum)*

Gail McPeek



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	367	19.36%	319	16.55%
Probable	828	43.67%	1051	54.54%
Confirmed	530	27.95%	353	18.32%
Total Breeding	1725	90.98%	1723	89.41%

Data presented by Township/Range

0 30 60 120 Miles

Ovenbird *(Seiurus aurocapilla)*

Mike Bishop



Willie McHale ©
Species sponsored by: Fred & Alyce Townsend
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A walk through just about any forested area in Michigan during June or July will be rewarded with the unmistakable "*teacher-teacher-TEACHER*" song of the Ovenbird. This wood warbler, with the thrush-like appearance and habit, is one of the most common forest species of the upper Midwest with its region-wide range centered around the Great Lakes Basin (Van Horn and Donovan 1994). The greatest densities of Ovenbirds are found in Michigan, northern Wisconsin, and northeastern Minnesota. The rest of its range includes much of eastern North America from Canada south to Alabama and Georgia and west through the upper Great Plains to Alberta. The species winters from southernmost Florida, throughout the Caribbean and south to Mexico and Central America. The bird's name is derived from its characteristic dome-shaped, ground nest that reminded early naturalists of the familiar old-world earthen ovens.

Distribution

Prior to settlement, the Ovenbird was undoubtedly well represented in the avifauna of the state's forested areas (Pinkowski 1991). Even with the extensive habitat loss that occurred after settlement, the Ovenbird was still common where larger contiguous blocks of undisturbed hardwood and mixed-hardwood forests persisted (Barrows 1912). Currently, the Ovenbird is widely distributed across the state, occurring in every region.

The Ovenbird's distribution in Michigan, and indeed range-wide, is centered throughout the UP and Northern LP. Its statewide distribution follows a basic pattern of higher densities in forested areas versus much lower densities in agricultural, industrial or urban locales. Consequently, the eastern half of the SLP shows the lowest densities particularly around the heavily populated urban areas of Detroit, Flint, Lansing/Jackson and the primarily agricultural lands of the thumb. In comparing the distribution of Ovenbirds between MBBA I and MBBA II, these are the only regions that show an apparent retraction of range. Even so, corridors within these locations contain breeding populations where larger forests still exist.

Breeding evidence was lower in the southeastern LP and along the southern border and higher in the NLP and UP. Overall, changes in breeding evidence between MBBA I and MBBA II were very small. Of the townships surveyed that reported breeding evidence, the UP showed an increase from 81.3% to 86.6%, the NLP an increase from 89.7% to 90.4%, and the SLP a decrease from 60.5% to 51.2%.

Differences in the levels of breeding evidence were relatively unchanged as well. The overall change in breeding confirmations dropped from 11.3% in MBBA I to 9.4% in MBBA II. Probable breeding evidence rose from 39.8% to 46.5% and possible breeding evidence dropped from 25.2% to 18.8%. By region, the SLP showed declines in all levels of breeding evidence reported, whereas the NLP and UP showed increases in probable and confirmed evidence but decreases in possible evidence.

Breeding Biology

Ovenbirds arrive in the LP by late April and the UP by early May (McPeek and Adams 1994, Chartier and Ziarno 2004). Breeding spans a relatively long period for a Neotropical migrant, taking place between late May and early August, with fledging completed as late as late August (Van Horn and Donovan 1994). By early August the birds have quit singing and migration begins toward the end of the month reaching its peak in mid-September. By the middle of October most Ovenbirds have left the state and over-wintering is very rare (McPeek and Adams 1994, Chartier and Ziarno 2004).

Breeding was confirmed in only 14.8% of the townships surveyed in MBBA II. Given the cryptic nature of the nests and the generally shy habit of the bird, this is hardly surprising despite its widespread occurrence. It should also be pointed out that the protocols for MBBA II emphasized finding nests less than the first atlas did (KNC 2004). The number of townships reporting probable breeding evidence was 52.1%. This was determined by counting singing males which are far more conspicuous than the species' camouflaged ground nests.

Abundance and Population Trends

BBS data for the Ovenbird across its entire range show a significant small increase during 1966-2007 (Sauer et al. 2008). For USFWS Region 3, which includes the Upper Midwest and western Great Lakes the increase is a bit more substantial and statistically significant. The increase appears even more substantial for Michigan even though it is not statistically significant. This is probably due to the fact that the protocols for MBBA I and MBBA II document distribution but are less able to substantiate population trends. However, looking at a time period encompassing the two Atlases, 1983 – 2007, there has been no significant change in Michigan (Sauer et al. 2008). Comparing

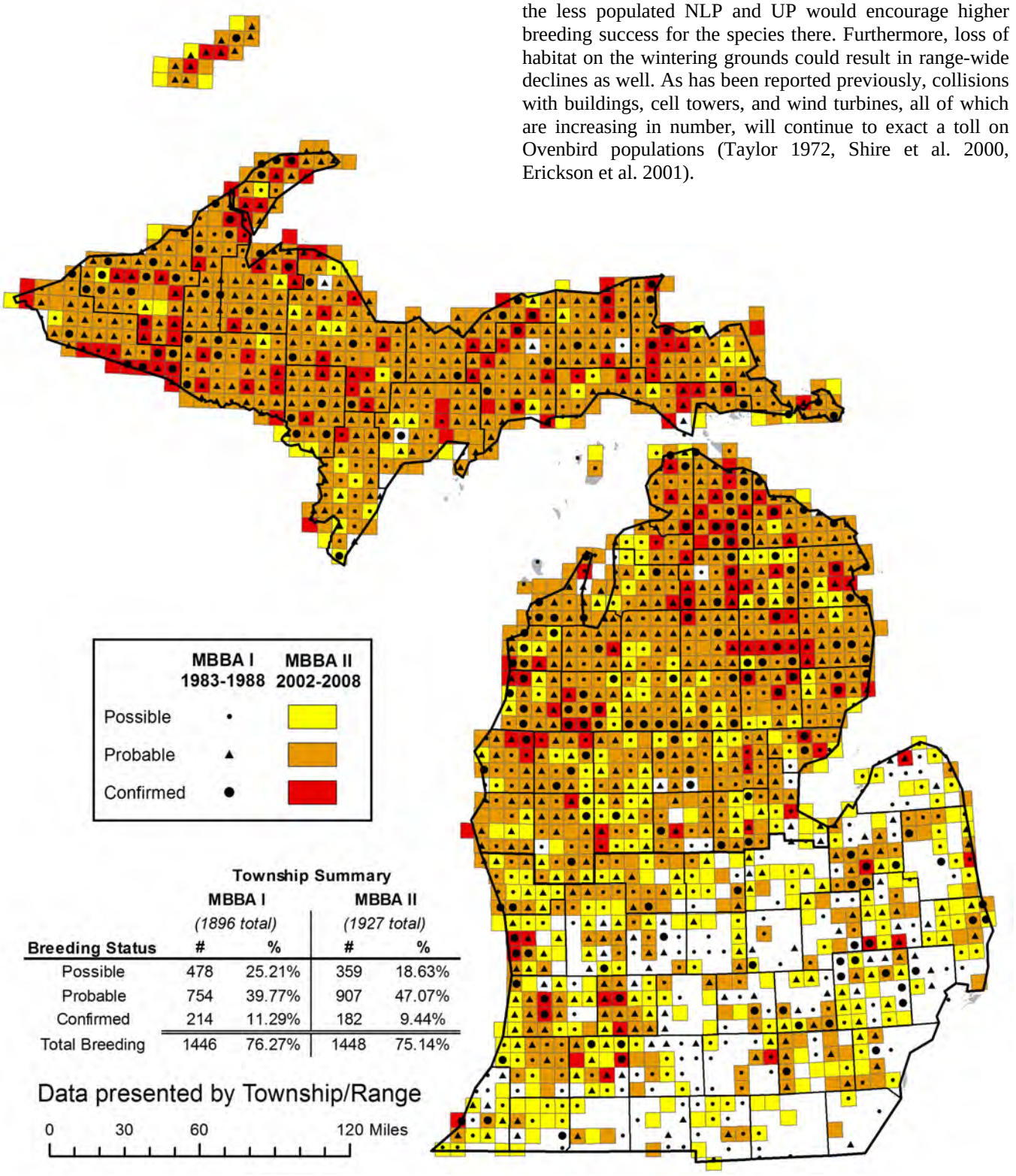
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breeding evidence collected from MBBA I and MBBA II does not indicate any significant changes in the distribution of Ovenbirds throughout the state. Consequently, the current trend for Ovenbird populations throughout its Michigan range has been one of stability. Similar trends have been found in the second breeding bird atlases for both Ontario and New York (Burke 2007, McGowan 2008).

Conservation Needs

Because Ovenbirds are considered area sensitive, requiring relatively large, contiguous tracts of mature forest for breeding, loss or fragmentation of forests would certainly impact their numbers in Michigan and throughout their range (Van Horn and Donovan 1994). While development in the SLP continues to cause fragmentation, the outlook in the less populated NLP and UP would encourage higher breeding success for the species there. Furthermore, loss of habitat on the wintering grounds could result in range-wide declines as well. As has been reported previously, collisions with buildings, cell towers, and wind turbines, all of which are increasing in number, will continue to exact a toll on Ovenbird populations (Taylor 1972, Shire et al. 2000, Erickson et al. 2001).



Louisiana Waterthrush *(Parkesia motacilla)*

Christopher N. Hull

Status: *State Threatened*



Mike Shupe ©

This fascinating southern waterthrush sings its loud, clear, distinctive song over the sound of babbling brooks as far north as eastern Nebraska, lower Michigan, southern Ontario, and New England, and as far south as eastern Texas, central Louisiana, and northern Florida. It winters from Mexico and southern Florida south to Central America, northern South America, and the West Indies (AOU 1983, Robinson 1995).

Hubbard (1971) suggested that the Louisiana Waterthrush evolved while isolated in the southern Appalachians during an interglacial period of the Pleistocene. It prefers lotic (flowing-water) upland deciduous forest habitats, for which it exhibits a degree of morphological and behavioral specialization (Barrows 1912, Bent 1953, Craig 1984, Craig 1985, Craig 1987). Specifically, the Louisiana Waterthrush avoids moderate and large streams, selecting small, fast-flowing, first-order streams with gravel bottoms in hilly, upland deciduous forest (Mengel 1965, Graber et al. 1983, Eaton 1988, Peterjohn and Rice 1991, Robinson 1995, Bruner 1998, Cutright 2006, McCracken 2007, Rosenberg 2008). It may nest in swamps and bottomlands without gravel substrates, but less commonly (Bruner 1998, Kleen 2004, McCracken 2007, Rosenberg 2008), and in lower densities (Graber et al. 1983). The species is considered area-sensitive (Cutright 2006), and large, continuous tracts of mature forest, tens to hundreds of acres in size, are required (Eaton 1958, Eaton 1988, Peterjohn and Rice 1991, Robinson 1995, Kleen 2004, Cutright 2006, McCracken 2007, Rosenberg 2008). Territories are linear, following continuously-forested stream habitat, and range 188-1,200 m in length (Eaton 1958, Craig 1981, Robinson 1990, Robinson 1995).

Distribution

Using the newer findings above, which were derived using modern knowledge and techniques, the "logical imperative" approach of Brewer (1991) would lead us to predict that the Louisiana would have been historically distributed throughout the SLP to the tension zone, and likely beyond somewhat, in suitable habitat. The Louisiana probably ranged at least somewhat into the NLP, and potentially even the UP, since its range in New England reaches the latitude of the Keweenaw Peninsula (Robinson 1995), and habitats occupied in the northernmost portions of its range often contain significant coniferous components (Cutright 2006, McCracken 2007, Rosenberg 2008). Unfortunately, the statewide deforestation brought about by lumbering and settlement preceded ornithologists' ability to reliably identify this species and accurately define its habitat (Sager 1839, Gibbs 1879, Cook 1893, Ridgway 1902, Barrows 1912, Wood 1951, Zimmerman and Van Tyne 1959, Brewer 1991).

However, even after deforestation had taken place, both Cook (1893) and Barrows (1912) considered the Louisiana Waterthrush to be common throughout the SLP, but found nowhere north of Saginaw or Montcalm Counties. In 1936, it was found slightly further north, in Newaygo County (Wood 1951). Declines were reported for the western (Zimmerman and Van Tyne 1959) and then eastern (Kelley 1978) SLP, and finally Payne (1983) reported that the species had become uncommon and local in the SLP.

Similar to MBBA I (Hull 1991), MBBA II data (see map) show the Louisiana Waterthrush today to be sparsely distributed in a V-shaped pattern which extends northward up the western third of the SLP and into the west side of the NLP as far north as Manistee County (just west of the adjacent Wexford County northern limit of MBBA I); and northward up the eastern third of the SLP, into the Thumb as far north as Tuscola County (same county and townships as in MBBA I). As in MBBA I, the species was largely unrecorded in the central SLP, most of the NLP, and the entire UP. Also as in MBBA I, the species was reported in far fewer blocks in the east than in the west. Generally, there was close correspondence with locations for which the species was reported in MBBA I. Many of the townships in which the species had been detected in MBBA I revealed it again in MBBA II; quite a number did not, and for far fewer, MBBA II revealed new locations. The Wexford and Manistee Counties locations are two tiers of counties north of Wood's (1951) northernmost breeding record from 1936, and three tiers north of the records known by Barrows (1912). Thus, the Louisiana Waterthrush has extended its range northward over the past 100 years; however, this is most likely a reoccupation of the species' presettlement range, rather than an expansion of it.

Breeding Biology

The Louisiana Waterthrush is among the first of the warblers to return in the spring, as well as one of the first to nest, and has been recorded as early as 28 March (Kelley 1983). This may be an adaptation to the species' habit of nesting in and along streambanks, since nests are vulnerable to flooding (Kleen et al. 2004), and early arrival allows the birds to conduct nest site selection when stream flows are at or near their seasonal maxima (Bruce and Peterjohn 1991, Bruner 1998, Cutright 2006), thus reducing the risk of a later nest loss due to flooding. This may also be one of the advantages of selecting small streams, where flood peaks

Louisiana Waterthrush *(Parkesia motacilla)* ***Christopher N. Hull***

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and flow volumes are lower than for larger streams (pers. obs.). Most nesting occurs from late May to mid-June, but a few nests have been found during the first two weeks of July (Kelley 1978, Schumacher 1983). Nests are situated in a hollow or cavity in a stream- or ravine- bank, or in a root mass or stump of an overturned tree (Barrows 1912, Wood 1951, Bent 1953, Robinson 1995). Data from Eaton (1958) and Robinson (1995) suggest that pairs may favor south-facing slopes for nest sites. Clutch size ranges from four to six, and typically five. Only one brood is raised. Louisianas are frequently parasitized by cowbirds, and suffer significant losses, especially where forest cover is reduced (Wood 1951, Bent 1953, Eaton 1958, Robinson 1995).

Abundance and Population Trends

In MBBA I, the Louisiana Waterthrush was reported in 86 blocks statewide: 12 NLP and 74 SLP (Hull 1991). In MBBA II, it was reported in 52 blocks statewide: 11 NLP and 41 SLP. This amounts to a decrease in blocks of 40% statewide: 8% in the NLP, and 45% in the SLP, between MBBA I and MBBA II. If these figures are adjusted by estimates of reduced Atlas effort in these two regions (13.6% in the NLP, and 9.3% in the SLP), the Louisiana Waterthrush may have experienced a 5% increase in number of blocks in the NLP; but it seems clear that it suffered a substantial decline in the SLP (36%, adjusted), and a visual examination of the map reveals that the greatest decline occurred in the west, where a large number of MBBA I blocks did not yield the bird in MBBA II.

The Louisiana Waterthrush's early nesting season, local distribution, and habitat preferences are not conducive to roadside detection on BBS routes. As in MBBA I, only three BBS routes reported the species (compared with 61 for all of FWS Region 3, with a regional abundance of < 1.0 birds per route). While the Region 3 BBS trend analysis for 1983-2007 (Sauer et al. 2008) shows a general increase in birds per route from 0.15 in 1983 to over 0.25 in 2007, this was not statistically significant, due to the overall low abundance and small sample size.

The vast deforestation of the logging era, and concomitant stream degradation due to erosion, siltation, and transportation of sawlogs probably resulted in substantial population reductions for this species. Stream damage from the lumber era, in the form of erosional sedimentation (which imbeds essential invertebrate substrates) and increased flood peaks and "flashiness" (which endangers nests), remains today in many streams, and continues to degrade habitat quality and reduce wildlife (USDA 1986, Fitzpatrick et al. 1999, Fitzpatrick and Knox 2000, Riedel et al. 2001, Anderson et al. 2006). Modern-day forestry and development of all types continue to contribute these prevalent nonpoint source impacts to streams (USEPA 2009, MDNR and MDEQ 2009).

Therefore, while reforestation (which creates or improves breeding habitat) has occurred, stream alteration continues to degrade otherwise suitable habitat. This may be the most compelling reason for the decline of the species in Michigan, particularly in the SLP; and it may explain why the species appears to be holding its own, or even slightly increasing, in the NLP – where there is overall lower development pressure. The timing of the species' decline in the SLP, decades after the lumbering era, but coincident with increasing development, would seem to support this conclusion, as would the relative abundance of the Northern Waterthrush (which is less demanding of continuous forest cover, and is more of a wetland generalist) in the SLP (Hull 2010). The Louisiana Waterthrush, with its narrower ecological amplitude, is more vulnerable to habitat degradation and loss.

Conservation Needs

Nationally, the Louisiana Waterthrush is not a species of concern. It is not listed on the U.S. Watchlist of Birds of Conservation Concern (NAS 2010, ABC 2010), and the IUCN Red List lists it as a species of Least Concern (IUCN 2010). However, significant declines have been reported in Ontario, due to forest and wetland loss (McCracken 2007); and in New York, for unknown reasons, though loss of forest cover due to exotic pests, food loss due to stream acidification, and high mercury levels are all postulated (Rosenberg 2008).

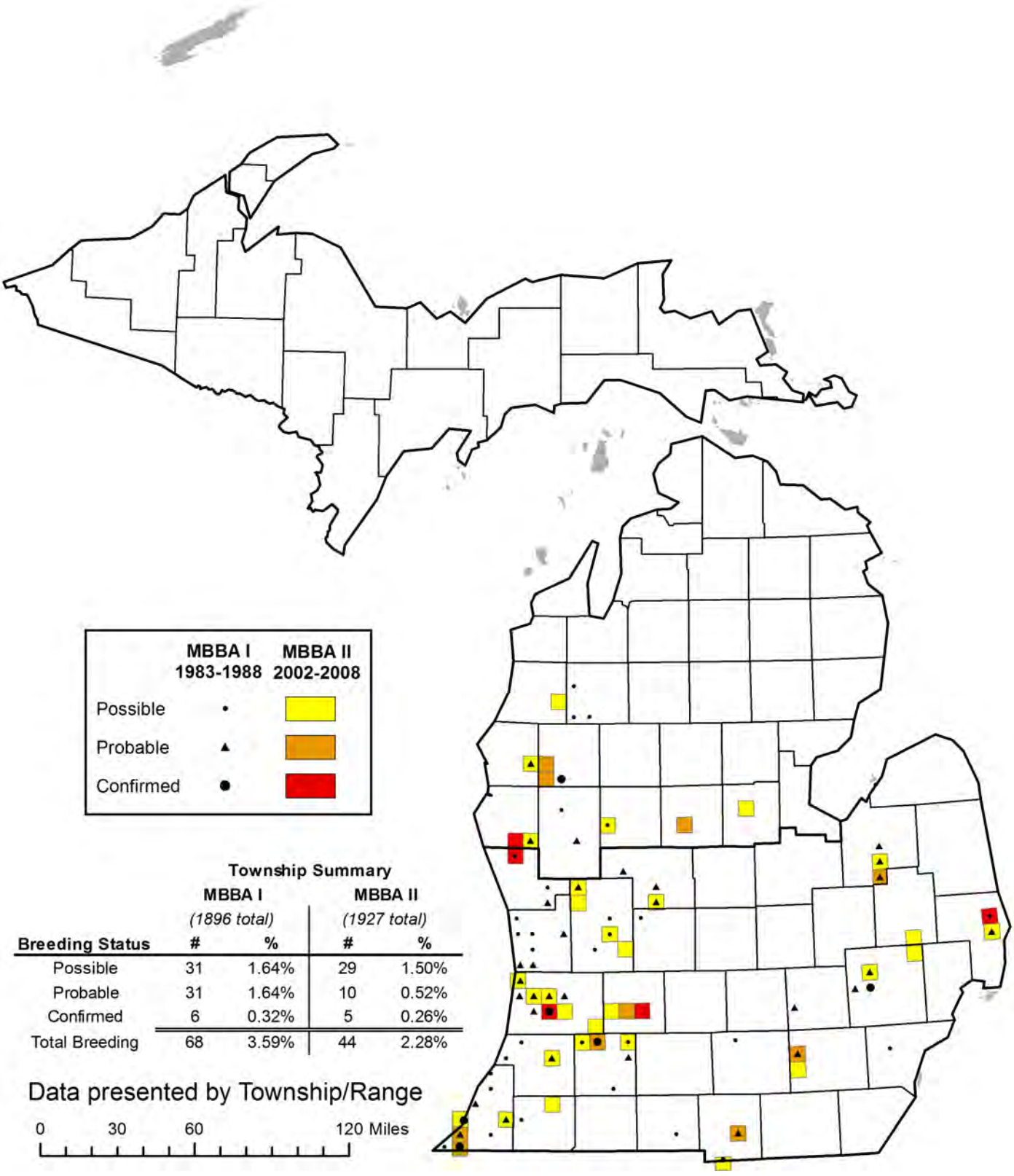
As a result of the findings of MBBA I (Hull 1991), the Louisiana Waterthrush is designated as a state listed threatened species (Michigan Administrative Code 2009). The marked decline in records for the species in MBBA II, particularly in the SLP, is a cause for concern.

To maintain stable, sustainable populations in Michigan, the Louisiana Waterthrush requires the preservation of high-quality, gravel-bottom, first-order stream habitat, and, to a lesser degree, other lotic and lentic (still-water) systems, covered by large unbroken tracts of upland, mature, largely deciduous forest. Stream restoration projects which trap and remove sediment and improve flows and natural vegetational cover on impacted streams could restore degraded habitat. Stream quality should be protected through the use of Best Management Practices (MDNR and MDEQ 2009). Forest streams should also be protected from channelization and the removal of snags, windfalls, and bank vegetation. In MBBA I, habitats used by this species were not adequately documented by the Atlas Habitat Survey; therefore, MBBA II active blocks for this species should be surveyed to assess habitat type and quality in order to document habitat use by this species in Michigan. Because differentiation between the waterthrushes continues to be a challenge even today, blocks in which Northern Waterthrushes have been recorded should be surveyed also. The tropical forests which comprise winter range habitat for this species are being destroyed at a rapid pace (Robinson 1995); therefore, protection of winter habitat and monitoring of breeding populations are both critical.

Louisiana Waterthrush *(Parkesia motacilla)*

Christopher N. Hull

Status: *State Threatened*



Northern Waterthrush *(Parkesia noveboracensis)* ***Christopher N. Hull***



Robert Epstein ©

This large, brown, thrush-like warbler sings its loud, clear, ringing song in northern bogs and swamps from northwestern Alaska to Newfoundland, north to the treeline, and south to northern Washington, Montana, the central Canadian Prairie Provinces, northern Minnesota and Wisconsin, Michigan, northeastern Ohio, Pennsylvania, the Virginias, and New England (AOU 1983, Eaton 1995, McLaren 2007). It winters in western, southern, and eastern Mexico, Central America, northern South America, the West Indies and extreme southern Florida (AOU 1983, Eaton 1995).

The Northern Waterthrush breeds in northern forested wetlands, adapting to wetland types across its range. While specifically adapted, morphologically and behaviorally, for life in boreal, lentic, (still-water) systems, it will occasionally use slow-moving lotic (flowing-water) systems, and essentially every type of coniferous, deciduous, and open shrub wetland habitat which occurs across its vast range (Bent 1953, AOU 1983, Craig 1984, Craig 1985, Craig 1987, Eaton 1988, Eaton 1995, Peterjohn and Rice 1991, Pitcher 1998, Howe 2006, McLaren 2007, McGowan 2008). Throughout its breeding range, and regardless of wetland type, the two most important habitat requirements are dense cover near ground level, combined with the presence of water (Eaton 1995). In New York, Eaton (1988) found that Northern Waterthrushes were found wherever forested wetlands exceeded 8 ha (19.8 a) in size. Territories are rectangular, and range 0.47-1.5 ha in size (Eaton 1995).

Distribution

Given its distribution across the boreal forests and wetlands of North America, its broad acceptance of essentially every type of coniferous and deciduous wetland habitat, and the profusion of such habitats throughout presettlement Michigan (Albert and Comer 2008), it is likely that the Northern Waterthrush originally occurred throughout the UP and NLP, and probably to some extent south of the tension zone, especially in the relict bog habitats of the southeastern LP. Unfortunately, the statewide deforestation brought about by lumbering and settlement preceded ornithologists' ability to reliably identify this species (Sager 1839, Gibbs 1879, Cook 1893, Ridgway 1902, Barrows 1912, Wood 1951, Zimmerman and Van Tyne 1959, Brewer 1991), thus eliminating the possibility of documenting its presettlement distribution. Brewer (1991) considered it one of the "northern withdrawals" which retreated northward as deforestation advanced. It then returned as the forests regrew. Therefore, rather than what might have been perceived as a southward "range extension", the Northern Waterthrush most likely reoccupied its presettlement range. Though much wetland habitat was degraded or lost, the species adaptability has enabled it to make use of a wide variety of remaining habitats, and reclaim a semblance of its original range.

By 1991, MBBA I found the Northern Waterthrush in clumped distributions throughout the UP and NLP; slightly into the western SLP; and throughout the Thumb (Hull 1991). MBBA II found a similar distribution, although somewhat less clumped in the UP and NLP, and extending farther south into the southwestern LP and with a scattered distribution in the central LP, extending to the bottom of the state. MBBA II population concentrations largely occurred in townships which had shown them in MBBA I.

Breeding Biology

Northern Waterthrushes arrive in spring as early as 18 April (Kelley 1983), but more typically during the first half of May in the SLP and after mid-May in the UP (Wood 1951). Preferred nest sites include cavities in upturned tree root systems or banks; or alongside fern clumps. The nest is usually covered from above by growth. Clutch sizes range from one to five, with a mean of four (Eaton 1995). Eaton (1995) found dramatically lower rates of cowbird parasitism for the Northern Waterthrush than for the Louisiana, to which he attributed the situation of nests in wooded swamps with thick understory, hidden from above and the overall occurrence of much of the species' breeding range (in New York) outside that of the cowbird.

Abundance and Population Trends

The Northern Waterthrush was recorded in 560 blocks statewide in MBBA II, up from the MBBA I total of 498 blocks. Consistent with this species' reputation for having difficult-to-find nests, only 16 blocks had confirmations. Using figures adjusted for differences in Atlas effort between the two surveys, MBBA II recorded the Northern Waterthrush in 19.7% more blocks statewide than MBBA I, although this trend was not uniform throughout the state. In the UP, the species' representation increased 16%, and in the NLP, it increased 18.6%. In the SLP, however, it decreased 6.4%.

BBS data show no conclusive trends. Twenty-four Michigan routes (down slightly from 25 in MBBA I) and 70 in FWS Region 3 recorded the species. While the Region 3 BBS trend analysis for 1983-2007 (Sauer et al. 2008) shows a slight decrease in birds per route, the trend was not

statistically significant, due to overall low abundance and small sample size.

The net decline in number of blocks reporting Northern Waterthrush in the SLP occurred despite the recording of a substantial number of new blocks in which it had not been reported in MBBA I. The species' decline in the most populous, developed, and fastest-growing region of the state (the SLP), contrasted with its increase elsewhere, suggests that development and its impacts are the cause. The fact that a scattered distribution of new blocks for the species is in the central SLP, outside of the larger population centers of the eastern and western SLP, may tend to support this. The impacts of development most likely to threaten this species are wetland loss and loss of forest cover. The fact that the Northern Waterthrush's rate of decline in the SLP since MBBA I is low relative to that of its close relative, the Louisiana, during this same time period can probably be attributed to its wider ecological niche, . Specifically, the Northern Waterthrush accepts any type of wooded or even partially open wetland habitat, while the Louisiana's requirements are more specific (Hull 2011). Nevertheless, even with the Northern Waterthrush's adaptability, habitat degradation and destruction appear to have brought about a small net decline in the SLP.

Atlas data from surrounding states and provinces tell a similar story. In New York, Ohio, and Indiana (all states with low numbers of the species), populations appear to be showing no significant changes (McGowan 2008, Peterjohn and Rice 1991, Pitcher 1991). In Wisconsin, a steady decline has occurred since 1980 (Howe 2006). In Ontario, populations appear to be stable-to-increasing in less-developed regions, and declining or gone from areas of increasing population and development (McLaren 2007).

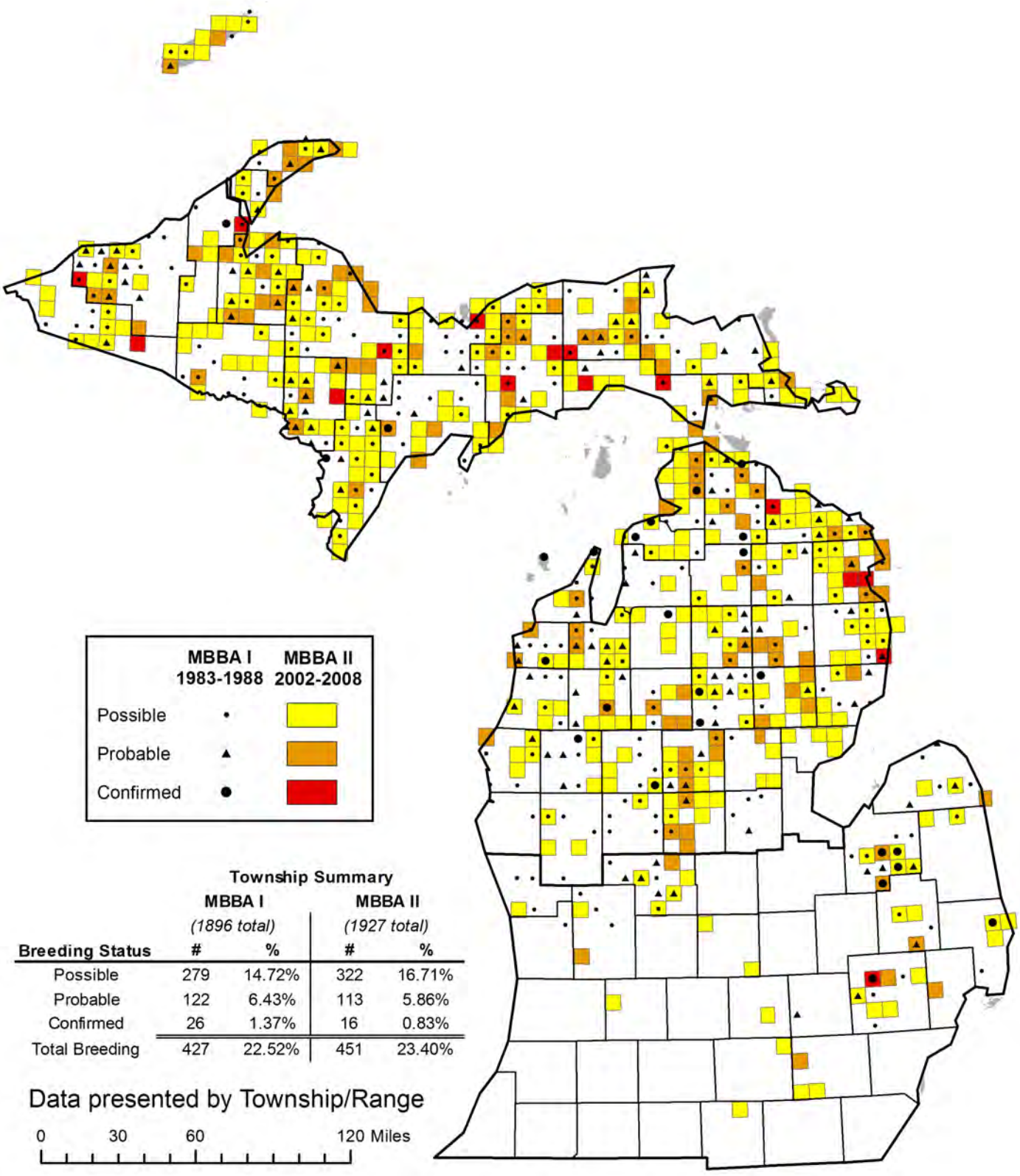
Conservation Needs

The Northern Waterthrush is not a species of concern. It is not listed on the U.S. Watchlist of Birds of Conservation Concern (ABC 2010, NAS 2010); and the IUCN Red List classifies it as a Species of Least Concern (IUCN 2010). Reed (1992) gave the species the lowest ranking for conservation priorities, based upon its wide breeding and wintering ranges; and, in Michigan, the species is not listed as a species of concern.

Much of the Northern Waterthrush's breeding range lies in remote regions where threats from human activity are not immediate. However in Michigan, human population and its impacts are denser. Threats include forest and wetland degradation and loss, including stream degradation and toxic contaminant exposure via forest pest eradication and mosquito abatement programs (Eaton 1995; C. Hull, pers. obs.). For the species to survive in Michigan, it must be protected from these threats. However, the most immediate and powerful threat to the species may be on the winter range, where mangrove swamp and other tropical forests which form critical habitat for the species are being destroyed at a rapid rate (Eaton 1995). Because of the vast remoteness of much of the Northern Waterthrush's breeding range, declines due to loss of critical winter habitat may not be detected until serious momentum is reached. Therefore, protection of the species' wintering habitat and monitoring of breeding populations are both critical.

Northern Waterthrush *(Parkesia noveboracensis)*

Christopher N. Hull



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	279	14.72%	322	16.71%
Probable	122	6.43%	113	5.86%
Confirmed	26	1.37%	16	0.83%
Total Breeding	427	22.52%	451	23.40%

Data presented by Township/Range

0 30 60 120 Miles

Golden-winged Warbler *(Vermivora chrysoptera)*

Robert B. Payne



John Van Orman ©

Golden-winged Warblers breed in northeastern North America from New York, Pennsylvania, southern Ontario and southern Manitoba to Michigan, Wisconsin and Minnesota and south through the Appalachian Mountains into North Carolina and eastern Tennessee. They are long distance migrants and in winter they occur from Central America to extreme northwestern South America (Confer 1992). In addition to their distinctive plumage of a yellow cap and wing bars and a broad black mask and black throat, the songs of Golden-winged Warblers are distinct from songs of the related Blue-winged Warbler. One set of Golden-winged Warbler songs (accented song, type 1) is a distinctive "*bee-buzz-buzz-buzz*", differing from the "*bee-buzz*" of Blue-winged Warblers. The other songs, called (unaccented song type 2) are more similar in the two species, and these songs vary among localities within the species (Confer 1992, Gill et al. 2001).

Distribution

In Michigan the Golden-winged Warbler occurs mainly in the NLP and the UP; they also occur in scattered localities in the SLP. Their breeding habitat is found primarily in early successional stages of woodlands, along the edges of fields and in shrubby wetlands.

Breeding Biology

In Michigan, Golden-winged Warblers arrive in early May, breed in spring and early summer, and leave in August (Barrows 1912). Territory size averages 1.9 ha in Michigan (Murray and Gill 1976, Will 1986) and can range from 0.4 to 6.0 ha (Confer 1992, Confer and Larkin 1998). In Michigan the first nests are built 21 May - 1 June; when nests are lost, replacement nests are built in June and into early July. After a successful first nest, second nestings are unknown. Nests are an open cup of grass placed on the ground, well concealed, in the shade and often along edges of forest and field. The warblers sometimes are brood parasitized by Brown-headed Cowbirds (Will 1986, Confer 1992).

Where Golden-winged Warblers occur together with Blue Winged Warblers, the two species sometimes occur on overlapping territories and are not aggressive toward each other, and other times they occur on exclusive neighboring territories and are aggressive toward each other. They often interbreed and produce fertile hybrid young (Berger 1958; Gill and Murray 1972a, 1972b; Murray and Gill 1976; Gill 1980, 2004). Interspecific hybridization is an important aspect in the biology of these warblers. The hybrids and the offspring of hybrids are sometimes known as "Brewster's Warbler" and "Lawrence's Warbler". Birds identified as backcross hybrids ("Lawrence's Warbler", the most readily identified intermediate form, with yellow and a black mask and bib) were recorded in MBBA I and MBBA II in the SLP, where Blue-winged Warblers have largely replaced the Golden-winged Warblers.

In southern Ontario, Golden-winged Warblers mate with their own species or with Blue-winged Warblers at random in relation to the local abundance of the two species. The hybrid warblers are as successful in reproduction and fledging as are conspecific pairs of Golden-winged Warblers (Reed et al. 2007; Vallender et al. 2007a, 2007b). The breeding biology of these warblers is further noteworthy in that more than 30% of nestling warblers in a mixed-species population were the result of extra-pair copulations, and genetic mismatches of the social father (the male on whose territory the female nested, and her social mate) and the genetic father of the nestlings were seen in 55% of the broods.

Abundance and Population Trends

During the late 1800s and early 1900s in North America, Golden-winged Warblers expanded their distribution northward into Michigan (Gill 1982, 2004, Confer 1992). In Michigan, they occurred mainly in the SLP and generally were not found in the NLP, although as early as 1891 they were reported as far north as Mackinaw City (Barrows 1912). In the UP they were reported in 1921, yet by 1940 they were hardly known in that region (Wood 1951). The first observations in the Keweenaw Peninsula were in 1963-1977, the earliest summer record was in 1981, and summering birds have increased in numbers in more recent years (Binford 2006).

In the past few years, Golden-winged Warblers have become less widespread in Michigan. In the southern three tiers of counties in the SLP, they were recorded in 37 townships in MBBA I; they were in only seven townships in MBBA II. In the SLP in MBBA I they were in 15% of the townships, while in MBBA II they were in only 4%. In the NLP Golden-winged Warblers appeared in 33% of the townships in MBBA I and in 26% in MBBA II. In the UP the proportion of townships with warblers was 16% in MBBA I and 12% in MBBA II. A decrease in distribution occurred mainly in central and western UP in Delta, Marquette and Ontonagon counties.

Golden-winged Warblers have undergone a steady and significant decline in numbers observed in Breeding Bird Surveys in Michigan between 1966 and 2006, from about

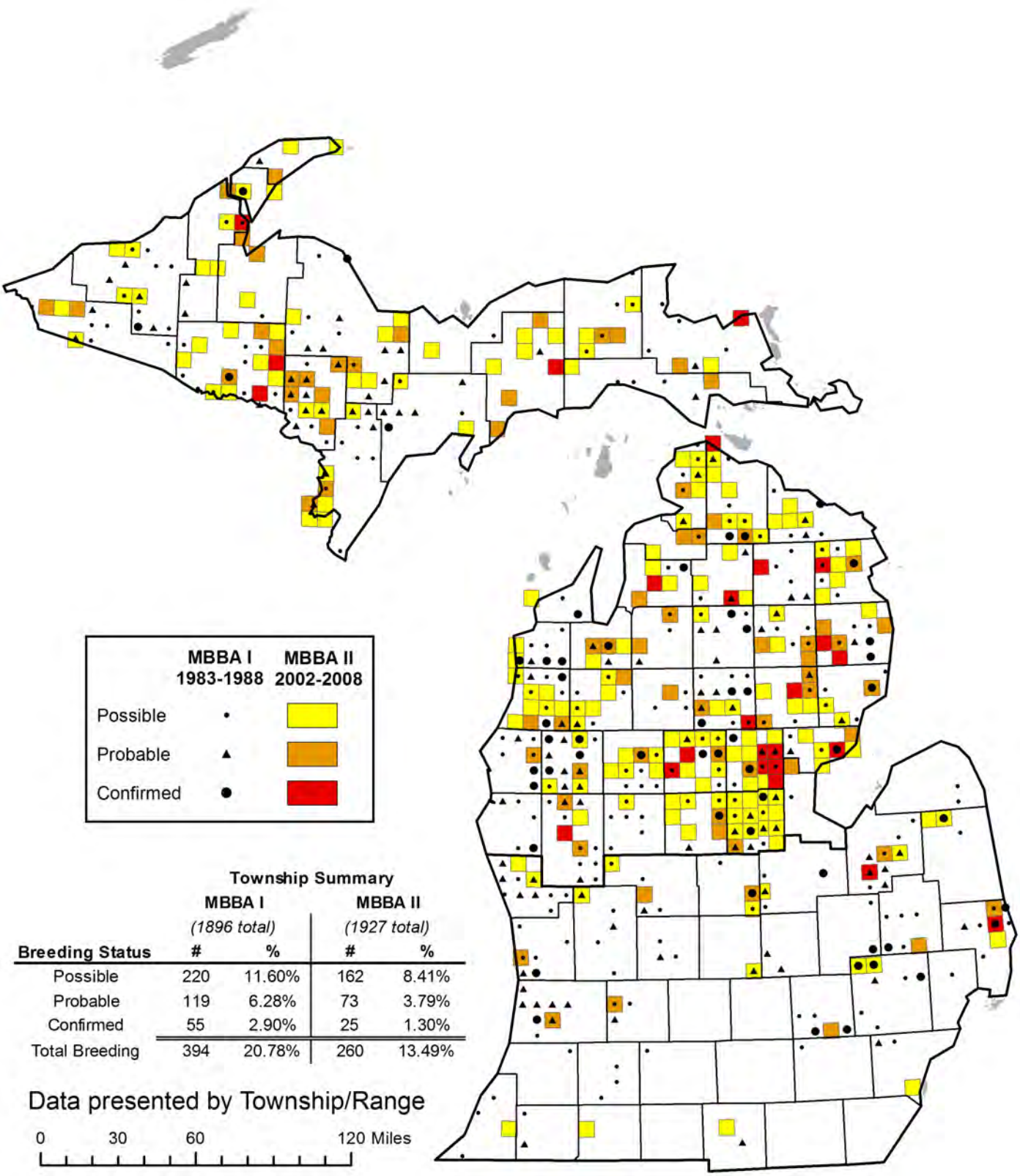
0.5 birds per route in the first five years of the survey to less than 0.1 birds per route in the last five years. Throughout the warbler's range in North America, a significant decrease in breeding numbers occurred from 0.5-0.6 birds per survey route in 1966-1970 to fewer than 0.3 birds in the years 2000-2004, an annual rate of decrease of 3.4% (Sauer *et al*. 2008). In neighboring Wisconsin and southern Ontario, their numbers and their distributional area in the breeding season also have declined (Cutright et al. 2006, Cadman et al. 2007). In Ontario the birds now are found mainly along the southern edge of the Canadian Shield, and these concentrations have shifted northward from the previous atlas period of 1981 to 1985 when Golden-winged Warblers were mostly in the southernmost parts of the province (Cadman et al. 2007). In the past 50 years in counts of migrating birds banded at Long Point on Lake Erie in southern Ontario, the numbers of Golden-winged Warblers relative to Blue-winged Warblers have decreased from more than 200% to only 15% (COSEWIC 2006). Throughout their range the global population of Golden-winged Warblers is estimated to be about 210,000 birds, and the species is considered "Near Threatened" (BirdLife International 2009).

Conservation Needs

In Michigan, the decrease in Golden-winged Warblers coincided in time with the northward expansion of Blue-winged Warblers, a process that has continued in Michigan and elsewhere in eastern North America through the past century (Confer 1992, Cutright et al. 2006, Buehler et al. 2007, Cadman et al. 2007, McGowan and Corwin 2008). However the decrease in numbers in the UP was not owing to competition with Blue-winged Warblers, because that species was observed in only four UP township localities in MBBA II and the Golden-winged Warblers were seen in 77 township localities. Golden-winged Warblers as a species are challenged by the widespread introgression of genes of the expanding Blue-winged Warblers. As many as a third of the birds in Golden-winged Warbler plumage have Blue-winged Warbler genes, owing to hybridization and genetic introgression; and introgression is two-way, Golden-winged Warbler genes moving into populations of Blue-winged Warblers (Shapiro et al. 2004;, Vallender et al. 2007a, 2007b). The northward expansion of Blue-winged Warblers and introgression of their genes into populations of Golden-winged Warblers, as well as the decline of Golden-winged Warblers in northern Michigan, may be associated with the widespread climatic warming in the region through the past century. Binford (2006) suggests that suitable habitat such as aspens at the edge of bogs, beaver ponds and deciduous swamps occurred in northern Michigan even before logging opened the habitat and extended the areas where warblers now occur in summer. In the UP a recent increase in forest cover may also be involved in the decline of Golden-winged Warblers, which require early successional forest. Elsewhere in their range, a cycle of burning areas of forest has been proposed to manage suitable habitat of secondary growth woodland and scrub (Confer 1992). The many challenges faced by this species are being addressed nationally by the Golden-winged Warbler Working group, which has partnered with two Michigan Universities: Michigan Technological University and Michigan State University.

Golden-winged Warbler *(Vermivora chrysoptera)*

Robert B. Payne



Blue-winged Warbler *(Vermivora cyanoptera)*

Robert B. Payne



Greg Schneider ©

Blue-winged Warblers breed in eastern North America from New England, New York and southern Ontario to Michigan and Wisconsin and southward into Missouri, northern Arkansas and Alabama. The warblers leave their breeding areas around the middle of August (Wood 1951). Long distance migrants, they winter on the tropical Caribbean slope in eastern Mexico and Central America and along the Pacific slope in Panama (Gill et al. 2001). They are identified by their yellow head and body and their blue-gray wings with white wing bars. Singing males are usually recognized by their insect-like songs described as "*bee-buzz*" by Sibley (2003), but also referred to as accented song, type 1 by Kroodsma (1988). The other song is called unaccented song, type 2 by Kroodsma (1988), and is heard more often early in the breeding season when males are establishing their territories. This second type is described as a series of rapid notes "*tsi tsi tsi tsi zweeeeeeee zt zt zt*" (Sibley 2003).

Distribution

In Michigan the Blue-winged Warbler occurs throughout the SLP and in the southern half of the NLP and they are found at scattered localities in the northern NLP and the UP. Their breeding habitat is open shrubby lands, woodland openings, the edges of streams, willow swamps, and old fields with shrubs and small deciduous trees.

Breeding Biology

In Michigan the first males arrive in early May. They set up a territory two to nine days before the females arrive; once females arrive, the pairs may form within a day. Some males arrive as late as the second half of May and early June. Territory size is large, ranging from 1.5 to 5.2 ha and averaging 1.8 ha. Nests are built and eggs are laid beginning around 28 May. A pair has only one brood in a season, although the birds may replace a nest if it is lost early in the season; renestings occur into July. Nests are built on the ground, often in a clump of grass or at the base of goldenrods or berry bushes in a shaded site near the forest edge and along deer trails. The warblers are sometimes brood parasitized by Brown-headed Cowbirds (Wood 1951, Murray and Gill 1976, Will 1986, Gill et al. 2001).

Where they come into contact with Golden-winged Warblers, the Blue-winged Warblers are sometimes interspecifically territorial with the other species; territorial males respond aggressively to songs of the other species, and the two species interbreed and produce hybrid young (Gill and Murray 1972a, 1972b: Confer and Larkin 1998). During 1969-1971 when the warblers were observed intensively in Michigan in Livingston and Clinton Counties, the two warbler species were seen in equal numbers in the wetter habitats with shrubs of poison sumac, red osier and gray dogwood. The incidence of mixed mating and hybridization in this area was about 20% (Gill and Murray 1972a, 1972b; Murray and Gill 1976; Gill 1980, 2004). The hybrid warblers do not appear to be at a disadvantage in survival or reproductive success (Vallender et al. 1977a, 1977b). "Brewster's Warbler", once named as a distinct species, is the most common form of hybrid; the male is white on the underparts and the wing bars and cap are bright yellow. The hybrids have been seen throughout the state, with most records in the SLP. During the late 1970s and 1980s two color-banded male "Brewster's Warblers" were seen over four breeding seasons at the E.S. George Reserve in Livingston County. One male paired and nested with a female Blue-winged Warbler; the other male paired and nested with a female Golden-winged Warbler. In each case the female mated with a male "Brewster's Warbler" that sang the typical song of the female's species; and in each case her fledged young were yellow in juvenile plumage, like young Blue-winged Warblers (Payne 1991). A hybrid may have the song of either parent species, perhaps depending upon which kind of male provided its parental care.

Abundance and Population Trends

Blue-winged Warblers were rare in Michigan in the early 20th Century, with the first specimen records dating from 1896 and fewer than 12 records by 1912 (Barrows 1912). By 1940 they occurred only in the southernmost counties (Wood 1951). In MBBA I the warblers occurred throughout most of the SLP and only a few were observed north of Saginaw Bay. In MBBA I the proportion of townships sampled and the warblers reported was 49% in the SLP, 10% in the NLP and none in the UP. In MBBA II the warblers showed a northward expansion of their range into the tip of the Thumb in the northeastern SLP and in the NLP and a few scattered observations in the southernmost counties of the UP. Numbers of townships where warblers appeared in MBBA II were 50% in the SLP, 17% in the NLP and less than 1% in the UP. Throughout the state and through the warbler's range in North America, census numbers in the Breeding Bird Survey have remained about the same from 1966 through 2004 (Sauer et al. 2008). Elsewhere, in neighboring Wisconsin and Ontario their numbers and northward distribution have increased in recent years (COSEWIC 2006, Cutright et al. 2006, Cadman et al.

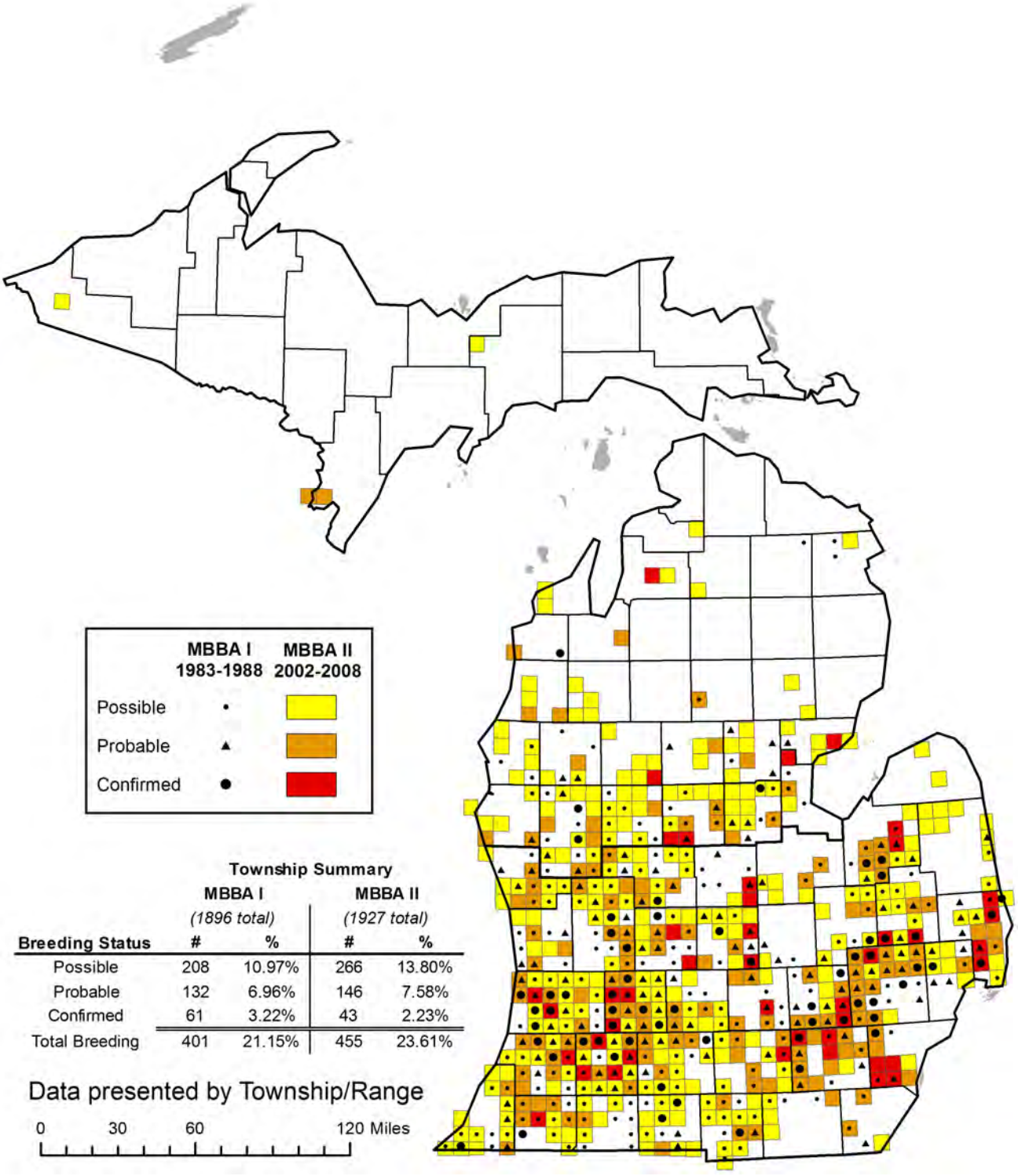
Blue-winged Warbler *(Vermivora cyanoptera)*

Robert B. Payne

2007); in New York no changes were noted (McGowan and Corwin 2008). The causes of the northward extension of the species' range are not known, but the consequences of the change in distribution include increased hybridization with Golden-winged Warblers and a reduction of the range of Golden-winged Warblers.

Conservation Needs

No special concerns are evident.



Black-and-white Warbler *(Mniotilta varia)* ***Vincent S. Cavalieri***



Darlene Friedman ©

Creeping up and down trunks and branches much like a nuthatch or creeper, the Black-and-white Warbler hardly behaves like a warbler at all. With its striking black and white racing-stripe patterned plumage and rusty bicycle tire song, this familiar warbler of the forests is a favorite of many Michigan birders. Like many other warbler species, the Black-and-white is a Neotropical migrant, making twice yearly journeys from its breeding range across much of the eastern and western parts of North America to its wintering areas in the Gulf Coast states, Central and South America and the Caribbean.

The Black-and-white Warbler breeds in most of the forested parts of the eastern and central United States and Canada (McPeek 1991, Kricher 1995, Howe 2006). The breeding range stretches from British Columbia and the Northwest Territories in the north and west, across Canada and the northern tier of the United States to the Maritime Provinces and Maine to the east; then south to North Carolina, through much of Appalachia, the Ohio River valley and into the Ozarks and Ouachita Mountains, and then into northern Louisiana and northeast Texas. There are also disjunct breeding populations along the Missouri River corridor in Iowa, Nebraska, the Dakotas and Montana as well as in the Black Hills of South Dakota (Kricher 1995). The winter range is amongst the broadest of all the wood-warblers, stretching from the southeastern United States through Central America, northern South America and the Caribbean (Kricher 1995).

Distribution

The Black-and-white Warbler is a breeding species across the entire state of Michigan, though it is much more common in the UP and in the northern part of the LP. It appears that this has been the case for some time as authors from Barrows (1912) onward describe a similar pattern of occurrence. MBBA II results show a more continuous distribution in the UP than results from MBBA I, with an additional small spike in records from the SLP as well. The Black-and-white Warbler is one of the earliest spring migrant wood-warblers in Michigan, arriving in southern Michigan during mid-April, then continuing to spread northward throughout the state, and arriving at Isle Royale by mid-May (McPeek 1991). To the south, the Black-and-white Warbler is an uncommon summer resident in Illinois and Indiana, occurring more frequently in the more heavily forested southern parts of those states (Bruner 1998, Dring 1994). In other nearby regions, the Black-and-white Warbler is a common breeder in Wisconsin and Ontario, with numbers being greater in the heavily forested northern parts of those areas (Howe 2006, McLaren 2007).

Breeding Biology

The Black-and-White warbler breeds in deciduous or mixed deciduous-coniferous forests. There seems to be a preference for mesic to wet-mesic "swamp forests" in many parts of their range (McPeek 1991, Kricher 2005). In Michigan and Wisconsin the importance of mixed deciduous-coniferous forests over purely deciduous forests has been noted (McPeek 1991, Howe 2006). This species seems to prefer mature forests though they are occasionally found in earlier successional forests as well (McPeek 1991, Kricher 2005, Howe 2006).

The Black-and-white Warbler is a ground nesting species, normally placing its nest at the base of a stump, large rock, or tree (McPeek 1991, Kricher 1995). Occasionally it will place its nest in a cavity at the top of a stump if it is close to the ground (Kricher 1995). Nesting takes place from late May through June, though second nesting attempts may run through July and even into early August (McPeek 1991, Howe 2006).

Abundance and Population Trends

The total Black-and-white Warbler population is estimated at around 14 million birds. Of these, approximately 1.5% of the total population is estimated to breed in Michigan (PIF 2007). This relatively significant percentage of the total global population nests here because of the relatively large amount of forest cover found in Michigan. Clearly Michigan is an important breeding area for this species.

Overall, atlas observers found very similar numbers of Black-and-white Warblers during both MBBA I and MBBA II. There was an apparent increase of this species in the UP from 68% of townships during MBBA I to 80% of townships during MBBA II, though this may be explained by the increase in sampling effort in the UP that occurred in MBBA II. The Black-and-white Warbler remains a very common summer resident in the heavily forested UP (80% of townships) a common summer resident in the NLP (57% of townships) and an uncommon summer resident in the more agricultural and urban SLP (13% of townships).

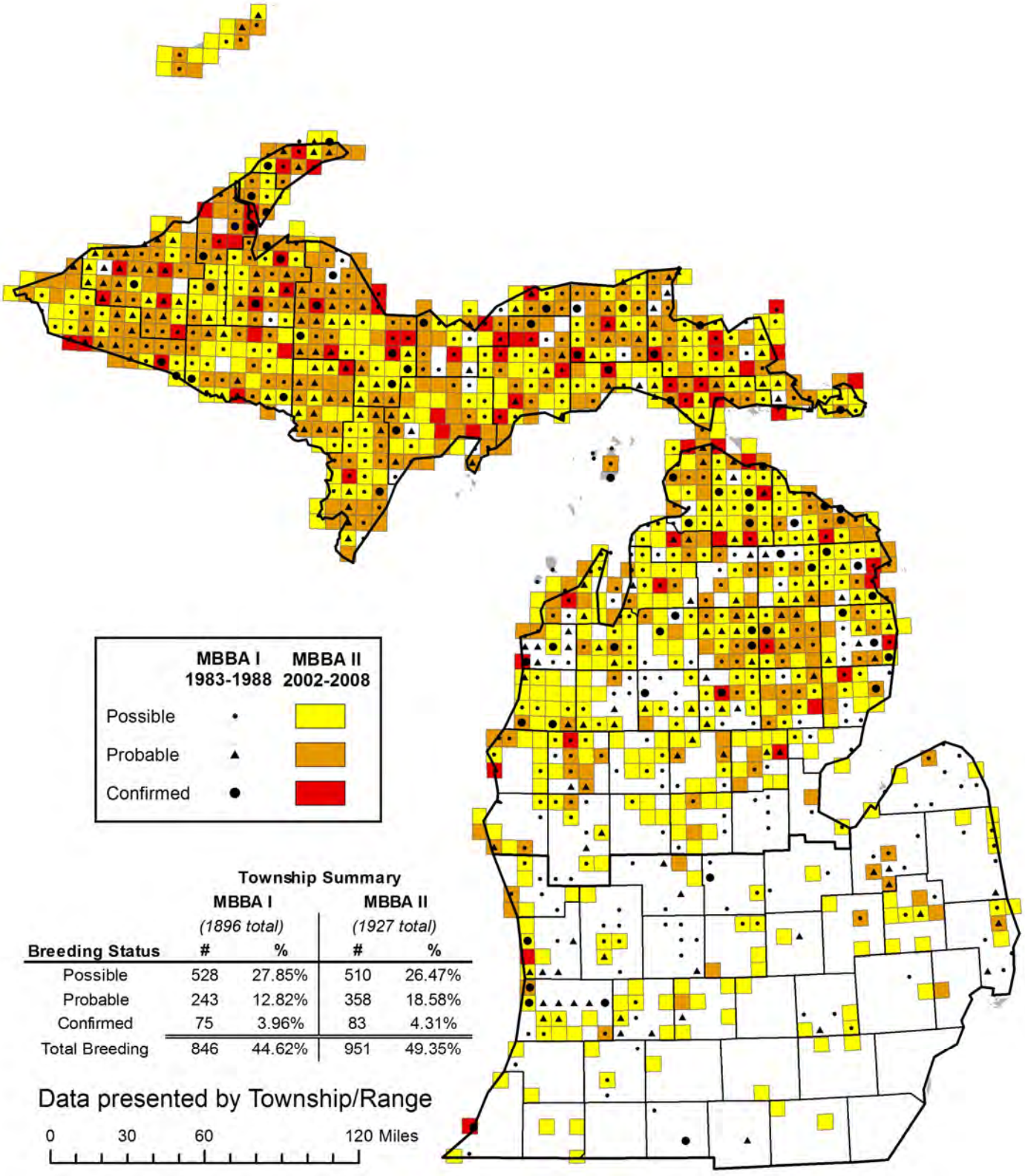
BBS data shows that Black-and-white Warblers have experienced a modest 0.8% annual decline since the BBS was initiated in 1966. Since 1980 this decline has been 1.3% annually (Sauer et al. 2008). In Michigan this has been less severe with trends actually showing a 2.3% annual increase from 1966 to 2007, but from 1980 to 2007 there was a 0.4% annual decline (Sauer et al. 2008). Declines have also been noted in the National Forests of Wisconsin (Howe 2006).

Black-and-white Warbler *(Mniotilta varia)*

Vincent S. Cavalieri

Conservation Needs

The Black-and-white Warbler appears to be in no immediate danger as they continue to be common in many areas with extensive forests. However, this species has been described as a forest interior species, sensitive to forest fragmentation and Brown-headed Cowbird parasitism (Erlich 1988, McPeek 1991, Kricher 1995, Howe 2006). The annual declines seen in the Black-and-white Warbler are a cause for concern and more rangewide monitoring and research should be done to better determine and understand causes for these declines.



Prothonotary Warbler *(Protonotaria citrea)* ***Matt Gould***

Status: *Special Concern (MNFI)*



Darlene Friedman ©
Species sponsored by: Ray Adams

Every spring the rivers of the southern Lower Peninsula come alive with the loud, ringing "*tweet, tweet, tweet, tweet*" song of the Prothonotary Warbler. The Prothonotary Warbler, formerly known as the golden swamp warbler, is found in wooded bottomlands along rivers and streams. Distinguished by its bright yellow-orange head and breast and blue-gray wings and tail, the Prothonotary Warbler is a stunning sight to behold.

The breeding range for this species is concentrated mostly in the southeastern United States with Michigan, New York and southern Ontario representing its northernmost range, and Texas, Nebraska, and Oklahoma forming the western boundary of its breeding range. During the winter, Prothonotary Warblers migrate to Central and South America where they prefer mangrove forests.

Distribution

The Prothonotary Warbler has remained a constant inhabitant of the southern LP since MBBA I. Of the 17 confirmed reports in MBBA II, the majority came from Berrien County (three confirmed) north to Van Buren and Allegan counties, and east to Kalamazoo County (two confirmed in each). Wayne County was the farthest east block with a confirmed record, while Muskegon, Gratiot, and Saginaw counties were the northernmost confirmed records in the state. The northernmost record for the species was a possible from Antrim County. Several counties with confirmed breeding records from MBBA I failed to have confirmed records in MBBA II (Ottawa, Calhoun, Clinton, Oakland, Branch and Cass). Wayne County was the only county to have confirmed breeding during MBBA II and not MBBA I. The distribution of Prothonotary Warblers has remained almost the same since MBBA I. The SLP continues to have the densest concentrations of this species since it was found in every county in the southwestern part of the state during both Atlas surveys.

Breeding Biology

The Prothonotary Warbler is one of only two North American warblers to nest in cavities, sharing this unique behavior with the western species, Lucy's Warbler (*Oriothlypis luciae*) (Morse 1989). . Prothonotary Warblers often construct their nests in old Downy Woodpecker holes, but will use any other natural cavity in a dead snag or branch of a live tree (Petit 1999). The species is also partial to nest boxes placed in suitable habitat and will readily use them. It is almost always found nesting above or near standing water (Petit 1999). The nest itself is comprised of two different substrates. The cup is constructed of dry material, grasses, leaves and rootlets, which are placed upon a thick, moist bed of bryophytes, mosses and liverworts (Blem and Blem 1994). On average the clutch size for this species is three to seven eggs. In Michigan the average clutch size was approximately five eggs (Walkinshaw 1941). Fledging for Prothonotary young occurs at 10-11 days of age. Studies have shown that site fidelity in Prothonotary Warblers increases with the number of broods that are produced (Hoover 2003). Individuals benefit from returning to territories that produced two or more broods and also from abandoning territories that produced zero broods (Hoover 2003). Parasitism is also a concern for Prothonotary Warblers. Brown-headed Cowbirds have been observed parasitizing Prothonotary Warbler nests more frequently than other cavity nesting species (Petit 1991). It has been observed that the impact of parasitism on warblers is low as the females will abandon the nest after it has been parasitized. In many cases though, females will accept the cowbird eggs if no other suitable nesting sites are available within their territory (Petit 1991).

Abundance and Population Trends

Throughout the southern LP, there was a slight decline in the number of townships that reported Prothonotary Warblers during MBBA II compared to MBBA I. In the northern LP, three townships reported possible breeding Prothonotary Warblers during MBBA II compared to no reports at all from the northern LP during MBBA I. In the southern LP, 38 townships reported possible breeding during MBBA I compared to 29 during MBBA II. Sixteen townships reported probable breeding birds which was consistent between the two surveys. confirmed breeding reports dropped from 20 townships reporting during MBBA I to only 15 townships during MBBA II (representing a 25% decline). One possible reason for this small drop could be attributed to the difficulty of surveying for this species. Prothonotary Warbler habitat can be difficult to survey on foot due to their preference for wet, swampy areas. Float surveys are required for much of the Prothonotary Warbler habitat in Michigan. This method of surveying can be limiting and therefore lead to birds being overlooked by the surveyors.

Prothonotary Warbler *(Protonotaria citrea)*

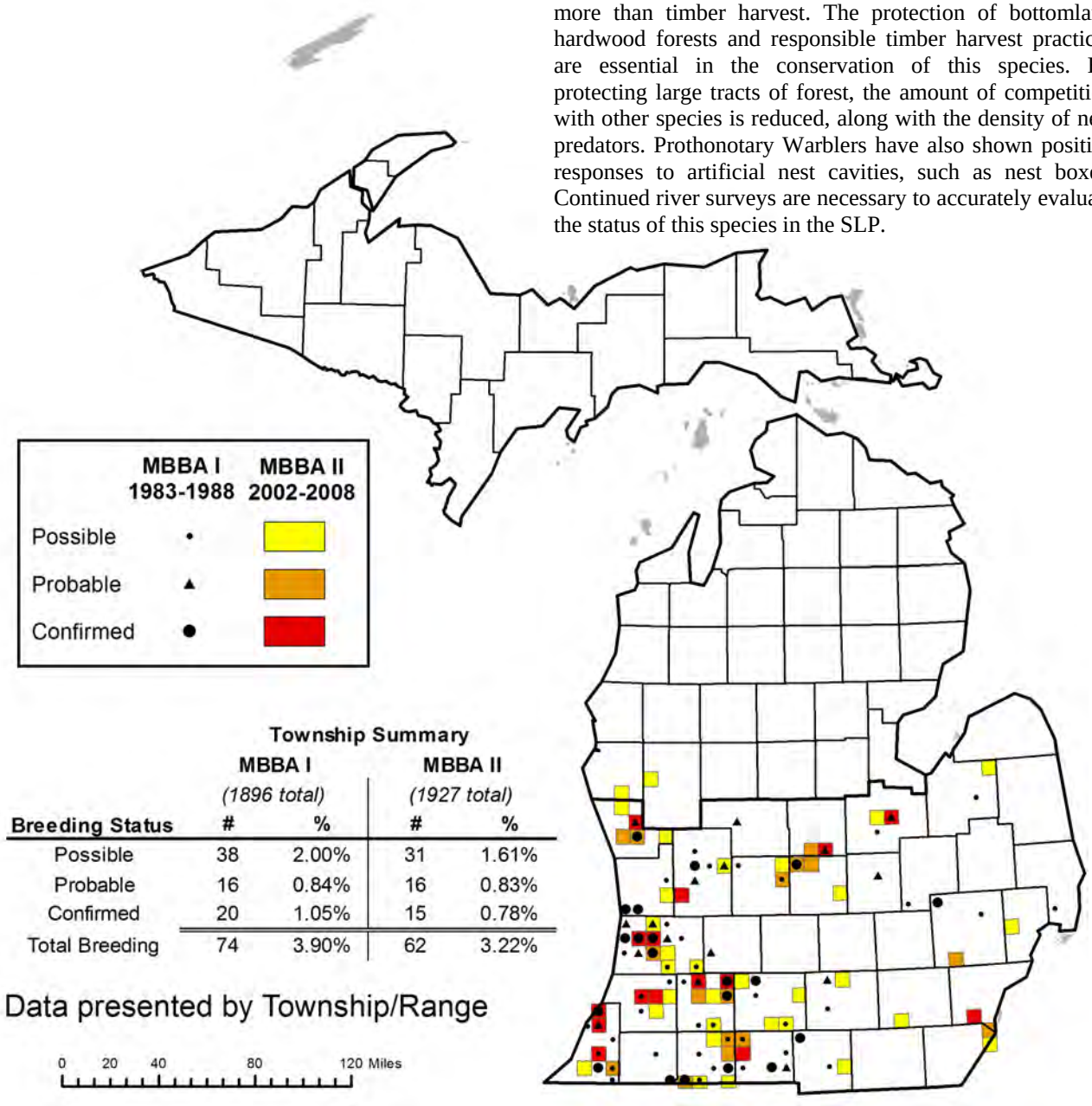
Matt Gould

Status: *Special Concern (MNFI)*

Partners in Flight estimates the Michigan population of Prothonotary Warbler to be around 3,000 birds (PIF 2007). Prothonotary Warbler populations are lower in the Upper Midwest due to the fact that this area is the northernmost extension of their breeding range. BBS trends for Michigan since 1983 showed a slight decline, whereas USFWS Region 3 showed a slight increase. However, neither of these trends was significant. The only area in the Great Lakes region that showed a significant decline in population on Breeding Bird Surveys was Ontario. Wisconsin, Illinois, Indiana and Ohio all showed non-significant population trends for the species (Sauer et al. 2008).

Conservation Needs

The Prothonotary Warbler remains a species of special concern in Michigan. Partners in Flight lists Prothonotary Warbler as a species of conservation concern in the United States (PIF 2007). Degradation and destruction of habitat had the greatest negative impact on the species (Petit, 1999). While habitat degradation negatively affects the nesting habitat of the Prothonotary Warbler, recent studies have shown that responsible timber harvest may not have as detrimental an effect. Timber harvests were shown to reduce the number of nest cavities and increase the size of male territories, but there was no increase in the number of nest predations or brood parasitism in the study areas (Cooper et al. 2009). Cooper et al. (2009) theorize that the timing and extent of annual flooding influences reproductive success more than timber harvest. The protection of bottomland hardwood forests and responsible timber harvest practices are essential in the conservation of this species. By protecting large tracts of forest, the amount of competition with other species is reduced, along with the density of nest predators. Prothonotary Warblers have also shown positive responses to artificial nest cavities, such as nest boxes. Continued river surveys are necessary to accurately evaluate the status of this species in the SLP.



Tennessee Warbler *(Oreothlypis peregrina)* ***Vincent S. Cavalieri***



Darlene Friedman ©
Species sponsored by: Rich & Brenda Keith

The Tennessee Warbler, like other Neotropical migrant species is a bird of two worlds, spending its life migrating between the extensive boreal forests of Canada and the tropical habitats of southern Mexico, Central and South America. It was during this migration when the great nineteenth century ornithologist Alexander Wilson collected the first Tennessee Warbler along the Cumberland River in Tennessee, thus giving the bird its name. On its breeding grounds, the Tennessee Warbler is a spruce budworm specialist, shifting areas of occurrence and abundance to match the outbreaks of the budworm.

The Tennessee Warbler breeds across the boreal forest zone of Canada from British Columbia and the Northwest Territories in the west across to Newfoundland and the Maritime Provinces in the east. In the United States, the Tennessee breeds in a small part of southeastern Alaska and just barely makes it into the northern tier of states, primarily in northern Minnesota, the Upper Peninsula of Michigan, the Adirondack Mountains of New York and northern New England (Rimmer and McFarland 1998). The Tennessee is a long-distance migrant wintering from southern Mexico through Central America and into northern South America. Most spring migrants seemingly cross the Gulf of Mexico and then spread out across the central and northeastern United States and then into Canada (Rimmer and McFarland 1998). The fall migration tends to be more easterly (Dunn and Garrett 1997).

Distribution

In Michigan, the Tennessee Warbler occurs almost exclusively in the UP where the preferred habitat of extensive forested bogs can be found (Binford 1991). Even in the UP it is a relatively rare species, occurring at the very southern edge of its breeding range. Only areas with relatively extensive spruce bogs are occupied by breeding Tennessee Warblers in the UP and even some seemingly suitable habitats do not support the species (Binford 1991). The Tennessee is a similarly rare breeder in Wisconsin and New York, occurring only in the far northern parts of those states where coniferous bogs and other boreal habitats occur (Wood 2006, Peterson 2008). During the Wisconsin atlas period there were no breeding confirmations, leading credence to its status as a rare breeder in our region, though summering males were recorded in some of the more boreal northern parts of the state (Wood 2006). In Ontario the species is much more widespread, particularly in the northern parts of the province in the Canadian Shield and Hudson Bay Lowlands where there are extensive boreal forests (Crins 2007).

Breeding Biology

The Tennessee Warbler breeds in boreal forest habitats. In Michigan and Ontario, they particularly prefer coniferous bogs dominated by spruce and tamarack (Binford 1991, Rimmer and McFarland 1988). These forests are typically described as open or "park-like" and often have openings with shrub stage willows, birches and alders (Binford 1991, Rimmer and McFarland 1998). In other parts of their range they use "shrub scrub" types of habitats where small deciduous shrubs are found within coniferous forests or along riparian areas (Dunn and Garrett 1997, Rimmer and McFarland 1998).

The nest of this species is placed on the ground, typically in a mound of sphagnum moss at the base of a fallen tree, overturned stump, or next to a small shrub (Ehrlich et al. 1988, Rimmer and McFarland 1998). These nests, which are often very well concealed, are usually in a small clearing in the boreal forest or on the margin of a bog. They are often associated with alder or willow shrubs (Rimmer and McFarland 1998, Wood 2006). The Tennessee Warbler, like several other boreal forest breeding warbler species, specializes on exploiting outbreaks of the spruce budworm, a moth species that has periodic outbreaks in different areas of the boreal forests. The Tennessee Warbler fluctuates in numbers and areas of occurrence as it responds to these outbreaks. Densities of Tennessee Warblers can increase dramatically in areas of outbreaks (Ehrlich et al. 1988, Rimmer and McFarland 1998, Wood 2006, Crins 2007).

Abundance and Population Trends

The population of Tennessee Warbler has been estimated at around sixty million birds. Of these, approximately 16,000 are estimated to breed in Michigan (PIF 2007). While this is a very small percentage of the total breeding population, Michigan trails only two other states in estimated numbers of breeding Tennessee Warblers, with the vast majority of the population breeding in Canada (PIF 2007). As an indicator species for semi-open boreal forests, presence and numbers of Tennessee Warblers could be used to measure the health of this rare habitat type in Michigan (Benyus 1989).

The Tennessee Warbler continues to be a rare species in Michigan. Atlas observers for MBBA II found very similar numbers to MBBA I. They found Tennessee Warblers in

9% of townships in the UP, which is exactly the same as during MBBA I. Outside of the boreal forests of the UP there continues to be very little evidence of breeding Tennessee Warblers in Michigan, with less than 1% of townships in the NLP having Tennessee Warbler observations, including no sightings of this species outside the UP during MBBA II. In addition, the Tennessee Warbler sometimes lingers far south of the breeding range well into June and sometimes fall migrants begin to filter back through the region in early July. This almost continuous stream of migrants passing through the area during the breeding season, makes determining true breeding status that much more difficult (Binford 1991, Wood 2006).

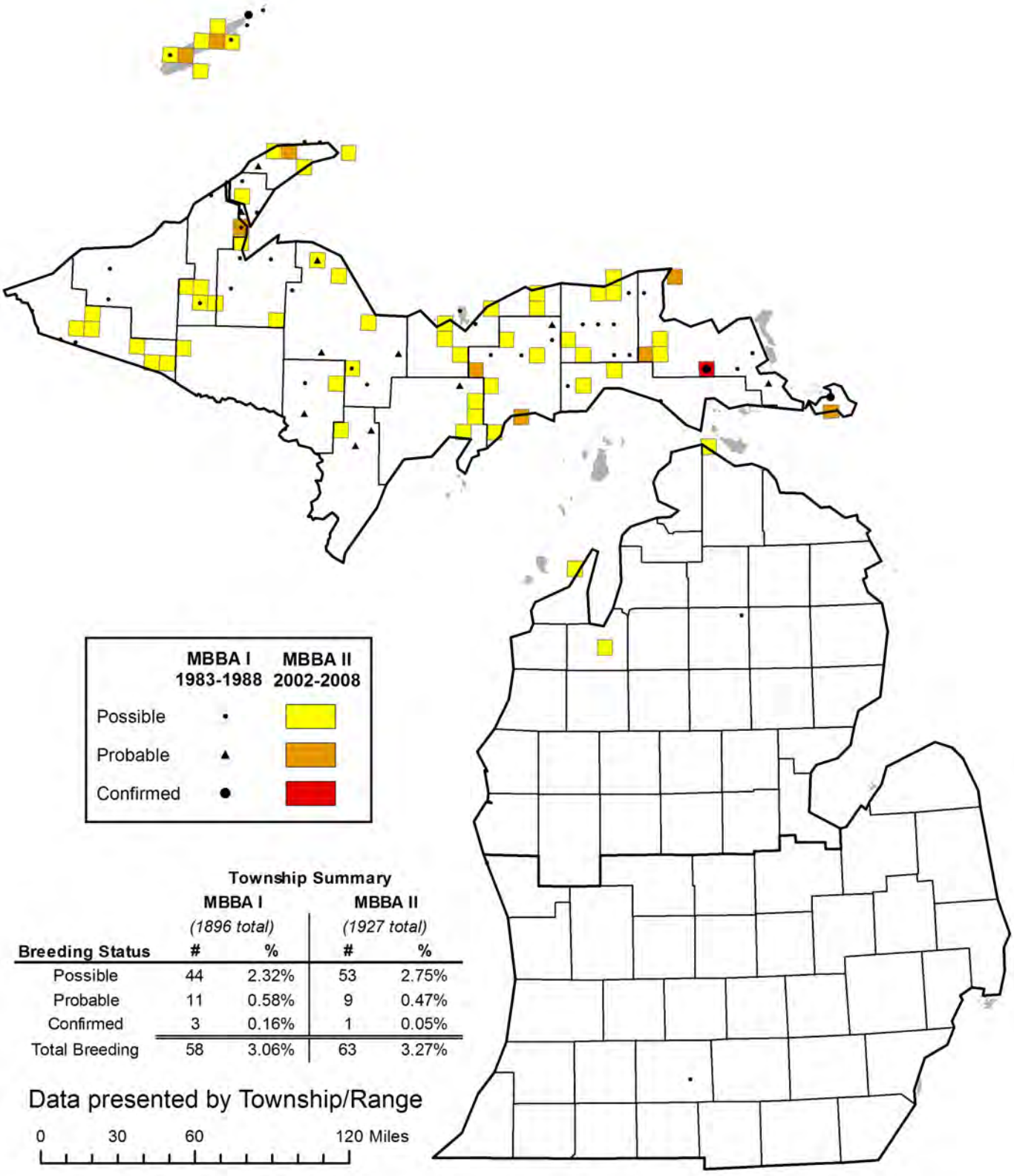
BBS data show that Tennessee Warblers have experienced a survey wide 1.1% annual decline since the BBS was initiated in 1966. From 1966 to 1979, the Tennessee Warbler actually showed a 10.6% annual increase in population; however since 1980, they have shown a 7.5% annual decline (Sauer et al. 2008). It should be noted that interpreting BBS trends for this species can be difficult because few BBS routes occur in the core range of the Tennessee Warbler. In addition densities fluctuate based on spruce budworm outbreaks which can also make trend interpretations difficult (Crins 2007).

Conservation Needs

The Tennessee Warbler may actually be more abundant now than in the nineteenth century because of the increased amounts of suitable habitats created by logging operations (Rimmer and McFarland 1998). There is some concern that overlogging, road construction and development could negatively impact this species (Binford 1991). In addition, peat-harvesting and drainage could also degrade Tennessee Warbler habitat (Rimmer and McFarland 1998). The Tennessee Warbler is vulnerable to collisions with TV towers and other tall, lighted structures during migration (Rimmer and McFarland 1998). A potential problem on the wintering grounds is the conversion of shade grown coffee plantations to sun coffee systems, which could adversely affect this and other Neotropical migrant species. Maintaining rustic shade grown coffee plantations could be beneficial to this species (Rimmer and McFarland 1998). Another concern is replanting of boreal forests with jack pine and black spruce instead of balsam fir, a change that could lead to decreased budworms and thus less forage for Tennessee Warblers. In addition, spraying insecticides to control budworm outbreaks may have negative impacts on Tennessee Warblers (Peterson 2008).

Tennessee Warbler *(Oreothlypis peregrina)*

Vincent S. Cavalieri



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	44	2.32%	53	2.75%
Probable	11	0.58%	9	0.47%
Confirmed	3	0.16%	1	0.05%
Total Breeding	58	3.06%	63	3.27%

Data presented by Township/Range

0 30 60 120 Miles

Nashville Warbler *(Oreothlypis ruficapilla)*

Julie A. Craves



Willie McHale ©

Nashville Warblers are common migrants throughout the state as they journey between their wintering areas in the Neotropics and northern breeding sites. There are two widely separate breeding populations: one in the northwestern U.S. and parts of adjacent Canada, and the other in north central to eastern Canada, New England, the Upper Great Lakes, and the Appalachians to West Virginia (Williams 1996).

It has been commonly believed that the eastern population winters mainly in northeastern Mexico to Guatemala, while the western population winters in California and western Mexico (Curson et al. 1994, Williams 1996). However, recent molecular studies found eastern breeding individuals throughout the entire wintering range; the analysis included feather samples taken in southeastern Michigan at the Rouge River Bird Observatory in Dearborn (Lovette et al. 2004, Smith et al. 2005).

Distribution

Barrows (1912) reported the Nashville Warbler as a frequent summer resident throughout the NLP and most of the UP, preferring tamarack swamps, especially near edges and openings. Wood (1951) noted it as a summer resident south to Montcalm County, while Payne (1983) said it was common "in the north." A similar pattern held in both MBBA I and MBBA II, with breeding concentrated in the UP and eastern NLP; Atlas records were slightly scarcer in the western NLP in both periods. This distribution likely corresponds with the favored nesting habitat of the eastern population, which includes tamarack swamps and spruce-cedar bogs, and occasionally jack pine or second growth aspen stands (Williams 1996). Participants in MBBA I found nesting Nashville Warblers most often in mesic and wet conifer forests and mesic mixed forests.

In the SLP, the actual summer status of Nashville Warblers is a bit unclear. In MBBA I, the southernmost confirmed nesting was in Midland Co. There were no confirmations and only five townships with records at the level of probable in the SLP. There were a modest number of possible records in both Atlas periods in the SLP, some of which should be viewed with caution. Nashville Warblers have quite protracted migration periods, with spring migrants in the southernmost counties into June, and presumed southbound migrants appearing in late July or early August (Kelley 1978, Craves 2007). That being said, in MBBA II there was an increase in the number of townships recording probable or confirmed nesting activity in the SLP; confirmations were in Huron, Gratiot, and Barry Counties. Ohio, as well, seems to be seeing more evidence of nesting Nashville Warblers.

Although the first Ohio Breeding Bird Atlas recorded only one unmated male (Peterjohn and Rice 1991), the first three years of their second Atlas effort has recorded one probable and two possible records (OBBA 2009).

In contrast, Ontario reported a similar distribution between their two Atlases, with this species being mostly absent in the southwesternmost part of the province (McLaren 2007). Wisconsin had only one quad, assigned a level of probable, in the southern two tiers of the state (Howe 2006). They have not been recorded breeding in Indiana (Castrale et al. 1998, BBA Explorer 2009). Nor were any found during the Illinois Atlas (Kleen et al. 2004) although they were apparently regular summer residents in northeastern Illinois and southern Wisconsin in the late 1800s (Cory 1909, Pitelka 1940).

Breeding Biology

Nashville Warblers construct well-hidden cup nests on or near the ground, where they can be difficult to find (McLaren 2007). This species raises a single brood, of typically four to five young, each season, and is an uncommon cowbird host (Williams 1996). A couple of interesting reports of cowbird-parasitized nests from Michigan and Ontario described young Nashville Warblers sitting on the backs of cowbird nest-mates in order to be fed by their parents, or a female warbler sitting on the back of a cowbird nestling to reach and feed her own young (Roth 1977, Williams 1996).

Abundance and Population Trends

BBS trends indicate a slightly positive, non-significant trend in Michigan for the period spanning the two Atlas periods. MBBA II data suggest Nashville Warblers may be increasing, especially in the UP. Overall, breeding evidence was noted higher percentage of townships in MBBA II than in MBBA I; this increase was nearly 14% for the UP. Breeding can be hard to confirm, as Nashville Warblers build well-concealed nests on the ground, often under a fern or shrub (McLaren 2007). Still, they were confirmed in a higher proportion of townships in which they were found in MBBA II – 21% versus 15% in MBBA I.

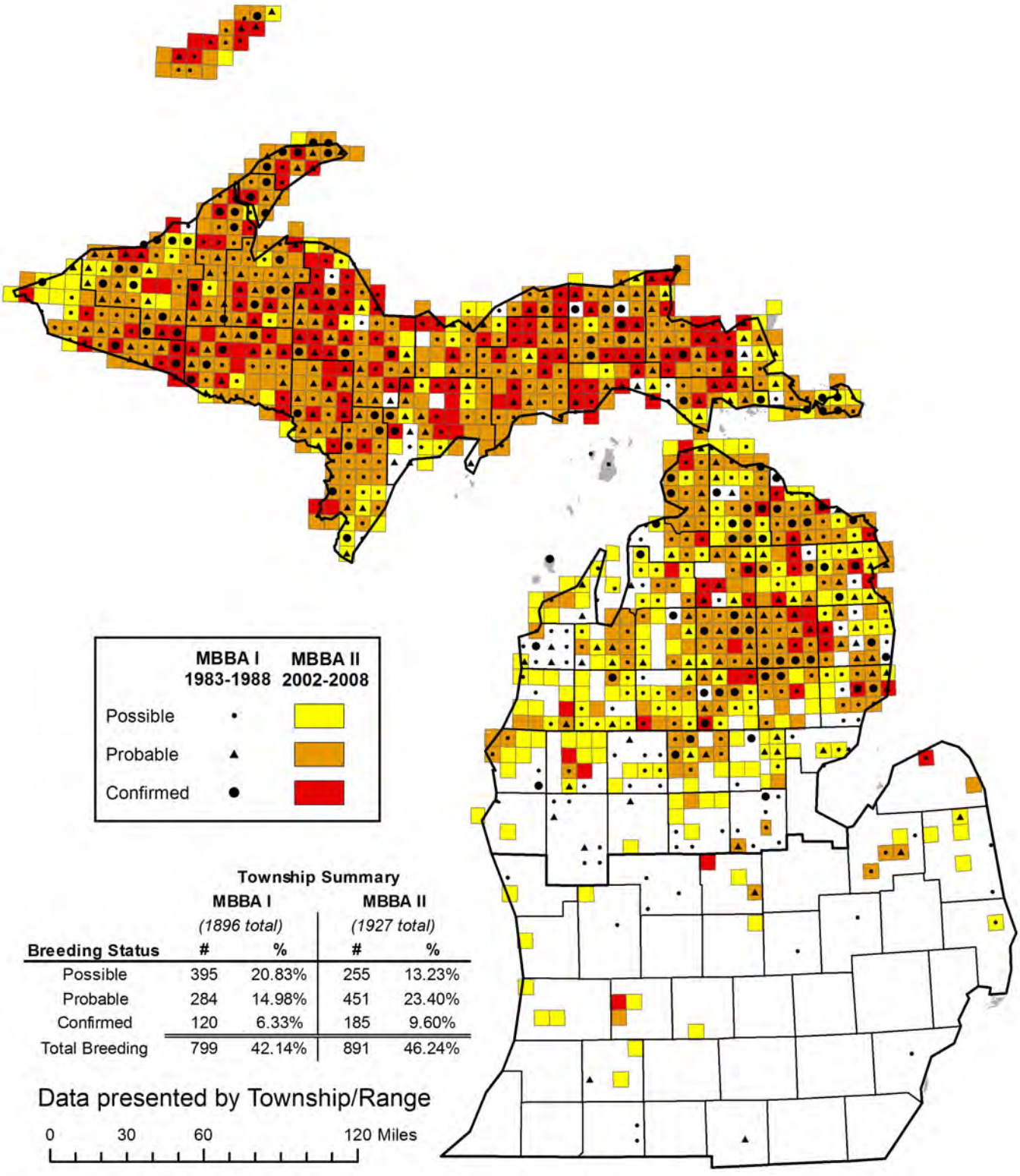
Conservation Needs

An important component of nesting habitat for Nashville Warblers is a well-developed herbaceous layer, so light penetration to the forest floor is essential (Roth 1977, Williams 1996). Therefore, these birds often utilize edges and openings, including along roads and edges created by timber harvesting. This adaptability may help to support continued good numbers of Nashville Warblers in northern Michigan for the near future.

Nashville Warbler *(Oreothlypis ruficapilla)*

Julie A. Craves

Longer term, climate change may be a concern. Price (2000) listed Nashville Warbler as a species that may be potentially extirpated from Michigan by the year 2100. Using several different climate change models, Matthews et al. (2007) predicted a decrease in habitat suitability for Nashville Warblers in the state along with a corresponding decrease in abundance, especially in the NLP.



Connecticut Warbler *(Oporornis agilis)*

Vincent S. Cavalieri



Darlene Friedman ©

Often one of the last eastern wood-warblers added to the life lists of many birders, the Connecticut Warbler has a reputation for being secretive and hard to find. The Connecticut Warbler is a summer resident of areas far to the north of the homes of most U.S. birders and is not often seen on migration. These traits make it one of the most wanted birds for many birders' "life lists". A large warbler superficially similar to the related Mourning Warbler, which can occur in the same range and sometimes similar habitats, one of the things that sets the Connecticut Warbler apart is its voice. The song is very loud and distinctive and can be heard ringing out from the bogs and forests where the Connecticut makes its home. Named after the state of Connecticut because that is where the first specimen was collected, this species does not breed in that state nor is it even a common migrant there.

Distribution

The Connecticut Warbler has the smallest breeding range of any northern warbler aside from the Kirtland's (Binford 1991). The Connecticut Warbler breeds in a band from east-central British Columbia in the west to Quebec and the northern Great Lakes region of the U.S in the east. In the U.S., the Connecticut Warbler breeds in northeastern Minnesota, northern Wisconsin, and northern Michigan (Cadman et al. 1997, Pitoccheli et al. 1997). Connecticut Warblers winter in northern South America, primarily east of the Andes Mountains around the periphery of the Amazon basin. It is the only North American migrant to winter in much of this area (Pitoccheli et al. 1997). The Connecticut Warbler utilizes different migratory routes in spring and fall migrations. During spring migration, the Connecticut Warbler moves primarily up the Mississippi valley while in the fall it appears to move east across Canada and then down the Atlantic coast of the U.S. (Pitoccheli et al. 1997).

In Michigan, this is a breeding species only in the far northern parts of the state, occurring in the UP and northern two tiers of counties in the LP. In the rest of the state, the Connecticut Warbler is both a spring and fall migrant. This species is a very late spring migrant. It does not typically begin passing through the SLP until mid- to late-May and sometimes is still passing through the UP as a migrant into June. In Michigan, birds begin fall migration in late August and continue throughout September with some birds lingering through the early parts of October (Binford 1991).

Breeding Biology

The Connecticut Warbler is a ground nesting species that utilizes a wide variety of habitats during the breeding season. These habitats include wet coniferous forests such as spruce and tamarack bogs, dry coniferous forests such as jack pine barrens, and dry deciduous forests usually dominated by aspen. One common feature of these seemingly diverse forest communities is that they are all open, often described as "park like" by Connecticut Warbler researchers. Typically they also have dense ground cover, used to hide the nest (Erlich et al. 1988, Binford 1991, Pitoccheli et al. 1997, Johnson 2006).

In Michigan, egg-laying likely occurs in early to mid-June; a nest was observed in Ontonagon County that fledged on July 1, indicating egg-laying on or near June 5 (Walkinshaw and Dyer 1961). Fledglings and adults carrying food have been observed throughout the month of July and into early August in northern Michigan (Binford 1991).

Abundance and Population Trends

Partners in Flight (PIF) estimates a population of 1,400 Connecticut Warblers in Michigan, accounting for roughly 0.1% of the total population for this species (PIF 2007). This low percentage of the total population is expected as Michigan lies at the very southern extreme of this species' breeding range and much of our state is unsuitable or fringe habitat.

Comparisons between MBBA I and MBBA II point to a decline in the Connecticut Warbler over the last 20 years. MBBA I observers located Connecticut Warblers in 68 blocks during the initial atlas period, but this species was only found in 32 blocks during MBBA II. Especially conspicuous is the lack of observations from the NLP, where nine blocks had Connecticut Warblers during MBBA I but only one block during MBBA II. In addition, atlas observers confirmed breeding in 11 blocks during MBBA I but only one block in far western Gogebic County had a breeding confirmation during MBBA II. Due to the inaccessible habitats and secretive nature of the Connecticut Warbler, this species is probably under-recorded during atlas efforts. This leads to low sample sizes and makes it difficult to interpret the extent of the decline of the Connecticut Warbler in Michigan.

Conservation Needs

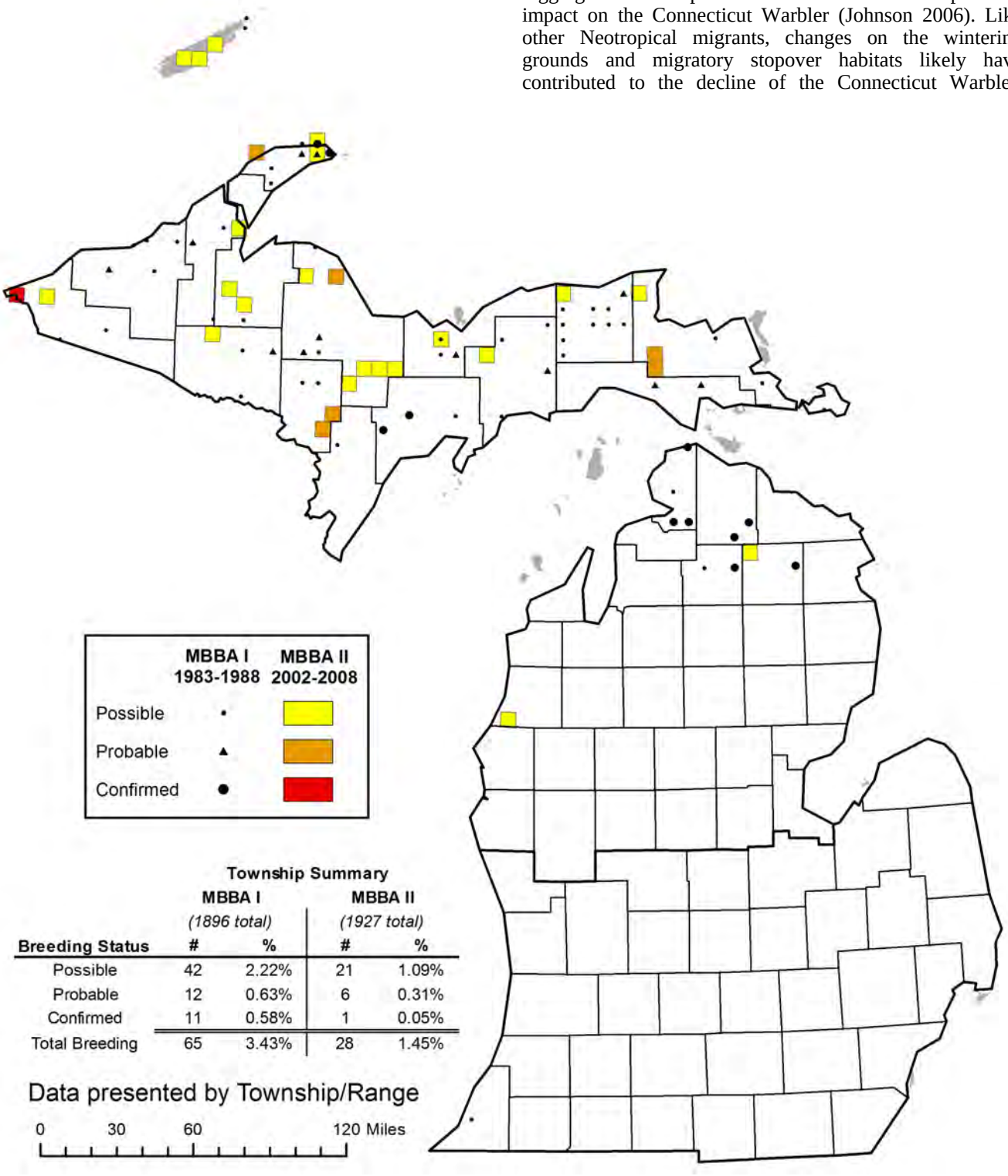
BBS data show that Connecticut Warblers have experienced a significant decline of about 3% per year in the Boreal Hardwood Transition Bird Conservation Region, the region that includes northern Michigan. The Connecticut Warbler has shown similar declines in other parts of its range as well (Sauer et al. 2008). These declines likely contribute to the lower number of Connecticut Warblers observed during the second atlas period in Michigan. Due to reasons discussed previously, caution should be used in interpreting this data. In Ontario there was actually a several-fold increase in

Connecticut Warbler *(Oporornis agilis)*

Vincent S. Cavalieri

observations of Connecticut Warblers between the first and second breeding bird atlas, though BBS data indicates a significant decline in Ontario's Connecticut Warblers since 1981 (McLaren 2007). This conflicting data points out the difficulty in describing trends in species with small sample sizes, like the Connecticut Warbler.

Although the Connecticut Warbler appears to be in no immediate danger, more research should be done to examine the causes of the decline of this species. In Michigan, much of the breeding habitat occurs in national and state forests and other areas of low population density, and thus should be mostly safe from development and other sources of habitat degradation and fragmentation in the immediate future. It has been noted in Wisconsin, however, that heavy logging of black spruce and balsam fir has a potential impact on the Connecticut Warbler (Johnson 2006). Like other Neotropical migrants, changes on the wintering grounds and migratory stopover habitats likely have contributed to the decline of the Connecticut Warbler.



Mourning Warbler *(Geothlypis philadelphia)* ***Jack Reinoehl***



John Van Orman ©

The low rolling song of the Mourning Warbler has a peculiar appeal to the professionals of Madison Avenue, as it has been used in a number of commercials. To Michigan birders it is a welcome sound, though enjoying the fine plumage of the songster is far from guaranteed. In the east this warbler nests from southern Michigan and northern Pennsylvania north to the southern tip of James Bay; the western range extends through Saskatchewan to northern Alberta. The Mourning Warbler migrates through Texas and Mexico to its wintering grounds in the lowlands of southern Central America and northern South America (Pitocchelli 1993). In Michigan, this warbler nests throughout the state, but very uncommonly in the south. Most atlas records are likely based on hearing the distinctive song.

Distribution

In northern Michigan, the Mourning Warbler is found in most townships. There, this species is found in a variety of habitats mostly of disturbed types, but including woodland that is generally damp, with partially open canopy and dense understory, as observed in MBBA I (McPeek 1991). Farther south, the species is nearly always associated with open second growth habitat, often preferring recent clearcuts (pers. obs.). This warbler made quite a good showing in counties as far south as Montcalm, Tuscola and Lapeer, but is still very uncommon as a possible nester anywhere in the southern three tiers of counties in our state. Unlike most northern warblers whose ranges extend into southern Michigan, this species does not appear to have any particular preference for areas near Lake Michigan. During MBBA II, confirmation of nesting proved difficult, especially in the SLP, but there is little doubt that the map well represents the breeding range of the species and the frequency of its occurrence in the state.

In states to the south of Michigan, this species is a very rare nester. As of 1993, this species had never been confirmed as nesting in Indiana (Pitcher 1998). During the Ohio BBA, nesting was confirmed both in the northeast and the northwest parts of the state. In northwest Ohio, most of the records were from Oak Openings Preserve, about 15 miles south of the Michigan state line (Peterjohn and Rice 1991).

To the east and west of Michigan, this species is quite numerous. BBS surveys found the greatest population density of the Mourning Warbler in several areas including northeastern Wisconsin, and in Minnesota north of western Lake Superior (Sauer et al. 2008). High population density also extends northwest to the Great Slave Lake area and east across southern Canada to the Maritimes. In southern Wisconsin and Ontario, as in southern Michigan, this species occurs at low density (Sauer et al. 2008).

Breeding Biology

A few migrant Mourning Warblers are found occasionally in the first half of May, but its average arrival is the third week of May. Thus the Mourning Warbler is among the latest of the spring migrants to arrive. Its spring migration continues later than that of almost any other passerine, with migrants occasionally found in the second week of June. Thus any individual of this species recorded away from known nesting areas in the early part of the nesting season must be classified with caution. Eggs are laid mostly in late June and early July (Pitocchelli 1993). Departure from the state starts early in August, and this warbler is quite difficult to detect during its southward migration.

Abundance and Population Trends

According to Partners in Flight, the Mourning Warbler is moderately numerous in Michigan with an estimated population of 120,000 (PIF 2007). Its numbers fall far short of such abundant species as Ovenbird and Nashville Warbler. Maps based on BBS surveys show low levels of population in most of the LP and substantial density of population in the western UP. The very sparse populations in the extreme south do not register on those maps (Sauer et al. 2008).

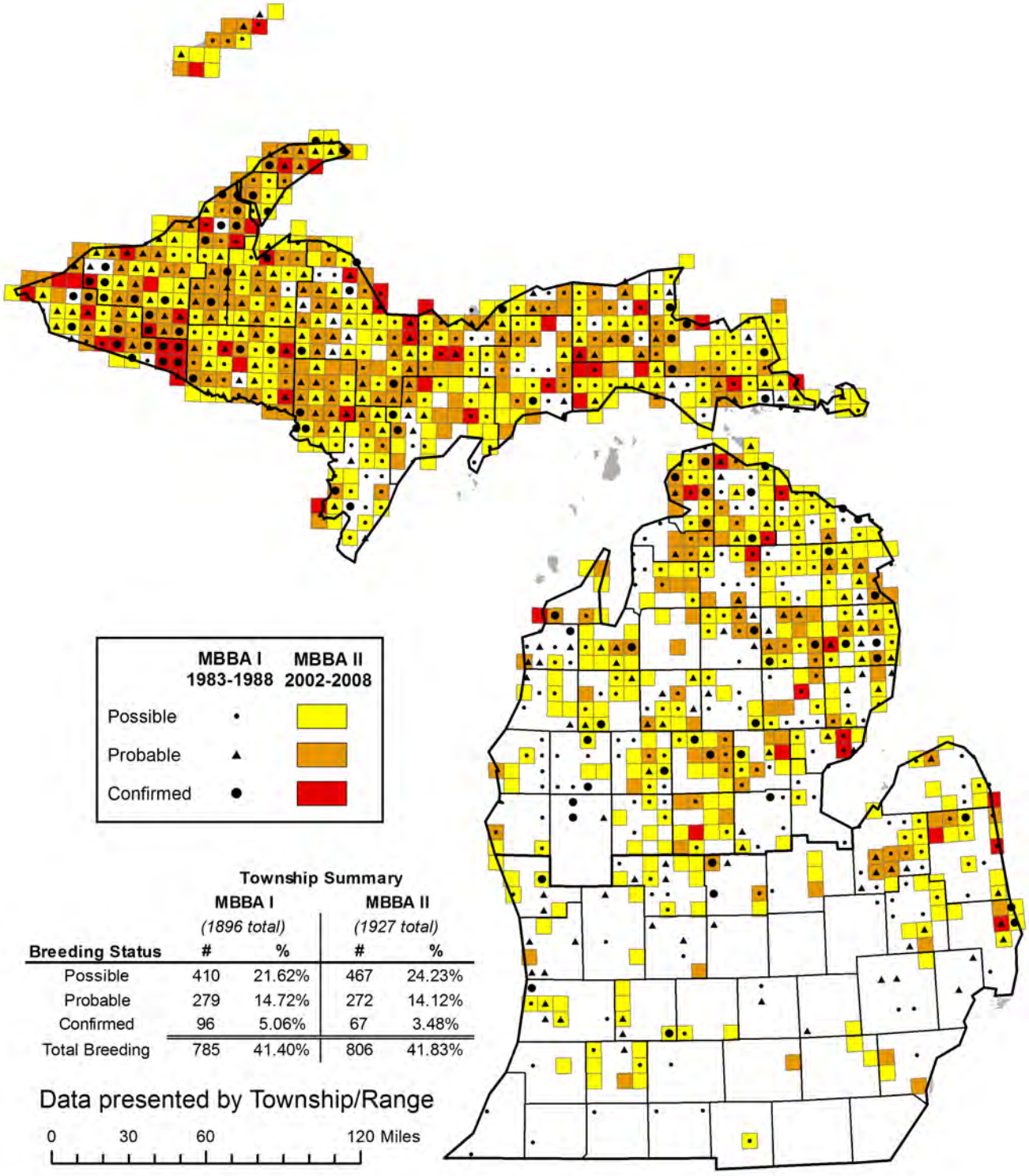
In BBS data, the population of the Mourning Warbler has been quite stable over the last 40 years in Michigan, but it shows significant decreases over its full range (Sauer et al. 2008). Comparing the two atlases, there was a significant increase in detection between MBBA I and MBBA II in the UP, and decreases in the LP. The net result of these is a slight increase in the number of blocks in which this species was found. Population trend maps from the BBS for Michigan agree with this mixed picture with decreasing populations in most of the LP, but increases in the eastern and western UP (Sauer et al. 2008). Pitocchelli (1993) regarded overall populations as stable. Data from BBS surveys suggest significant recent population declines in Ontario, but Zimmerling (2007) did not agree with this estimate, finding a mixed picture by region but an overall increase in detection from the first Ontario atlas to the second.

Mourning Warbler *(Geothlypis philadelphia)*

Jack Reinoehl

Conservation Needs

The Mourning Warbler has a large population and is not regarded as requiring unusual attention. Partners in Flight notes that a "high percent of the population is in a single biome" and hence requires "long term planning" (Rich et. al. 2004). In Ontario, Zimmerling (2007) observed that following a clearcut, "regenerating forests . . . [provide] ideal habitat." Thus human activity can aid this species in maintaining its population level.



Common Yellowthroat *(Geothlypis trichas)*

Deaver D. Armstrong



Jerry Jourdan ©

The black mask of the Common Yellowthroat easily helps distinguish this species for the birder but it is an important character for the bird as well. Males with more extensive masks are more successful competitors for territories with other males as well as in attracting females (Pedersen et al. 2006). The characteristic song of this species is also well known to birders and yet each male's song exhibits enough unique variation that it becomes easy to identify individuals after studying their songs for only a short while. The loud song of the Common Yellowthroat, as well as its ability to nest in a broad range of habitat types, has likely contributed to observations of this species over such a broad range of Michigan (almost 90% of townships reported the species in MBBA II) as well as all of North America. The Common Yellowthroat breeds in all states in the continental U.S. and in all Canadian provinces and territories (Guzy and Ritchison 1999). However, western populations can be local, and so it is the eastern half of North America that has the highest breeding densities (Sauer et al. 2008). Throughout Michigan the species is a common summer resident, a fairly common migrant and is even occasionally found in the southern Lower Peninsula in early winter (Chartier and Ziarno 2004).

Distribution

Historical accounts (Wood 1951, Zimmerman and Van Tyne 1959, Payne 1983) describe the species as common to abundant and according to Barrows (1912) as being "found from southeastern Michigan to Ontonagon County." Both Michigan Breeding Bird Atlases show that the Common Yellowthroat was found in more townships than any other warbler with little change in statewide distribution between the two atlases. The species continues to occur in a slightly smaller percentage of townships in the UP than in the LP. Data in the first atlas showed that Common Yellowthroats preferred open wetlands or shrub wetlands (60% of all observations) and in the SLP, they were also the most common species found in wet conifer forests (Brewer et al. 1991). However, they used as many as 14 different categories of habitats according to the first atlas, so the species will nest in upland sites as well as wet as long as the lower vegetation is dense enough to provide cover for its low nests.

Breeding Biology

In southern Michigan, Common Yellowthroats are double brooded (Hofslund 1953), as are most Ohio birds (Peterjohn and Rice 1991), but only 27% of birds at a study site in southern Wisconsin were double brooded (Elias 2006), suggesting that some more northerly birds in Michigan may also produce a second clutch. Double brooding in at least some populations of Common Yellowthroat could very well contribute to its success in maintaining the widespread distribution in Michigan and surrounding areas.

In studies done prior to 1950 in Michigan, Brown-headed Cowbird parasitism rates were found to be 47% and 45% of nests found (Hofslund 1953, Stewart 1953). These numbers are much higher than more contemporary data from Illinois (an average of 23%), and in Ontario (19%), and suggest that this may be another area of Common Yellowthroat biology to reexamine here in our state (Kleen et al. 2004, McLaren 2007).

Abundance and Population Trends

BBS data from 1966 to 1979 show that Common Yellowthroat numbers were significantly increasing in the state at a rate of more than 3% per year (Sauer et al. 2008). However, between the first and second atlases (1987-2007), these same data show a slight, non-significant decrease in Michigan. USFWS Region 3 data, which includes Michigan and surrounding states, also show a slight decline over the period covered by the two atlases. Wisconsin is the only state in the region showing a significant positive annual trend from 1966 to 2007 (Sauer et al. 2008).

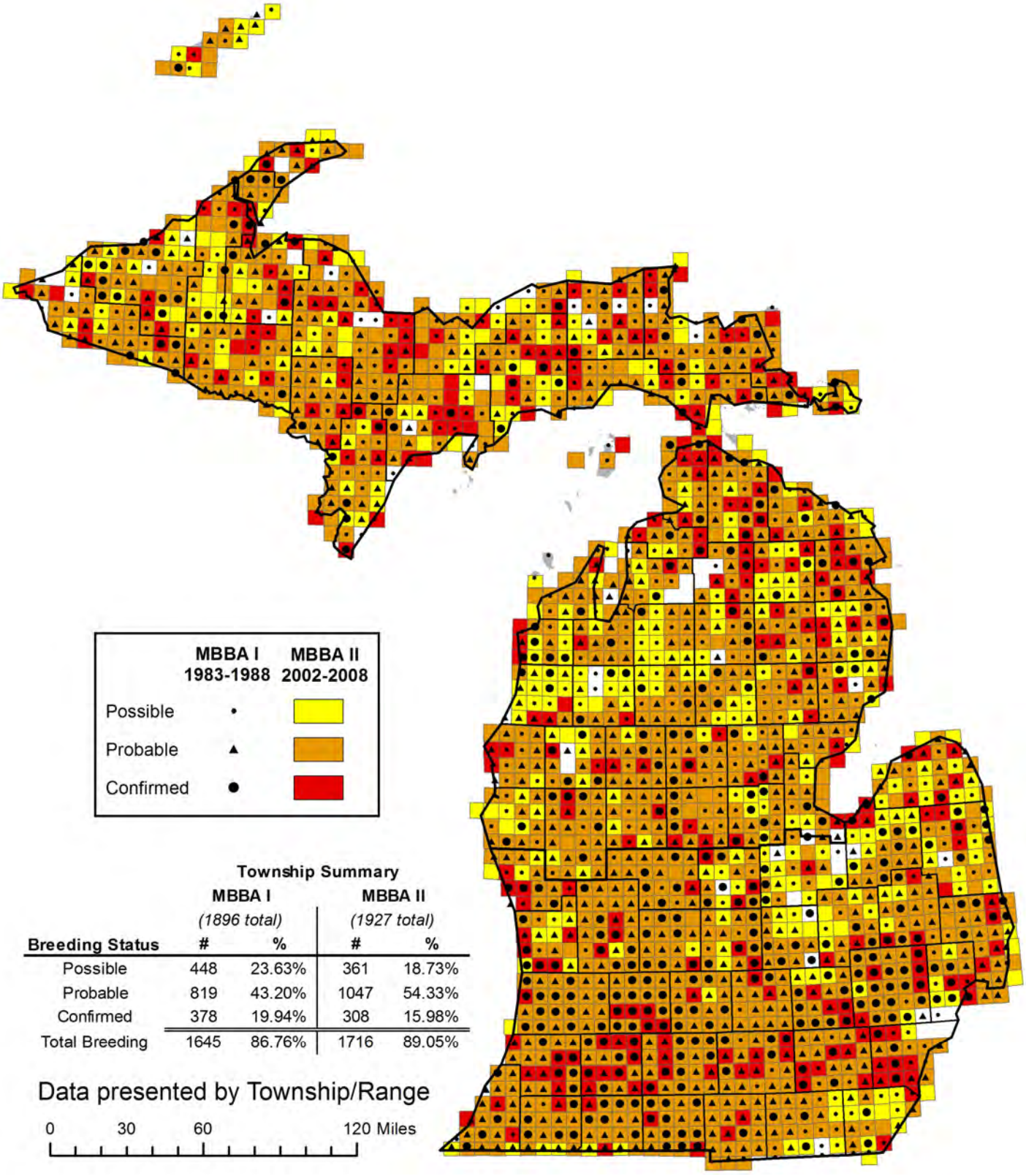
In spite of the wide distribution of Common Yellowthroat throughout Michigan (found on all of the 75 Michigan BBS routes along with 11 other species), the PIF (2007) database suggests that it is only the third most abundant warbler after Ovenbird and Nashville Warbler with an estimate of 650,000 individuals in the state. Michigan is home to an estimated 2% of the world's population of this species.

Conservation Needs

Common Yellowthroats are not currently at risk in Michigan or elsewhere. However, all of these populations can only be helped by preservation of small and large wetlands along with land use planning that protects natural open space.

Common Yellowthroat *(Geothlypis trichas)*

Deaver D. Armstrong



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	448	23.63%	361	18.73%
Probable	819	43.20%	1047	54.33%
Confirmed	378	19.94%	308	15.98%
Total Breeding	1645	86.76%	1716	89.05%

Data presented by Township/Range

0 30 60 120 Miles

Hooded Warbler *(Setophaga citrina)*

Lathe Claflin

Status: *Special Concern (MNFI)*



Willie McHale ©

This striking yellow warbler, with its bold black hood and yellow face, is readily located as it arrives on its breeding territory by its loud, whistling song described as *"tawee tawee tawee-TEEto* or *wee-tee wee-tee WEE-tee-you"*. It is a forest interior species and can be locally common. Typically found breeding in the eastern half of the U.S. south and east of Missouri, Illinois, Indiana, and Ohio, a stable population at the northern edge of its range occurs in a corridor running from northeast Illinois across southern Michigan into southern Ontario. In winter, the Hooded Warbler occupies lowlands in many of the Caribbean Islands and the Caribbean side of countries from southeastern Mexico to Nicaragua (Odgen and Stutchbury 1994).

Distribution

Prior to the late 1800s, Hooded Warblers were considered abundant throughout much of southern lower Michigan (Gibbs 1894, Barrows 1912). In the early 1900s they were no longer abundant anywhere in the state (Wood 1951). Most of the decline was undoubtedly associated with the extensive logging of Michigan's forests. Most remaining birds were reported from the western third of the SLP. Data from MBBA I showed significant breeding evidence in Michigan's SLP, though total numbers were still low. Sixty-six (9.5%) townships in 21 counties in the SLP recorded breeding evidence of Hooded Warblers. In MBBA II, township numbers in the SLP increased to 107 (15.1%) townships in 27 counties. Yet, total numbers of townships reporting breeding evidence is low, and more than half of the counties in the SLP reported no, or very limited, evidence of breeding. What little habitat exists is probably accounted for by second growth forests that have matured and former farmland that has returned to woodlands.

Comparison of the data from the two Atlases indicates both a small local increase in the breeding population of Hooded Warblers in Michigan and a range expansion. Twenty-one of 35 counties in the SLP had an increase in the number of townships reporting breeding evidence. For about a third of these counties the increase was more than doubled. Three counties reported no change and three reported slight declines. Newly reporting counties in the SLP numbered six. Numbers of reporting townships in the NLP increased from four to 13. Examination of the map shows that counties newly reporting this species during MBBA II are north and east of those reporting it during MBBA I. For example, the number of townships recording breeding evidence in Jackson, Washtenaw, Ingham, Livingston, Oakland, and Lapeer Counties increased from 10 to 22, and the expansion was clearly northeast.

The likely reason for the expansion in Hooded Warbler distribution between MBBA I and MBBA II is the further maturation of the mixed deciduous forests they prefer. As expected, comparison of the township map of Hooded Warbler and the vegetative cover map of Michigan (Brewer et al. 1991) shows that the distribution of Hooded Warblers coincides with existing dry, mesic, and wet deciduous forests. These forest types are dominated by oaks and hickories or sugar maple, beech, and ash. As they have matured, more habitats with the appropriate sized canopy gaps and well-developed shrubby understory has developed (Bisson and Stutchbury 2000). This type of habitat is readily found in the Waterloo and Pinckney Recreation Areas in Jackson County. Washtenaw and Livingston counties, also have significant populations of Hooded Warblers (pers. obs.). One area in particular that has a large population is the Fort Custer Military Training Center in Northeastern Kalamazoo County (Baldy et al. 2011). Other populations of interest are Kellogg Forest in Kalamazoo County, Barry SGA and Yankee Springs Recreation Area in Barry County, Allegan SGA in Allegan County, Warren Dunes State Park in Berrien County and Van Buren State Park in Van Buren County. As one proceeds northeast from there toward Lapeer County, development is more obvious but significant sized deciduous woods can still be found.

Breeding Biology

It is apparent from the extensive research into the breeding behavior of this species that it has developed a number of successful mechanisms to ensure breeding success. These adaptations probably explain in part why this species has been successful in the northern part of its range where its habitat is limited. Hooded Warblers arrive in late April to mid-May, and males establish territories ranging from 0.25-0.75 ha in size. Nesting dates extend well into July (Ogden and Stutchbury 1994). It nests close to the ground in well-developed understory found in openings of more mature, mixed deciduous forests greater than 15 ha in size (Bent 1953, MacClintock et al. 1977, Eaton 1988). Two broods are not uncommon and renesting occurs when the first fails. Extra-territorial forays by males into neighboring territories are an integral part of the breeding behavior of this species and are highly successful (Stutchbury et al. 1994). Site fidelity in this species is high; studies show an annual return rate of 47% over seven years for males and 29% for females (Howlett and Stutchbury 2003).

Hooded Warbler *(Setophaga citrina)*

Lathe Claflin

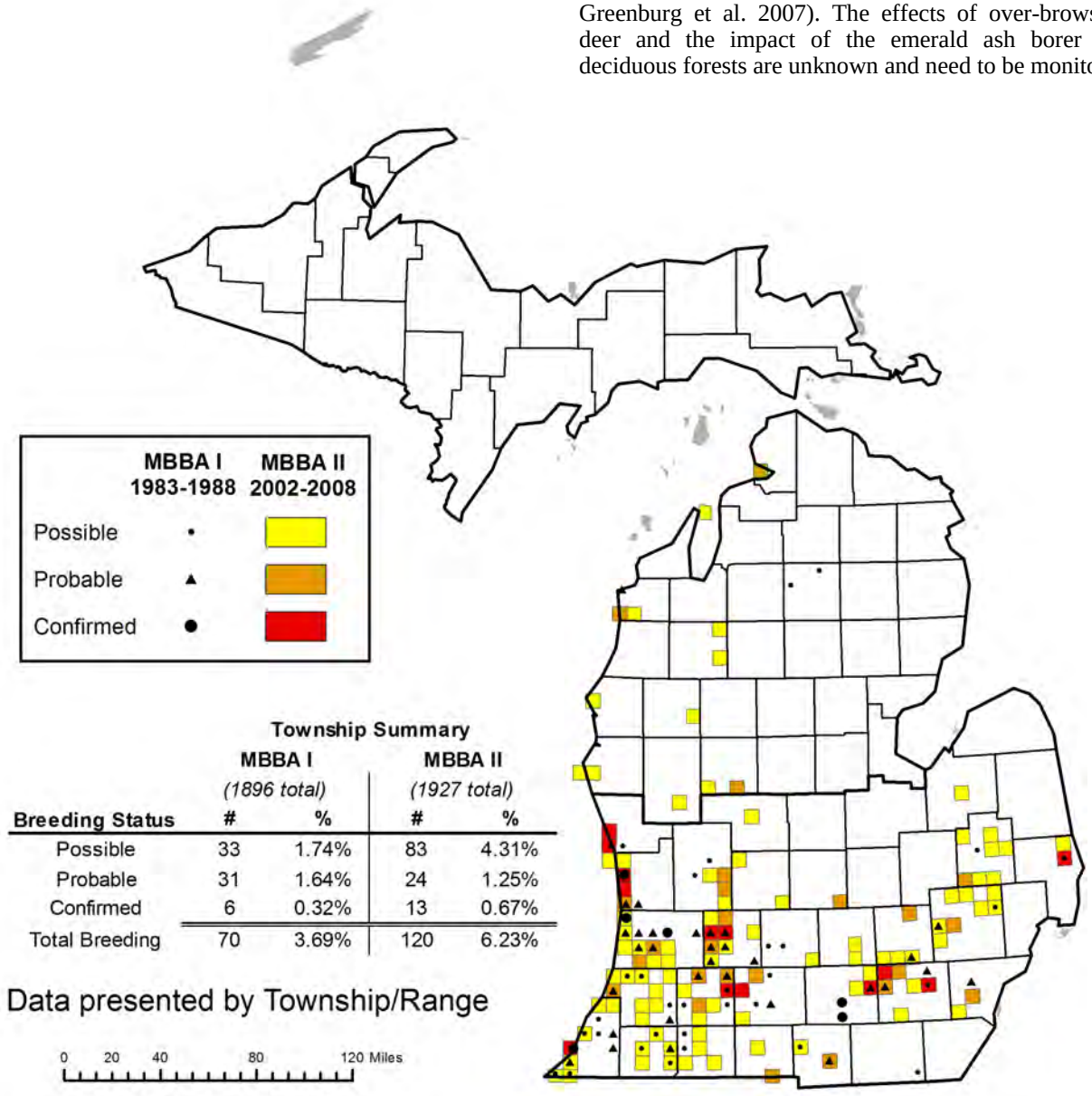
Status: *Special Concern (MNFI)*

Abundance and Population Trends

This species was detected too infrequently on BBS routes in Michigan to produce significant information about relative abundance (Sauer et al. 2008). As the township and block map shows, the Hooded Warbler is common only in a few places. Where it is present the average number of pairs per township is less than two. MBBA II data however, indicate a 62% increase in the last 20 years in the number of townships with evidence of breeding. Much of this increase occurred in townships adjacent to those reporting birds in MBBA I. Similar results were reported in recent Atlas projects in Ontario and New York (Cadman et al. 2007, McGowan and Corwin 2008). Thus three adjacent states and provinces at the northern end of this species range show increases in abundance over the last 20 years.

Conservation Needs

The Hooded Warbler is currently a species of Special Concern in Michigan. Though the population appears to be increasing slightly, total numbers are still low. Partners in Flight estimates there are about 6,000 Hooded Warblers in the state (PIF 2007). Like other area-sensitive forest dwellers, it is threatened by loss of its habitat and forest fragmentation. Research has shown that nest failure and cowbird parasitism are high in woodlots of <65 ha but low or virtually absent in larger woodlots (Lacki et al. 2004). Overall numbers of fledglings are higher in larger woodlots (Rush and Stutchbury 2008). Hence, retention of large woodlands is critical to its survival. Fuel reduction techniques (prescribed burns and mechanical cutting of smaller trees and shrubs) and selective logging can be acceptable forest management practices as long as they leave the canopy largely intact and allow time for understory regrowth (Artman et al. 2001, Shifley et al. 2006, Greenburg et al. 2007). The effects of over-browsing by deer and the impact of the emerald ash borer in wet deciduous forests are unknown and need to be monitored.



American Redstart *(Setophaga ruticilla)* ***Jack Reinoehl***



Darlene Friedman ©
Species is sponsored by:
Petoskey Regional Audubon Society

The American Redstart shows distinct differences in its habitat preference in southern and northern Michigan. In the UP and northern LP, it is an abundant breeder using a wide variety of forest and shrub habitats. It is fairly common on the west side of the southern LP and rather uncommon on the less forested southeastern part of the state. In southern Michigan, it is largely restricted to wet woodlands, primarily along streams. The American Redstart nests through the eastern and northern United States, and on both sides of the U. S. – Canadian border with highest population densities in the northern part of its range. It winters widely south of the border of the United States from the Caribbean and southern Mexico south to northern South America. This is a familiar and conspicuous species, unlikely to be overlooked by atlasers. Its small territory size of 0.1 hectares (Sherry and Holmes 1997) means that several singing males can often be heard from one spot, contributing to the ease of detection of this species.

Distribution

The American Redstart occurs throughout Michigan, and breeding was confirmed in 17.3% of townships in the state. But it is most widespread in the northern LP, where it was recorded in 85.88% of the townships. In MBBA II, increases in detection over levels in MBBA I were noted in all regions. The biggest percentage increase was in the southern LP, with 21.4% more townships reporting in MBBA II than in MBBA I. In the southeast, individual counties such as Washtenaw and Lapeer showed particularly dramatic increases: from four to nine townships and nine to 11 townships, respectively.

Habitat surveys from MBBA I and Wisconsin (Elias 2006) indicate that the American Redstart is found mostly in mixed and hardwood forest. The rate of occurrence in coniferous forests is much lower. Moreover, the species is not restricted to forest, since it is also found in wet, primarily deciduous, shrublands. This preference has allowed it to spread into areas such as the Gratiot-Saginaw State Game Area, where it was not found during MBBA I. In contrast, in Illinois the American Redstart is found "most notably along major river corridors" (Kleen et al. 2004), and this applies to southern Michigan as well.

In surrounding states, this warbler shows a variety of patterns of distribution, all consistent with the above observations. In Indiana and Illinois, the American Redstart is spread uniformly, and in both states is found in no more than 20% of blocks sampled (Bruner 1998, Kleen et al. 2004). In Ohio, it was found in 45.7% of blocks, with the greatest concentrations in the north and west (Peterjohn and Rice 1991). The Ontario atlas showed this species ranging north almost to Hudson Bay, with highest densities east of Lake Superior. Similarly, the redstart was detected with greater frequency in their second atlas effort than during the first (McLaren 2007)

Breeding Biology

The first American Redstarts arrive in southern Michigan in the first few days of May; seeing an individual in April is quite unusual. At Whitefish Point, the average arrival is 13 May with greater numbers present after 20 May (Granlund and Byrne 1994). Egg dates in Michigan are from late May into early July. This species will renest if a nest is destroyed, but it does not raise two broods (Sherry and Holmes 1997). In Lost Nation State Game Area, Hillsdale County, individuals on territory sing until mid-August, at a time when migrants from farther north are already starting to appear (pers. obs.).

Abundance and Population Trends

The American Redstart is a numerous species in Michigan. The Partners in Flight population estimates list only Ovenbird and Nashville Warbler among the warblers as more numerous in the state than the American Redstart, with Black-throated Green and Yellow-rumped Warblers about equal in numbers (PIF 2007). Between the two Michigan atlases, the state population has increased according to Breeding Bird Survey data, after decreasing between 1966 and 1979. Breeding Bird Survey trend maps show that the population change has varied quite a bit between different parts of Michigan. Consistent with observations from MBBA II, there has been a notable increase in the southern LP. In Hillsdale County, there was one American Redstart found in Lost Nation State Game Area and nine in the entire county during MBBA I; in MBBA II, 20 were counted in Lost Nation State Game Area alone (pers. obs.). Comparisons of BBS data show a decrease in population in the northern LP; the UP shows a complex pattern of increase and decrease.

In nearby states, population trends are also mixed. American Redstart numbers are increasing in Wisconsin and southern Ohio (Elias 2006, Peterjohn and Rice 1991) but decreasing in southern Indiana and Illinois (Bruner 1998, Kleen et al.

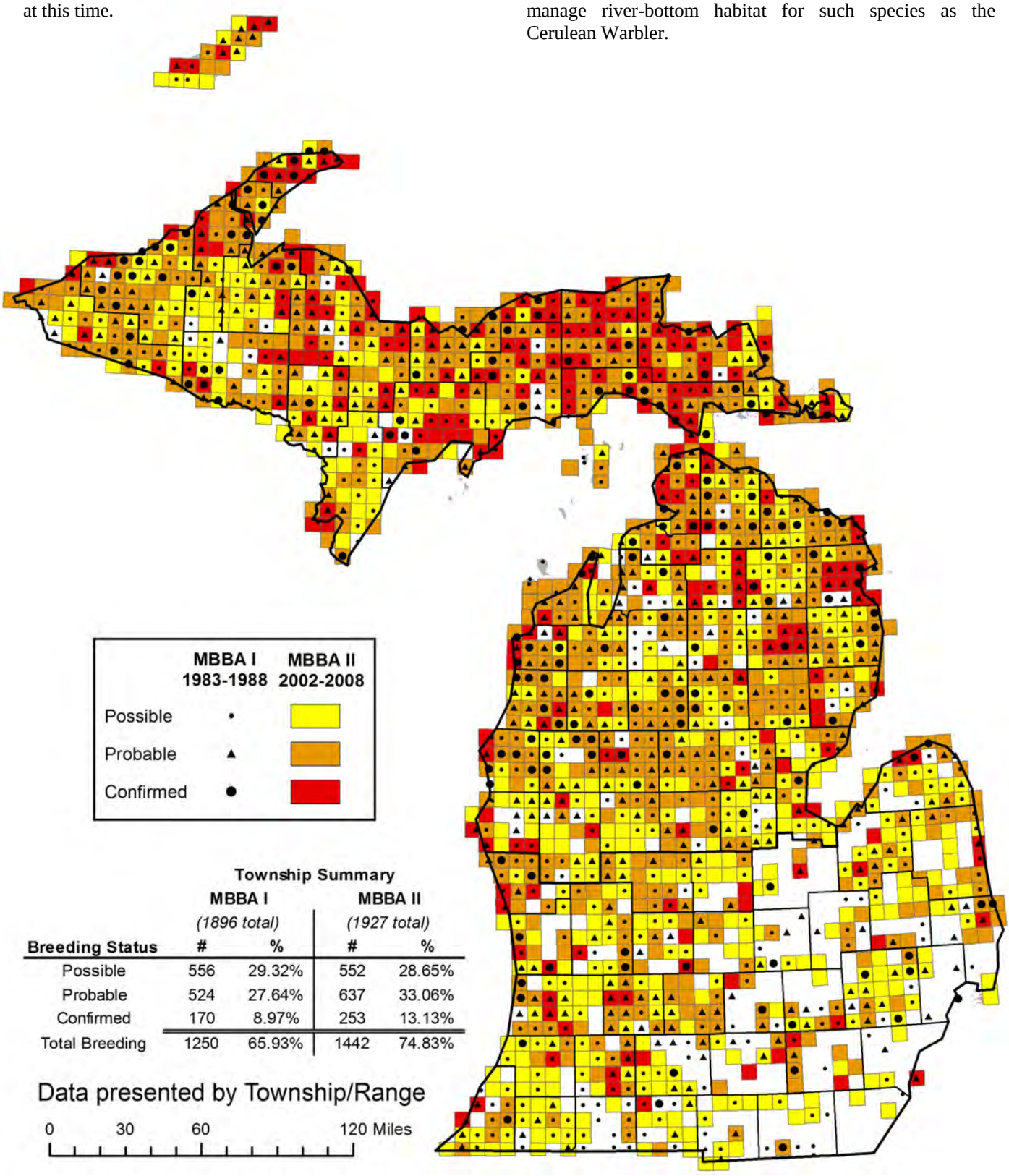
American Redstart *(Setophaga ruticilla)*

Jack Reinoehl

2004). According to Breeding Bird Survey data, population trends are more favorable in the Midwest than any other part of the country (Sauer et al. 2008). Over the entire continent, the species has shown a long-term decline of less than 1% per year, but this numerous species is not on any watch list at this time.

Conservation Needs

The redstart is numerous in Michigan. Its population level is steady with noticeable increases in areas where it has been less common. Therefore no specific management is needed. In southern Michigan, it would profit from actions which manage river-bottom habitat for such species as the Cerulean Warbler.



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	#	%	#	%
Possible	556	29.32%	552	28.65%
Probable	524	27.64%	637	33.06%
Confirmed	170	8.97%	253	13.13%
Total Breeding	1250	65.93%	1442	74.83%

Kirtland's Warbler *(Setophaga kirtlandii)*

John R. Probst & Deahn M. Donner

Status: *Federal & State Endangered*



Roger Eriksson ©

Species sponsored in honor of: Robert W. Moss

Spring travelers from around the world are attracted to the young jack pine forests of Michigan for a chance to hear the loud distinct song of the endangered Kirtland's Warbler. This blue-gray-backed warbler with a yellow underside can be heard singing from its perch in the tops of standing snags or jack pine trees, or seen hopping from tree to tree or to the ground, pumping its tail while searching for insects and blueberries. The breeding range of the Kirtland's Warbler is primarily restricted to public lands within 12 counties in northern Lower Michigan and scattered locations across Michigan's Upper Peninsula. Recent searches have documented occasional breeding in parts of Wisconsin and Ontario. This long-distance migrant winters in the Bahamas archipelago where it has primarily been found on Eleuthera Island. There has been one winter sight record from Mexico.

Distribution

It was not until 1903 that the first Kirtland's Warbler nest was discovered near the Au Sable River in Oscoda County. Surveys beginning in the 1950s found the breeding population confined to a 120 by 150 kilometer core breeding area in the northern LP (Mayfield 1953). During MBBA I, the majority of the breeding population continued to nest on public lands within this region. Currently, the Kirtland's Warbler population has expanded its breeding range into several key townships in the central and eastern regions of the UP (Probst et al. 2003), as documented by the annual census and MBBA II. Additional breeding records have been added by researchers and volunteers since MBBA I.

The Kirtland's Warbler's restricted breeding distribution follows from its narrow breeding habitat requirements and the availability of this habitat across Michigan. This warbler breeds exclusively in large, jack pine-dominated landscapes on nutrient-poor, sandy soils in glacial outwash ecosystems where trees are five to 23 years and 1.7-5.0 meters tall (Probst and Weinrich 1993, Kashian et al. 2003). Occupied suitable habitat is characterized by dense stands of young jack pine typically greater than 2,500 stems per hectare with 20-80% canopy cover. Optimal breeding habitat (where the highest density of warblers are typically found) has more than 7,500 stems per hectare and between 35% and 65% canopy cover, which was historically regenerated naturally following wildfire. Since the early 1980s, suitable habitat has also been created by planting trees (jack pine and rarely red pines) at densities about twice the normal forestry prescriptions (Probst 1988).

The majority of the breeding population has been found in wildfire-regenerated habitat until recently. Since MBBA I, the LP population has shifted into primarily plantation habitat (80-95% of singing males) in response to declining wildfire habitat and extensive plantation management on state, U.S. Forest Service, and U.S. Fish and Wildlife Service lands. Between 1960 and 1987, Kirtland's Warblers were found in unburned stands that had marginal natural regeneration after timber harvesting, presumably because of a shortage of higher-quality primary habitat (Ryel 1979, Probst 1986). When a large area of wildfire-regenerated habitat became available around 1987 along with an increase in dedicated plantations, the Kirtland's Warbler breeding population abandoned the unburned, naturally-regenerated habitats (Probst and Weinrich 1993). As plantation habitat has filled in the last decade, stands of unburned, unplanted habitat are once again becoming occupied (Donner et al. 2008).

Male populations in major breeding areas initially increase, then stabilize, and finally decline during the 10-15 year period of occupancy. Average tree heights range from 2.4 to 3.9 meters tall when populations peak at approximately 13-15 years of stand age. When trees reach 3.5 meters or more in height and no live needles are present below about 1.0 meter, the Kirtland's Warbler male population begins to decrease in the area due to declining habitat structure important for nesting and fledgling cover and for female foraging space. Characteristic ground cover in these areas consists of a mixture of low shrubs (e.g., blueberry, juneberry, sweetfern), grasses, sedges, forbs and exposed bare ground (Walkinshaw 1983). Ground cover is determined as much by site and shade-history factors as wildfire, despite dramatic ground cover differences immediately after fire (Probst and DonnerWright 2003).

Breeding Biology

Kirtland's Warblers arrive on the breeding grounds between 5 and 20 May (Mayfield 1960, pers. obs.) but some males settle in secondary habitat as late as early June. Nests are built on the ground typically near small openings. Male singing remains frequent throughout most of June, probably due to attempts to establish polygynous pairings (Radabaugh 1972, Bocetti 1994). By the last week of June,

Kirtland's Warbler *(Setophaga kirtlandii)*

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Status: *Federal & State Endangered*

singing is sporadic. Unmated males sing twice as much as mated males (Hayes et al. 1986) but mated males may sing as much as unmated ones while females are incubating eggs. Females incubate eggs of first nests in early June and young fledge beginning 15 June (Walkinshaw 1983, Mayfield 1972, Bocetti 1994). Few second nestings or renestings are initiated after 25 June but nests have fledged young as late as 20 August (Walkinshaw 1983). Individuals begin to disappear in early August, but many Kirtland's Warblers (mostly adults) stay on the Michigan breeding grounds through late September (Sykes et al. 1989). Kirtland's Warblers feed on a variety of insects such as aphids, spittlebugs, ants, wasps, and beetles, and also blueberries just after young have fledged (Deloria-Sheffield et al. 2001).

Abundance and Population Trends

Since MBBA I, the male Kirtland's Warbler count has increased every year. In 2008, results from the official comprehensive census of singing males throughout the known breeding range exceeded 1,800 males. Almost 3% of the males recorded were outside the historical breeding range in the LP. The increase of male sightings in the UP and eight counties (principally Jackson, Adams, Vilas and Marinette) in Wisconsin overlapped temporally with the discovery of scattered breeding pairs in the UP (summarized by Probst et al. 2003). Recently, at least 14 males and nine nests (2007/2008) were found in two Wisconsin counties (J. Trick pers. comm., pers. obs.). Three males were discovered in Petawawa, Ontario in 2006 and nesting was recorded in 2008 (Richard 2008).

These population trends are encouraging given the low number of males found during the 1961 census (502 males) and the stable population numbers of near 200 males found from 1971 to 1986 (Mayfield 1962, Mayfield 1972, Probst 1986). The increasing trend can be attributed to increasing suitable habitat available within the LP breeding range due to several large natural wildfires and the large-scale habitat management program put in place during the early 1980s (Donner et al. 2008), plus the continued Brown-headed Cowbird control program initiated in 1972 to reduce nest parasitism (Kelly and DeCapita 1982). Productivity increased from less than one fledgling per pair to 3.1 after cowbirds were controlled, and polygynous pairings did not seem to decrease productivity per pair (Walkinshaw 1983, Bocetti 1994), which is unusual when a male bird provides parental care of young.

Because habitat is only suitable for a 10-15 year period, habitat maturation forces young birds to find new breeding areas. Thus, the Kirtland's Warbler population is maintained or increased only if new breeding "colonies" are established to replace existing ones. The population fluctuations observed from 1971 to 1990 are related to a synchronous increase and subsequent decrease among maturing colonies (Probst 1986). Prior to 1986, about 70-80% of the counted males (between 155 and 180) were concentrated within six maturing wildfire areas that represented about one-third of the suitable habitat area available (Probst 1986, Donner et al. 2008). The population was being affected by the low proportion of suitable wildfire and plantation habitat (Probst 1986, Donner et al. 2008). By 1987, males began declining in these former areas and colonized developing habitat composed primarily of a 10,000 hectare wildfire (1980 Mack Lake Burn area, Oscoda County) and plantations created in the early 1980s that nearly doubled the amount of suitable habitat. In response, the male count tripled from 1988 to 1994. Because of the sudden increase in habitat availability, however, breeding male densities were much lower during this period than from 1981 to 1986 when suitable habitat amount was more limiting.

Although the rate of population increase has slowed, the male count has more than doubled since 1994. After this time, areas of the 1980 Mack Lake Burn were becoming unsuitable and few new areas were being created by natural wildfires. The increasing male count has redistributed into available plantation habitat. In addition, the Kirtland's Warbler population has broadened its spatial distribution across the LP breeding range since MBBA I in response to the type of breeding habitat available and the increasing population (Donner et al. 2008). Currently, the overall average density of Kirtland's Warblers in occupied habitat is the highest ever recorded (Probst et al. 2005, Donner et al. 2009). In addition, males are using marginal unburned, naturally regenerated habitat again after abandoning this habitat type during the rapid population increase in the early 1990s. The increasing breeding activities recorded in the UP and elsewhere reflect periods of rapid population growth and potential overflow from stabilization in suitable habitat within the LP breeding grounds serving as "source habitats" to population regulation (Probst et al. 2003).

Conservation Needs

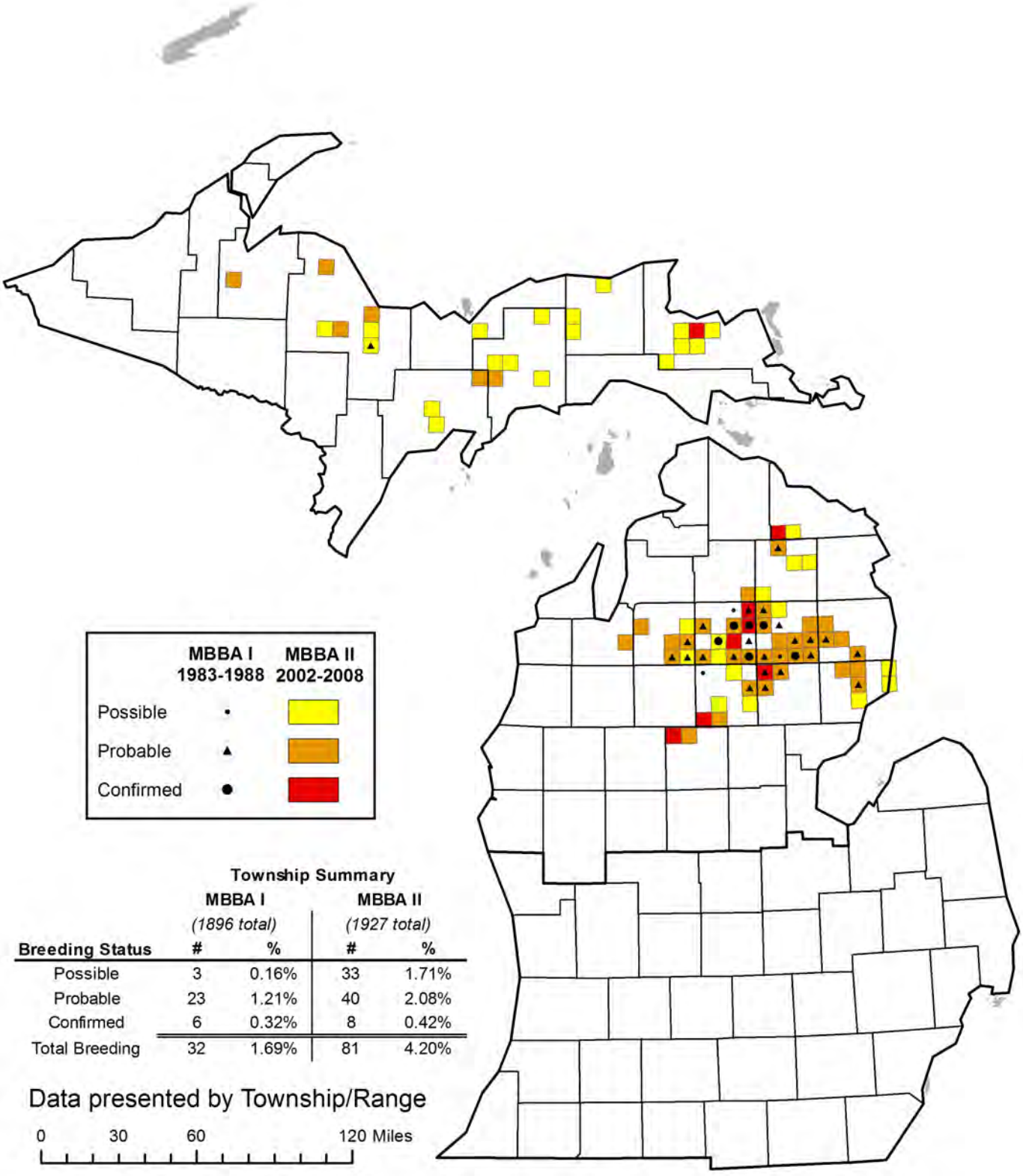
The area targeted for Kirtland's Warbler habitat management within the LP core breeding area is over 80,000 hectares under the Kirtland's Warbler Recovery Plan (developed under authority of the Federal Endangered Species Act of 1973; Byelich et al. 1976). The original plan called for regenerating jack pine habitat through harvest followed by burning on state and federal lands to provide approximately 16,000 hectares of suitably-aged habitat per decade to reach a goal of 1,000 breeding males. Because this goal has been met and the population has been shown to be regulated by habitat amount, the recovery plan may be modified to reflect a goal in suitable habitat area rather than male numbers. To meet future breeding habitat needs within the UP, the U.S. Fish and Wildlife Service is planning land exchanges or acquisition in the UP. Additionally, the Hiawatha National Forest is actively incorporating Kirtland's Warbler habitat management within existing multispecies management objectives. Early succession jack

Kirtland's Warbler *(Setophaga kirtlandii)*

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pine habitat management for the Kirtland's Warbler also can provide important habitat for other species such as the Upland Sandpiper, Eastern Bluebird, Black-backed Woodpecker, Sharp-tailed Grouse, and Northern Harrier. Any reduction of the Brown-headed Cowbird control program (as has been proposed for budgetary and biological reasons) has the potential to lower productivity within the core LP breeding population, which may lower the overall male population and reduce the number of male dispersers to peripheral areas such as the UP and Wisconsin.



Cape May Warbler *(Setophaga tigrina)*

Skye Christopher G. Haas



Darlene Friedman ©

Guaranteed to take one's breath away, the male Cape May Warbler's dazzling gold and chestnut coloration is matched by few other warblers in flash or splendor, and belies the subtlety of its almost inaudible song. This species is tied to the boreal forest, and in particular is dependent on spruce budworm and other lepidopteran larva during the breeding season. This is the only warbler species with a semi-tubular tongue, an adaption that aids in obtaining nectar from flowers and juice from fruit, a frequent component of this species diet during the non-breeding season (Baltz and Latta 1998). Its distribution in North America is also somewhat enigmatic with the species demonstrating an elliptical migration pattern from spring to fall. Autumn finds Cape May Warblers migrating in an eastward shift, with the majority of migrants found along the Atlantic Coast, and rarely west of the Appalachians. In the spring, the Cape May Warbler has a more westerly bent, with birds more common in the Midwest rather than along the Atlantic. Still birds are only rarely found west of the Mississippi valley; which suggests that birds on the westernmost portions of their breeding range in Alberta and the Northwest Territories reach the breeding grounds from the east rather than the south (Baltz and Latta 1998).

Distribution

Walter Barrows (1912) thought that the species was conceivable as a breeder in northern Michigan, but this species' status remained unclear for many years. Binford (1991) speculated that there was an increase in this species' population from Barrows' day, as well as the mid-twentieth century, where Zimmerman and Van Tyne (1959) described the species as "a very rare and irregular summer resident" with no confirmed breeding. Wood (1951) published the discovery of 19 singing males from a bog in Luce County, but nesting was not confirmed. The exact first record of breeding is unclear, but during the 1970s, fledglings had been recorded and Michigan's first nest had been found, and by the 1980s, the MBBA I had gathered breeding evidence in 137 townships; a substantial change from earlier accounts. It is thought that this expansion correlated with a major spruce budworm outbreak in the 1970s (Binford 1991, 2006).

There were no significant changes in the status or distribution of Cape May Warblers in Michigan between atlases. As expected, distribution was primarily restricted to the Upper Peninsula, with a small population in the NLP, and positive growth in the number of townships recorded. A slight shift in population density was noted, with more records in western UP townships compared to the MBBA I, where the highest densities were found in the eastern UP. This like with many other boreal species surveyed, may just be a reflection of observer effort, which was higher in the MBBA II in the western UP, rather than an actual change in distribution.

MBBA II found that even with a wide distribution across the northern portion of the state, Cape May Warblers were a highly localized species dependent upon a specific forested habitat and age class of trees. Primarily restricted to lowland coniferous habitat, with mature black spruce forest preferred, temporary local colonies will form. This habitat specialist depends on food sources found in this forest type, typically outbreaks of spruce budworm. Cape May Warblers may have experienced a lull in their Michigan population from 2000-2005, with very few to no birds recorded on BBS routes, point counts or early MBBA II efforts, but began to experience a rapid population growth in 2006 with extensive numbers recorded in the southwestern UP in 2007 (Binford 2006, pers. obs.).

Breeding Biology

Cape May Warblers typically return to the breeding grounds by the end of May. Habitat selection is restricted to lowland conifers, specifically mature black spruce bogs with a sphagnum floor (Binford 1991). Other breeding habitats used by Cape May Warblers include riparian corridors composed of spruce/fir with an understory of alder, and upland groves or plantations of white or ornamental blue spruce (Baltz and Latta 1998). In some areas, particularly in Gogebic and Iron Counties, windbreak lines of spruce in residential yards were sometimes used for nesting (S. Haas and R. Rutherford, pers. obs.). It has been found that tree height is an important component of nest sites selected by Cape May Warblers, with spruce or fir over 10 meters tall with well-developed crowns used most often (Baltz and Latta 1998). Trees can be scattered or dense, and in northern Ontario, height, not age, may be the most important factor in nest site selection. Cape May Warblers are absent from areas of mature spruce that are thought to not be usable when stunted by proximity to the James and Hudson Bays (Binford 1991, McLaren 2007).

Nests are placed high in the canopy of the spruce/fir, close to the trunk and are extremely hard to locate. Only a handful of nests have ever been found in Michigan, and all breeding confirmations in the MBBA II were of parents feeding young. When bringing food to young still in the nest, the parents spiral from the base of the tree up to the nest concealed by the dense foliage (Binford 1991). Due to the

scarcity of confirmed breeding records, little is known about the breeding phenology of Cape May Warblers. It is thought that there is only one brood a year and that it is timed to the presence of large larvae and pupae of budworm for nesting and fledgling periods (Baltz and Latta 1998).

Abundance and Population Trends

Partners in Flight estimates a breeding population of over 17,000 Cape May Warblers in Michigan, 0.5% of the world's population. This species reaches the terminus of the southward extension of its breeding range, and while perhaps less than critical abundance levels are found in Michigan, neighboring Ontario is home to over 24% of the planet's population of Cape May Warbler and is a likely source population of this species in the adjacent Great Lakes States (PIF 2007). There was no significant change to the overall population in Ontario between their atlases, but there was a precipitous drop of 35% in the southern shield in the second atlas. The cause was thought to be the low spruce budworm activity during their second atlas period (2000-2005), which correlated with the period of few Cape May Warblers in Michigan (McLaren 2007). No real difference in populations between atlases in New York was noted, but much of the state is unsuitable for nesting Cape May Warblers (Peterson 2008).

Due to the association of Cape May Warblers and outbreaks of spruce budworm, populations of Cape May Warbler can be ephemeral, with major reductions and even local extirpations occurring in periods of low budworm numbers. Conversely, Cape May Warblers are able to quickly take advantage of outbreaks and increase their clutch size, even up to nine eggs in a single brood (Baltz and Latta 1998).

BBS data has shown these oscillations in Cape May Warbler populations; both increases and subsequent decreases have been shown to vary between non-significant changes to highly significant short-term population declines (Baltz and Latta 1998).

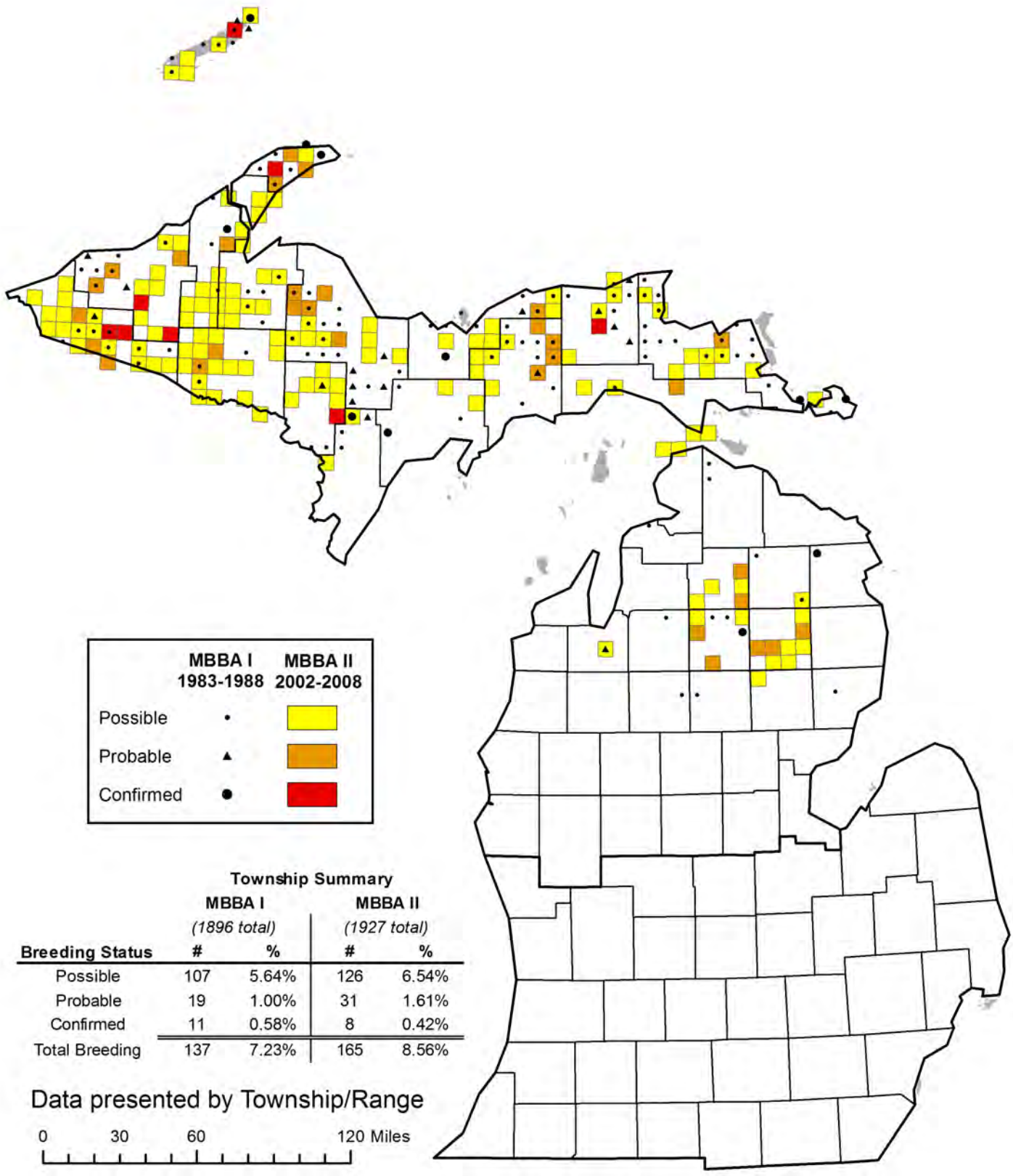
Conservation Needs

A number of threats may lead to a decline or permanent extirpation of Cape May Warblers in Michigan. Of global concern, the destruction of habitat on wintering grounds, as well as dangers posed by communication or wind towers could have a negative effect on populations during migration periods. In many locations in the state, local breeding populations of Cape May Warblers are concentrated along riparian corridors, so water quality issues are essential in maintaining a healthy ecosystem. In the Great Lakes region, allochthonous detritus from the riparian zone has a profound effect on the corresponding productivity of a particular watershed (M. Strand pers. comm.).

Of course the Cape May Warbler's status in Michigan is most dependent on populations of budworm to maintain periods of high breeding productivity to counter years of low breeding success. Habitat requirements are also rigid, with Cape May Warbler requiring tracts of mature spruce/fir forest. Unfortunately, modern lumber practices are somewhat incongruent with maintaining an expansive Cape May Warbler population. Pesticides are applied to large tracts of boreal forest, limiting the abundance of the spruce budworm. Large declines have been noted in other budworm specialists, namely Bay-breasted Warbler and Evening Grosbeak (Bolgiano 2004). Furthermore, production for pulp-paper timber has substantially increased, particularly in Michigan in the last several years, clearing the northern forests of suitable breeding habitat for the Cape May Warbler. This species' survival in Michigan as a summer resident is tenuous, and a more holistic approach to resource harvest is needed to ensure this soft-voiced singer's presence in the North Woods.

Cape May Warbler *(Setophaga tigrina)*

Skye Christopher G. Haas



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	107	5.64%	126	6.54%
Probable	19	1.00%	31	1.61%
Confirmed	11	0.58%	8	0.42%
Total Breeding	137	7.23%	165	8.56%

Data presented by Township/Range

Cerulean Warbler *(Setophaga cerulea)*

Skye Christopher G. Haas

Status: *State Threatened*



Greg Schneider ©
Species sponsored by:
Mr. Thomas Funke & Mrs. Susan Miller

Adorned in colors reminiscent of the sky, this beautiful blue-and-white warbler is a bird of the upper canopy, only occasionally drifting down to our eye level. Cerulean Warblers have garnered much attention in recent years, unfortunately due to their rapid decline as their required breeding habitat of extensive mature woodlands in eastern North America has been mostly cut, fragmented or converted into urban and agricultural land. Partial to tall deciduous trees, this species tends to be found contrastingly nesting along river bottom-lands, or in hilly or mountainous areas with steep ridges. Their range reflects this habitat choice with the two major centers of distribution located along the confluences of the Mississippi, Missouri, and Ohio Rivers as well as along the spine of the mid Appalachia. Spottily distributed across the eastern U.S. and Canada, this species can be found as far north as Minnesota, eastward to New York, Vermont, and Virginia, south to northern Mississippi, west to Arkansas, with scattered populations in eastern Oklahoma, Kansas and Nebraska (Hamel 2000). However its range is not contiguous, and consists of many local populations. For the winter, Cerulean Warblers depart for slopes of the Andes in South America, frequently part of a mixed species foraging flock, retaining its summertime habits as a resident of the forest canopy.

Distribution

Cerulean Warblers can be found in scattered locations throughout the LP, though the species is most frequently encountered in the southwestern counties of the state. Its range has expanded to territories in the Manistee and Huron National Forest regions, and is even found on rare occasions in the western UP. Overall, the species is not numerous, though in some of the larger State Game Areas, Cerulean Warblers can be considered locally common. The center of abundance for Cerulean Warblers has shifted since historical times, with southeast Michigan having an extensive population at the beginning of the 20th Century (Barrows 1912). However, the urbanization of the Detroit area after World War II, has led to a near disappearance of this species from the southeastern LP. Barrows described the species as abundant in Wayne County, yet neither MBBA I or II recorded this species in Wayne County. The species was likely limited historically by the expanse of white pine communities along the Saginaw and Tittabawassee Rivers. Extensive logging in the late 19th Century changed the tree species composition at the tension zone, and as the deciduous forests matured, a northward expansion of this species occurred, and by 1950, Cerulean Warblers could be found nesting in Saginaw and Newaygo Counties (Wood 1951).

By MBBA I, the decline of abundance of Cerulean Warbler was firmly established (Hands et al. 1989), and the species had largely retreated to the floodplain forests of the southwestern LP. This data as well as additional studies conducted by the Kalamazoo Nature Center in the early 1990s, as well as mapping efforts of the Cerulean Warbler Atlas from 1997-2000 documented that the highest densities were recorded along the Galien River in Berrien County, and in the Allegan and Barry State Game Areas (Adams 1991, McPeek 1994, Rosenberg et al. 2000). Unfortunately, numbers have continued to decline, and MBBA II data shows over a 12% decrease in the numbers of townships the species was recorded in since the first atlas. Again the center of abundance was found in the Allegan and Barry State Game areas with both locations recording at least 100 singing males, and a small handful of breeding confirmations (C. Putnam pers. comm.)

Very few observations were made north of the tension zone in the LP, being recorded in only six townships in MBBA I. However during MBBA II, a most interesting development was a cluster of singing males in the Huron National Forest, centered in Oscoda County but spilling over to the surrounding counties. Perhaps less surprising, but no less notable, is the expansion of the species in the Manistee National Forest. Most records pertain to observations of single birds, but Michigan IBA surveys on 12 June, 2007 near Hesperia recorded an impressive 27 singing males along the White River in Oceana County (C. Putnam pers. comm.).

Only a handful of observations have been recorded in the UP in both MBBA I and MBBA II. Both atlases recorded multiple singing males in western Menominee County. This may represent the only consistent location for this species in the UP as three territorial males were located in June 2007 over two adjacent townships along the Menominee River near where MBBA I surveys found two singing males in 1988. A single male that sang on territory near the City of Marquette from 22 May through 4 July 2008 before disappearing was likely unmated.

Breeding Biology

Much remains to be learned of the breeding habits of Cerulean Warblers - not surprising as the species spends so

Cerulean Warbler *(Setophaga cerulea)*

Skye Christopher G. Haas

Status: *State Threatened*

much of its time high above our heads. Extensive tracts of mature broadleaf forest are required by Ceruleans for breeding habitat. Nests are placed high in the outer branches of a deciduous tree, located over a span of open space, free of vegetation. The structure and composition of the nest is poorly known, and only the female incubates. The clutch size ranges from two to five eggs, and fledging rates have not yet been studied or published (Hamel 2000).

Abundance and Population Trends

Most if not all Cerulean Warbler sightings in the UP are likely males exploring new territory from Wisconsin populations. These borderlands may represent the only consistent summer locale for this species in the UP as three territorial males were located in June 2007 over two adjacent townships along the Menominee River. Additional surveys are needed to determine if territorial Cerulean Warblers are an annual occurrence in the UP or an occasional overflow of individuals from the Wisconsin population. Post MBBA II records from the UP have occurred in the Fumee Lake Natural Area in Dickinson County where hardwood forest has matured into a climax forest (Dombroksi 2009, 2010).

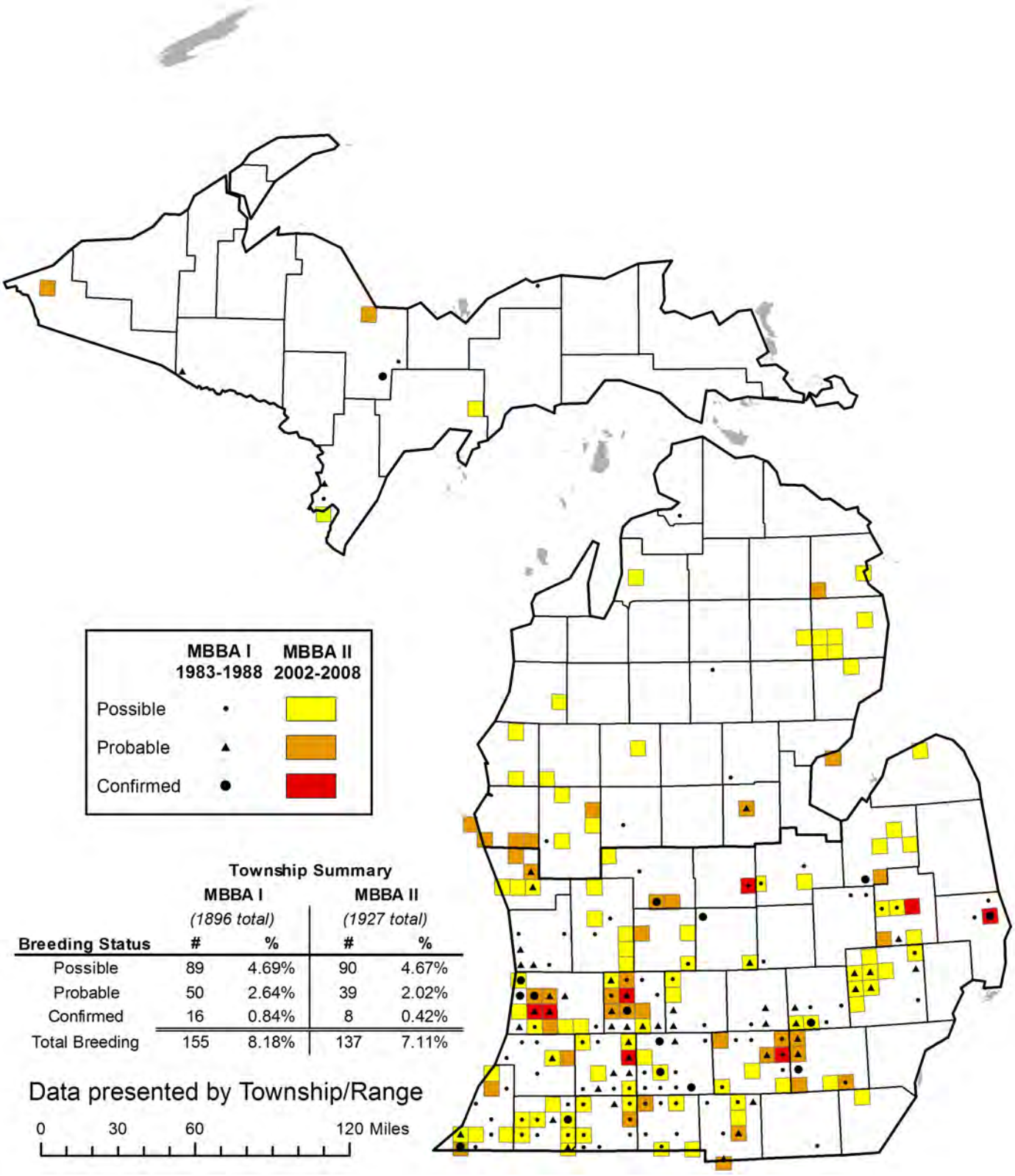
As for the population located in the LP, MBBA II showed a decline in the number of townships in which this species was recorded, despite expansion of range in the Huron/Manistee National Forests. BBS data shows that this species is only infrequently encountered in Michigan with only 0.05 birds/route detected. It may be that the overall population has declined to such a point that BBS monitoring may no longer be an effective tool in monitoring populations (Hamel 2000). Indeed, the national trend rate BBS data has shown a 50% decline over a 25 year period (Sauer et al. 2008).

Conservation Needs

The plight of the Cerulean Warbler is of great concern; habitat changes and land-use practices by anthropogenic means seemed to be the driving force in the decline of this species. This includes forest fragmentation of land used as breeding, migration and winter territories. Here in Michigan, the loss of mature deciduous forest, particularly along stream corridors in the SLP, has created a significant decline in breeding productivity. Hamel (2000) stated that the Cerulean Warbler may be the most sensitive North American bird to landscape-level changes in habitat. However as observed in the NLP, when suitable forest habitat has matured, Ceruleans will reclaim or, in the case of the population in the Huron National Forest, expand into it.

Cerulean Warbler *(Setophaga cerulea)* ***Skye Christopher G. Haas***

Status: *State Threatened*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	89	4.69%	90	4.67%
Probable	50	2.64%	39	2.02%
Confirmed	16	0.84%	8	0.42%
Total Breeding	155	8.18%	137	7.11%

Data presented by Township/Range

0 30 60 120 Miles

Northern Parula *(Setophaga americana)* ***Skye Christopher G. Haas***



Darlene Friedman ©

A true sprite of Michigan's North Woods, this living jewel is one of our most beautifully plumaged warblers. A delightful combination of blue, white, green and yellow adorns this small, delicate bird and its buzzy voice is akin to zipping open one's tent to greet a day of birding. The Northern Parula selects nesting habitats that are enchanting places, often wet sylvan glades full of tall, mature conifer trees, draped in lichens. Notable is this species' practice of placing its pendant nest in hanging epiphytic vegetation, though nests have been found in debris over streams caught by tree limbs during high-water events. This dependence on epiphytes has led to an odd distribution in the U.S. and Canada, with a northern population nesting in the boreal forest in conifers where it uses the lichen *Usnea* (also known as "old man's beard"), while the species is also widely distributed across the south where the bromeliad "spanish moss" serves as a nest site.

Distribution

While long-known as a summer resident in Michigan, the first Northern Parula nest in the state was not found until 1949 in Wilderness State Park, Emmet County (Graber 1951). This species is primarily found in the UP and the NLP, though there are occasional birds singing on territory from riverine corridors in the SLP, but breeding has not been documented. There is a report of breeding by Covert in the 1890s (Barrows 1912), but it is doubtful if Parulas were ever an established nesting resident of the SLP. The MBBA I recorded a handful of singing males from the southwest corner of the state, representing only 0.86% of SLP townships. This is in stark contrast to the MBBA II results where Northern Parula was recorded in 4.37% of SLP townships with four probable records. This increase in observations also reflected an expansion of distribution. Northern Parulas were observed northward along the Lake Michigan coastline into the Leelanau Peninsula and the northern tier of counties in the LP. Singing male Parulas were also noted in the southeast LP with birds in Lenawee and Washtenaw Counties, as well as along the southern basin of Lake Huron.

MBBA II results in the UP are even more notable, with a 61% increase in the number of UP townships from MBBA I. Particularly interesting are the data showing an increase in probable breeding records from 67 townships to an impressive 187. Despite being widespread across much of the UP, Northern Parula is mostly absent from the farmland and hardwood forests of Menominee County as well as the jack pine plains of eastern Chippewa County. Breeding confirmation of this canopy resident can be difficult, and no nests were discovered during MBBA II.

Breeding Biology

Little data exists about the breeding habits of the Northern Parula, mostly due to the inaccessibility of the nest, frequently concealed in the upper canopy at the outer end of a limb and obscured by the closed structure of the nest. Even when discovered, monitoring of the young's behavior is impossible until they fledge from the nest (Moldenhauer 1996). The Northern Parula is particularly beholden to damp coniferous forest where epiphytic lichens are used as structures for nest placement. On occasion, Parulas can be found in dry forests, typically in white pines where nests will be placed in clusters of dead needles and leaves (Moldenhauer 1996).

The first migrants return to Michigan during the last few days of April and early May, and singing males are back on territory in the UP by mid-May (Adams 1994, Chartier and Ziarno 2004). Second broods are not well documented in the northern portion of the range; an observation of nest building from 11 July in Emmet County was likely a renesting attempt (Graber 1951).

Abundance and Population Trends

Even in areas where found, Northern Parulas are rarely abundant, and are outnumbered by other species of warbler. Still, in the northern portion of Michigan, they are widely distributed, and the number of townships where this species was recorded increased from 14.24% in MBBA I to 22.86% in MBBA II, suggesting a population increase. Partners in Flight estimate the Michigan population to be 50,000 birds, about 0.6% of the global population (PIF 2007). Owing to their limited range in the state, as well as selective habitat preferences, Northern Parulas are infrequently encountered on BBS surveys and averaged only 0.33 birds per route (Sauer et al 2008). From 1986 to 1992 there was a slight and not statistically significant decrease from 0.6 to 0.4 birds per route detected in the UP, but the small numbers of individuals detected make it difficult to assess trends (Moldenhauer 1996). Still the species does have areas where it is locally abundant, and BBS routes in Ontonagon County displayed a high average of 9.3 individuals per route (Evers 1991).

These data mirror results from Ontario, where Northern Parula doubled in the number of observations between their first and second atlases, but are infrequently encountered on BBS routes (McLaren 2007). Both Wisconsin and New

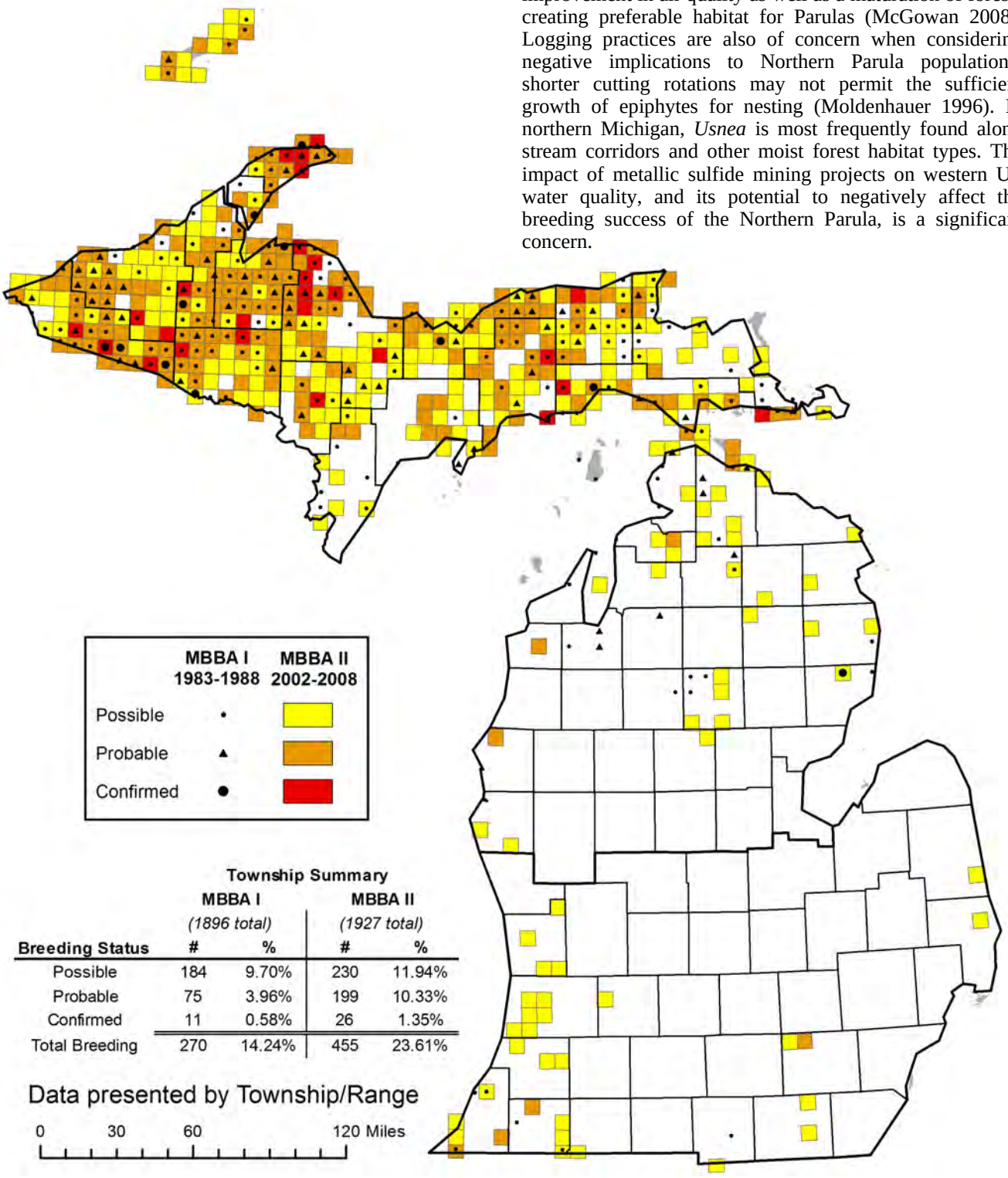
Northern Parula *(Setophaga americana)*

Skye Christopher G. Haas

York showed a slight increase in detections on BBS routes, with New York also showing a significant increase in numbers between their two atlases (Elias 2006, McGowan 2008). BBS data has shown a 2.3% increase for the Upper Midwest (USFWS Conservation Region 3) from 1966-2000 (Sauer et al. 2008).

Conservation Needs

The presence of *Usnea* lichens make for an excellent biological indicator of local air quality, and widespread decline in both *Usnea* and Northern Parulas in the second half of the 20th Century was recorded in northeastern states due to industrial aerial pollutants (McGowan 2008). Numbers have rebounded somewhat and birds reclaiming territory in New York State may represent both an improvement in air quality as well as a maturation of forests creating preferable habitat for Parulas (McGowan 2008). Logging practices are also of concern when considering negative implications to Northern Parula populations; shorter cutting rotations may not permit the sufficient growth of epiphytes for nesting (Moldenhauer 1996). In northern Michigan, *Usnea* is most frequently found along stream corridors and other moist forest habitat types. The impact of metallic sulfide mining projects on western UP water quality, and its potential to negatively affect the breeding success of the Northern Parula, is a significant concern.



Magnolia Warbler *(Setophaga magnolia)* ***Greg Cleary***



Darlene Friedman ©

Although the Magnolia Warbler's name belies its dependence on northern coniferous forests during the breeding season, its flashy plumage is indeed reminiscent of warmer climes. Because this warbler tends to stay low in the forest canopy, it is often easy to observe. Some care may be needed, however, in separating its somewhat variable song from that of the Chestnut-sided Warbler, which may be found in similar habitat. The breeding range of the Magnolia Warbler extends eastward from British Columbia and the southern Yukon through south-central Canada and the upper Great Lakes to the Maritime Provinces, and southward through New England and the Appalachian Mountains into West Virginia (Hall 1994).

Distribution

The Magnolia Warbler's broad-scale distribution within the state of Michigan has not changed significantly during the past century (Barrows 1912, McPeek and Adams 1994) and is strongly associated with the cool coniferous forests found in the UP. Between the first and second Atlas, however, the species evidently filled in some of its former breeding gaps within the peninsula. In MBBA I, this warbler was common in the eastern and western UP, but relatively scarce in the central UP. In MBBA II, this discontinuity (roughly encompassing northern Dickinson, southern Marquette, and western Alger Counties) is no longer as evident. The Magnolia Warbler remains less common in the south-central UP (specifically Delta, Menominee, and southern Dickinson Counties), though it appears to have made slight gains there as well. In the NLP, the species has shown a modest increase in the number of townships where it was recorded, with most new records near the Lake Michigan and Lake Huron shorelines. In the SLP, the Magnolia Warbler was observed in several townships along Lake Michigan, as it had been during MBBA I, and it was detected in various locations farther east as well. The four breeding confirmations in the SLP (compared to zero in MBBA I) included one in Washtenaw County.

The Magnolia Warbler's preferred nesting habitat in Michigan is dense stands of young balsam fir or spruce within coniferous or mixed forests (pers. obs.). In the SLP, as well as in Ohio and Indiana, stands of young hemlock are used for nesting (Peterjohn and Rice 1991, Castrale et al. 1998). Binford (2006) notes that the understory of undisturbed mature forests is generally too sparse to serve as breeding habitat for the species; thus, the Magnolia Warbler benefits from disturbances in the forest canopy, provided that new growth includes a strong spruce or fir component. U.S. Forest Service data show that the numbers of small spruce and balsam fir (1.0 to 2.9 dbh) in Michigan have almost doubled from 1980 to 2007 (USFS 2009), due in large part to increased harvests. These young trees, particularly balsam fir, often grow in clumps along the edges or wetter areas of clear cuts, as well as within interior forest areas associated with disturbance. Drought, disease, and pests such as spruce budworm have likely also contributed to the increase in numbers of young spruce and balsam fir (Scott Pugh, U.S. Forest Service, pers. comm.), apparently to the benefit of the Magnolia Warbler.

Breeding Biology

In an eastern UP study in which 85 to 112 Magnolia Warblers were banded annually between 1999 and 2001, male Magnolia Warblers arrived on their breeding grounds an average of six days before females. Although the earliest males appeared during the first week of May, most birds did not arrive until the second half of the month. Incubation began during the last week of May and continued into early July. Fledging generally occurred in July. Molting adults (i.e. birds that had completed or foregone breeding) were noted as early as the first week of July (R. Smith, F. Moore, and B. Johnson, unpub. data). Studies of the Magnolia Warbler throughout its range have found that nests are generally placed below two meters from the ground in conifers (DeGraaf and Rappole 1995).

Abundance and Population Trends

The PIF Landbird Population Estimates Database (2007) estimates the number of Magnolia Warblers in Michigan at 120,000, which represents just 0.4% of the world population. Information on population trends in Michigan is scant, as Breeding Bird Survey numbers are based on small sample sizes for the species. Atlas data strongly suggest that it is doing quite well, however, as there was a doubling of confirmed observations and a near doubling of total observations statewide from MBBA I to MBBA II. In the UP, which is the heart of the species' Michigan range, the Magnolia Warbler was observed in 17% of blocks during MBBA I and in 32% of blocks during MBBA II. Such substantial gains suggest that increases in observer effort between atlases likely account for only a portion of the increase in breeding numbers.

Ontario BBA data indicate a similar increase in the species during roughly the same time period covered by MBBA I and II. It has been proposed that this rise can likely be attributed to increased logging activity in the north and re-growth of retired farmland in the south (Cadman et al. 2007). In Wisconsin, the warbler is a common breeder in the

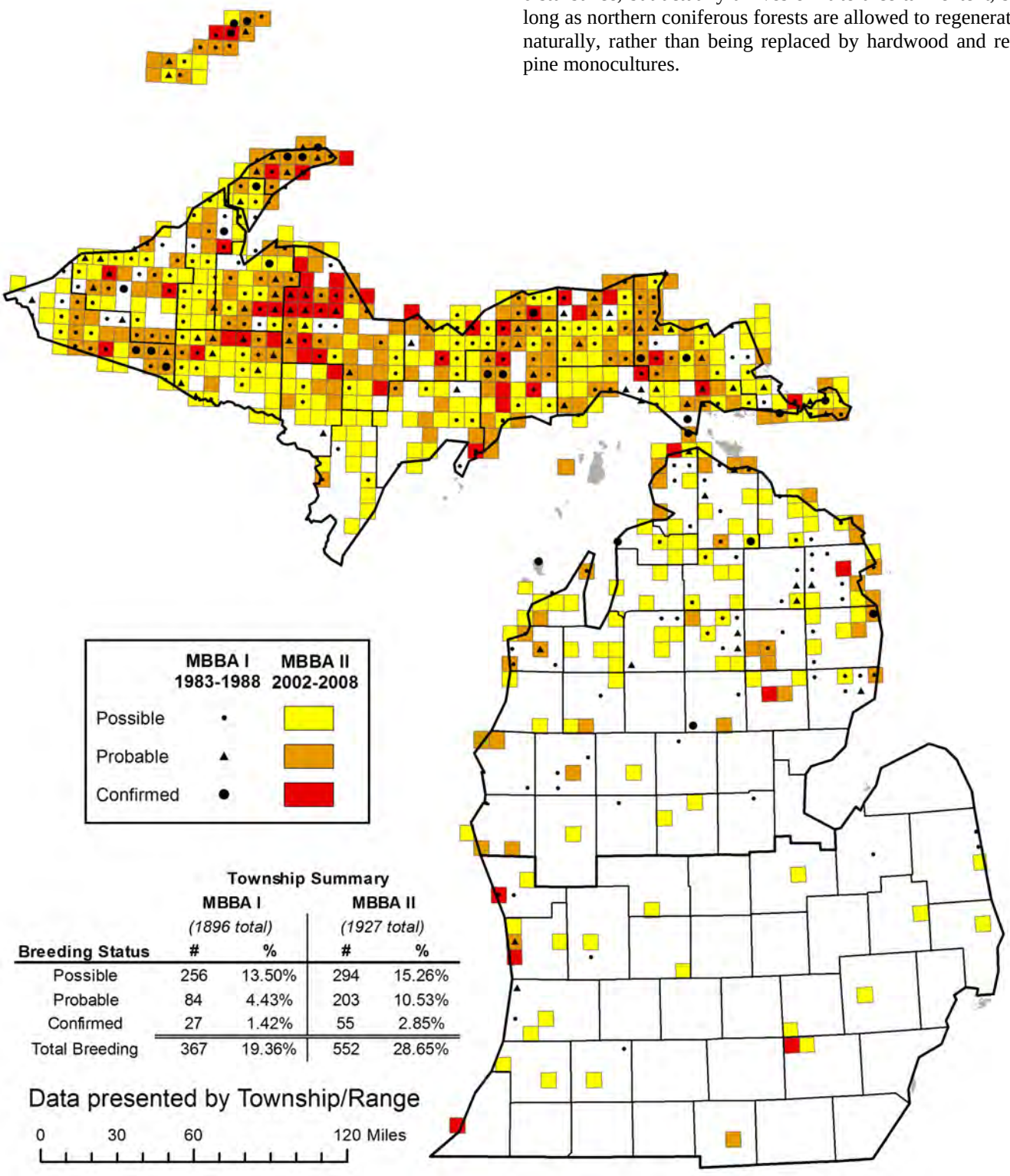
Magnolia Warbler *(Setophaga magnolia)*

Greg Cleary

northernmost two tiers of counties, especially in the higher country in the north-central part of the state, and its population there appears to be stable or increasing (Cutright et al. 2006), mirroring the situation in Michigan.

Conservation Needs

There do not appear to be any immediate conservation concerns for the Magnolia Warbler in Michigan. It should be noted however, that its increase over the past two decades may have come at the expense of other species that rely on large areas of relatively undisturbed coniferous forest. The Magnolia Warbler can not only tolerate disturbance, but actually thrives on it to a certain extent, so long as northern coniferous forests are allowed to regenerate naturally, rather than being replaced by hardwood and red pine monocultures.



Bay-breasted Warbler *(Setophaga castanea)*

Skye Christopher G. Haas



John Van Orman ©

A beautiful denizen of the boreal forest, the Bay-breasted Warbler is at the southern edge of its breeding range in northern Michigan, where it is restricted to spruce/fir forests, and intrinsically tied to spruce budworm outbreaks. The species' primary summer range extends from New Brunswick west through the boreal forests of Canada to the eastern borders of the Yukon and British Columbia. Only 10% of the breeding population is found in the United States, with birds found in New England, New York, Michigan and Minnesota (Williams 1996). A weak-voiced singer, the male's simple *"seta-seta-seeta"* song can easily be missed or mistaken for the similar sounding Cape May or Black-and-white Warblers. Michigan birders should be wary of identifying this species by voice alone, and the male's handsome plumage is more than enough reward for those who are patient enough to track this bird down for a visual confirmation.

Distribution

Sparsely distributed across Upper Michigan, the Bay-breasted Warbler's rarity as a breeding resident is akin to its other northern cousins, Connecticut and Tennessee Warblers. Barrows (1912) was unable to substantiate any confirmed breeding records despite scattered reports from the northern portions of the state. The first breeding evidence in Michigan was in 1933 when an adult was found at Burt Lake, Cheboygan County, feeding two young juveniles (Binford 1991). This remains the only nesting record for the Lower Peninsula. Dr. Laurence Binford has documented the largest breeding concentrations of the species for the state in the Keweenaw Peninsula. There, breeding has been documented since 1949 and has remained the most consistent nesting location in Michigan, where an impressive seven singing males and a mated pair were discovered over four locations in Keweenaw County in June 1995 (Binford 2006). The Michigamme Highlands in northern Marquette and Baraga Counties has also supported a limited breeding population, with breeding confirmed in the 1950s and 1990s in the Huron Mountain Club, Marquette County (Binford 1991, M. Kielb pers. comm.). Breeding has also been documented in the Tahquamenon Falls State Park in 1982, and in Grand Marias, Alger County where a nest was discovered on 27 June with young that fledged on 13 July 1974 (Adams 1994).

MBBA II found a slight decline in the number of detections of Bay-breasted Warbler with birds seen in only 5.2% of all UP townships, down from 6.4% during the first atlas. The number of detections in the northern LP stayed the same between atlases with records coming from only three townships. What is surprising is the number of possible breeding records recorded in the southwestern UP during MBBA II. This area, with its lack of mesic boreal habitat, has not historically supported this species. However the primary atlas observers for this region did not turn up any Bay-breasted Warblers, so it is possible that these records pertain to the similar sounding Cape May Warbler or Black-and-white Warbler or, if the identification was correct, late spring migrants.

Also of note is the lack of records in the eastern UP, where the species had been readily documented in the first atlas. It is unclear if this is an artifact of differences in observer effort between atlases or if there was a shift in distribution, possibly linked to budworm presence.

With the combination of habitat inaccessibility and the risk of being mistaken for commoner species with similar voices, some Bay-breasted Warblers undoubtedly went undetected by atlas observers and other birdwatchers. Further explorations of the Michigamme Highlands as well as mesic conifer habitats in the eastern UP may reveal more breeding locales of this scarce species.

Breeding Biology

The breeding biology of the Bay-breasted Warbler is poorly understood, and many aspects of the breeding cycle are not well documented. Mesic coniferous forest, specifically a thick, unbroken spruce/fir forest is thought to be the preferred nesting habitat. Binford postulated that the darkness of dense conifer groves was a prerequisite and correlated with the dark plumage of the bird (Binford 2006). The semi-moist, cool microclimate found along Lake Superior within this habitat type is attractive to Bay-breasted Warblers (Binford 2006), which may help explain why this species occurs more densely in the Keweenaw Peninsula than in similar forests inland.

Bay-breasted Warbler nests are placed high in a spruce or fir, typically close to the trunk. They typically produce only one brood in a year. A nest found in Rabbit's Bay, Keweenaw County was constructed of loosely woven white pine needles; this nest was collected post-breeding season and deposited at the University of Michigan Museum of Zoology (Binford 2006).

Abundance and Population Trends

Partners in Flight estimates a breeding population of 300 Bay-breasted Warblers in Michigan (PIF 2007); an optimistic assessment considering that the species was reported from only 39 blocks in MBBA II. Few species of *Setophaga* (formerly *Dendroica*) warbler have abundance trends linked so closely to their primary food source. Dependent upon outbreaks of spruce budworm, temporal populations form when an infestation of budworm occurs (Williams 1996). In Canada, a decline of these outbreaks

Bay-breasted Warbler *(Setophaga castanea)*

Skye Christopher G. Haas

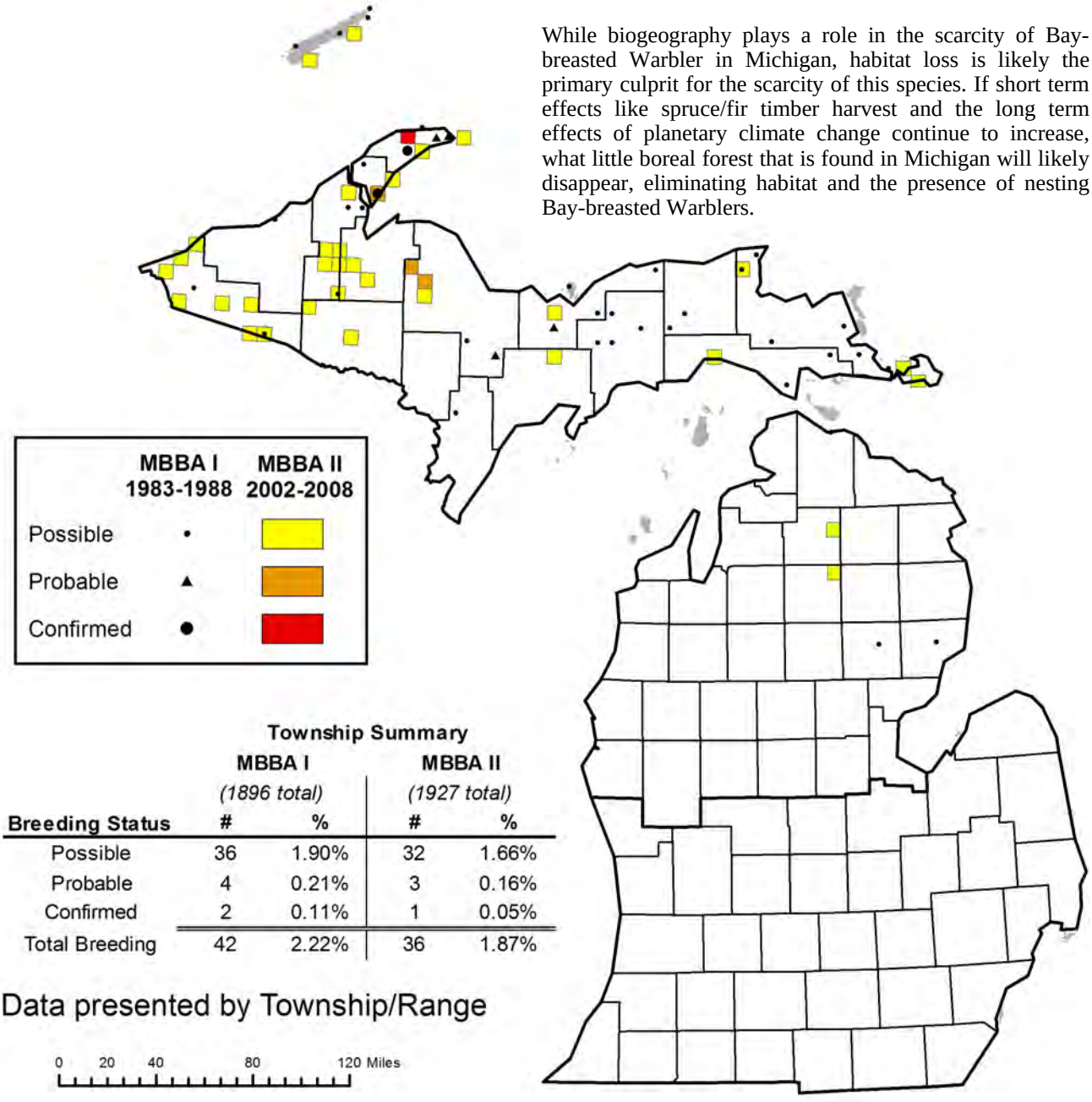
has been noted, and correlated with a decline in population of Bay-breasted Warblers (Zimmerling et al. 2007). BBS data from 1966 to 2008 showed only a 0.3% increase with a more recent trend of an annual decrease of 2.7% from 2003-2008 (Ziolkowski et al. 2010). Partners in Flight has noted these declines and has placed the species on their watch list (PIF 2007).

Michigan's Bay-breasted Warbler breeding population is one that appears to be tenuous at best, with confirmed breeding in one block and probable breeding in three blocks during MBBA II, while MBBA I saw two breeding confirmations and five blocks with probable breeding. With an overall decline in birds detected from 2.2% of townships to 1.8% of townships statewide, it is likely these trends will continue, and it is possible that Bay-breasted Warblers may no longer breed within Michigan within the near future.

Conservation Needs

The long term trends of the population of Bay-breasted Warblers are not encouraging. Affected by several anthropogenic activities, these combined pressures might soon begin to significantly decrease the population to a critical level where range reduction becomes a reality. Spraying pesticides for spruce budworm has substantially decreased the rate at which outbreaks occur, and in turn Bay-breasted Warblers are not able to maintain high levels of breeding productivity (Williams 1996). Logging is a particular concern as the boreal forest of Canada is seriously being affected, potentially limiting the number of surplus birds available to populate the outer edges of the range.

While biogeography plays a role in the scarcity of Bay-breasted Warbler in Michigan, habitat loss is likely the primary culprit for the scarcity of this species. If short term effects like spruce/fir timber harvest and the long term effects of planetary climate change continue to increase, what little boreal forest that is found in Michigan will likely disappear, eliminating habitat and the presence of nesting Bay-breasted Warblers.



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	36	1.90%	32	1.66%
Probable	4	0.21%	3	0.16%
Confirmed	2	0.11%	1	0.05%
Total Breeding	42	2.22%	36	1.87%

Data presented by Township/Range

0 20 40 80 120 Miles

Blackburnian Warbler *(Setophaga fusca)* ***Robert Doepker***



John Van Orman ©
Species sponsored by: Sharon Johnson.

The faint and ascending trill from the top of the tallest conifer is a clue to the presence of the male Blackburnian Warbler – a small bird with a flaming orange throat and breast. The Blackburnian is one of several wood warblers that co-exist by partitioning foraging niches based on the vertical structure of forested habitats (MacArthur 1958, Morse 2004). In the northern two-thirds of Michigan, the Blackburnian Warbler is a fairly common Neotropical migrant. It is strongly associated with mature, conifer dominated forests throughout its breeding range which corresponds to the southern boreal forest and hemlock-white pine-northern hardwoods forest region identified by Braun (1950). The breeding range encompasses the southern half of eastern Canada, the northern portions of Minnesota, Wisconsin and Michigan, and New England southward through the Appalachian Mountains into northeastern Georgia (Morse 2004). The birds leave Michigan in autumn to return to their wintering areas in southern Central America and northwestern South America.

Distribution

The breeding range of the Blackburnian Warbler in Michigan has been reduced compared to the time period preceding European settlement, but it has changed little in the last half century (Wood 1951). Barrows (1912) reported the bird as common in the northern two-thirds of Michigan and present in suitable habitat in the southern LP. The decline from the pre-settlement period is related to a reduction in forested area and a change in species composition and developmental stage of the remaining forest (i.e., from mature mixed or conifer dominated forest to young deciduous dominated forest).

The Blackburnian Warbler's preferred habitat throughout its breeding range is forest dominated by hemlock, white spruce, balsam fir and white pine (Beals 1960, Morse 1976, Collins 1983, Doepker et al. 1992). In northern portions of its breeding range, the presence of mature, coniferous-dominated stands that possess over 75% tree canopy cover and greater than 60% coniferous canopy cover are important breeding habitat attributes (Titterington et al. 1979, Collins 1983, Doepker et al. 1992).

The distribution of Blackburnian Warblers in the Lower Peninsula changed only slightly over the 20-year period between MBBA I and MBBA II. During both Atlas efforts, breeding activity was recorded in about four percent of townships in the southern LP and about 20% of townships in the northern LP. In contrast, this warbler appears to have expanded its distribution in the UP. Fifty-four percent of townships had recorded breeding activity during MBBA I, and this percentage increased to 70% of townships during MBBA II. The stronghold of the warbler remains the Ottawa and Hiawatha National Forests, likely a result of their forest management policies which includes a component of older forest including increased numbers of hemlock, white pine, white spruce and balsam fir.

Breeding Biology

The Blackburnian Warbler arrives in the Lower Peninsula in early May and a few days later in the Upper Peninsula. Nesting is usually initiated by late May, and most nests are established by early to mid-June. The nests are almost exclusively built in conifers, usually high in the canopy (Morse 2004). Little information is available on the incubation, hatchling and fledging periods. However, the incubation period is probably 12 - 13 days (Morse 1989), and only the female incubates. Both parents feed the young. Blackburnian Warblers forage primarily by gleaning insects from conifers and deciduous tree species. They have also been observed hawking insects.

Abundance and Population Trends

The number of singing Blackburnian Warblers detected on BBS routes in Michigan increased from about one per route in the late 1960s and early1970s, to about 1.4 per route since 2000 (Sauer et al. 2008). Although the trend line suggests an increasing population, it is not statistically significant.

The mean number of Blackburnian Warblers counted per BBS route over the period 1966–2007 was 1.2 and 2.8 for Michigan and the Northern Spruce–Fir Physiographic Region (containing the UP and NLP), respectively. The mean annual increase over the 1966–2007 period was 1.7% for Michigan, and 0.9% for the Northern Spruce – Fir Region. In Michigan during the more recent, 20-year period between MBBA I and MBBA II (1983–2007), the Blackburnian Warbler decreased at an annual rate of 0.08% (Sauer et al. 2008).

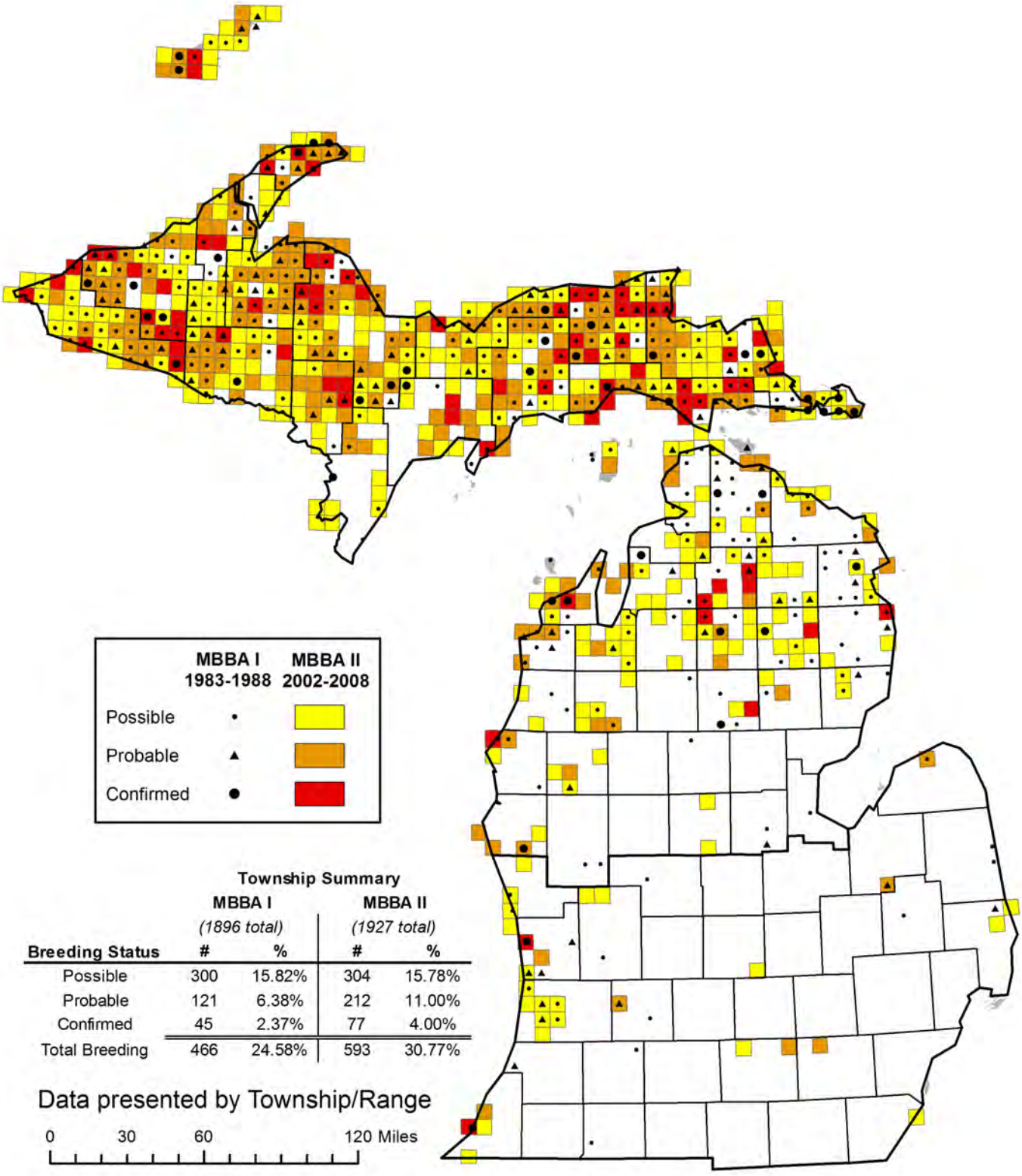
Conservation Needs

On the breeding grounds, Blackburnian Warblers are strongly associated with mature conifer dominated forests of hemlock, white spruce, balsam fir and white pine growing in an uneven-aged condition. Red-eyed Vireos and Ovenbirds, which inhabit mature deciduous forest, are 15 and seven times more abundant, respectively, than Blackburnian Warblers on BBS routes in Michigan. Mature conifer

Blackburnian Warbler *(Setophaga fusca)*

Robert Doepker

dominated forest must be provided to ensure a sustainable Blackburnian Warbler population in Michigan. The major threat on the breeding grounds is intensive timber harvest emphasizing even-aged management and shortened rotation periods. Such harvesting methods result in decreased proportions of conifers in uplands and a lack of mature trees growing in an uneven-aged condition.



Yellow Warbler *(Setophaga petechia)*

Deaver D. Armstrong



Darlene Friedman ©
This species sponsored by
Todd Alfes, Sandy Roethler, & Scott

Only one North American warbler has yellow tail panels and yellow under tail coverts; this unique plumage combination and a distinctive "*sweet, sweet, sweet, little bit sweet*" song make the Yellow Warbler well-known to birders. The species is also notable for its strategy in dealing with brood parasitism by the Brown-headed Cowbird. This enterprising bird simply builds a new layer of nest over the intruder's eggs, sometimes as many as six layers (Bent 1953). The Yellow Warbler breeds as far north into the Alaskan and Canadian tundra as permitted by the existence of shrubby vegetation, and as far south as central Mexico, although it is absent from much of the far southeastern and southwestern U.S. In the southwest this may be a result of declines and range contractions (Dunn and Garret 1997). In Michigan the Yellow Warbler is widely distributed as a fairly common migrant and resident in the UP and very common migrant and resident throughout the LP (Chartier and Ziarno 2004). Bent (1953) shows a late date of 8 October in Grand Rapids and Chartier and Ziarno (2004) indicate at least one record of a Yellow Warbler in the SLP in December.

Distribution

While Barrows (1912) described the Yellow Warbler as "universally distributed and just as abundant along the south shore of Lake Superior as in the southern part of the state," others subsequently reported it as considerably more common in the LP (Wood 1951, Zimmerman and Van Tyne 1959, Payne 1983). Wood (1951) noted that the species did not occur on Isle Royale, but both atlases have documented the species on the island. Yellow Warblers tend to be found in shrub thickets, especially those with willows (Lowther et al. 1999). Data from MBBA I showed that in Michigan the species preferred shrub wetlands but were also found with high frequency in shrub uplands and with moderate frequency in wet deciduous forests (Brewer et al. 1991). Both atlases also show a gap in the distribution of Yellow Warbler in the western UP, likely a function of the absence of suitable habitats.

Breeding Biology

In the best of habitats, Yellow Warbler territories are small and close together, and Indiana's Breeding Bird Atlas includes reports of the species nesting in colonies (Brunet 1998). Yellow Warblers incubate their four to five eggs from 8-11 days (Bent 1953, Lowther et al. 1999). They are usually completely finished with nesting by mid-July, as they rarely attempt a second brood if the first is successful (Lowther et al. 1999). Adult feeding of fledglings can continue for as long as several weeks after the young have left the nest. Although contemporary studies of Yellow Warbler nests in Michigan documented Brown-headed Cowbird parasitism ranging from 29% to 45%, only about one in four cowbird eggs actually fledged successfully (Lowther et al. 1999, Epp and Beaver 2000).

Abundance and Population Trends

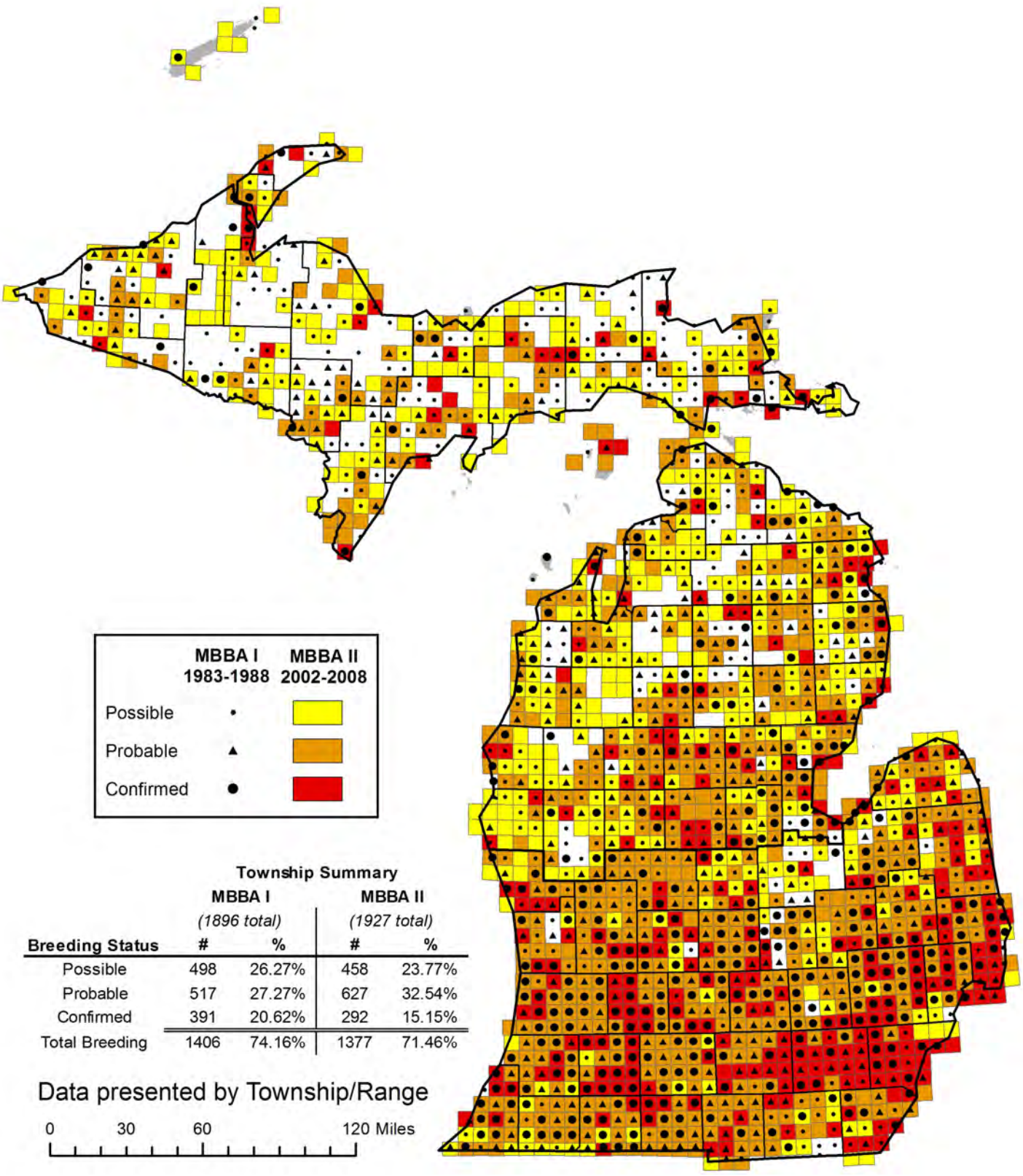
With an estimated state population of 310,000 individuals, the Yellow Warbler is the fourth most common breeding warbler in the state behind Ovenbird, Nashville Warbler and Common Yellowthroat; Michigan birds comprise approximately 0.8% of the world's population (PIF 2007). BBS data collected during the 20-year interval spanning the two Atlases show a very slight, statistically non-significant increase in the statewide population (0.17% per year) of the species. BBS results recorded the highest densities in the state's southwestern corner and Thumb area (Sauer et al. 2008). Although data for some neighboring states are similar, Illinois and Wisconsin populations of Yellow Warblers have significantly increased at annual rates of 4% and 1%, respectively (Sauer et al. 2008). However, the number of UP townships with Yellow Warbler in MBBA II declined from 50% to 42% of the townships surveyed, while results from the entire LP remain essentially the same. Perhaps there has been enough time between the two atlases for secondary forests in these areas to grow enough to no longer provide suitable habit for the species.

Conservation Needs

Yellow Warbler populations in Michigan and surrounding states seem to be relatively stable at this time. Although no specific management plans seem warranted, the preservation of the species' breeding habitat, especially sensitive riparian areas, is obviously vital to the Yellow Warbler's continued statewide prominence.

Yellow Warbler *(Setophaga petechia)*

Deaver D. Armstrong



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	498	26.27%	458	23.77%
Probable	517	27.27%	627	32.54%
Confirmed	391	20.62%	292	15.15%
Total Breeding	1406	74.16%	1377	71.46%

Data presented by Township/Range

0 30 60 120 Miles

Chestnut-sided Warbler *(Setophaga pensylvanica)* ***Jack Reinoehl***



Darlene Friedman ©

The lemon green and pale gray plumage of the immature Chestnut-sided Warbler is elegant in its simplicity and also completely distinctive. Among the large number of warblers with breeding range restricted to the northeastern portion of the North American continent, the Chestnut-sided Warbler has the southernmost distribution. Like many northeastern warblers, it ranges south in the Appalachians to northern Georgia. Quite unusual for this group of species, small numbers of Chestnut-sided Warblers can be found in hills west of the Appalachians in southern Indiana and Kentucky. Its wintering grounds are primarily in southern Central America. As with many small songbirds, detection of the Chestnut-sided Warbler by atlasers was primarily by song. For this species, recognition of the song represents a considerable challenge because of the strong similarity between the usual song of this warbler and that of the Yellow Warbler. The primary song of the Chestnut-sided, which is termed the accented ending song in Richardson and Brauning (1995), is highly variable; there is no single element of the song which allows separation from the Yellow Warbler with full confidence. It is thus conceivable that a few Chestnut-sided Warblers were misidentified as Yellow Warblers in the south where the latter is much more common, and that in the north the reverse error occurred.

Distribution

In Michigan, the Chestnut-sided Warbler is found throughout the state, though more sparingly in the SLP. During MBBA II it went undetected in Monroe County and very few were observed in most nearby counties. Distributions in Wisconsin and southern Ontario closely parallel those in Michigan with widespread but relatively sparse breeding in the south and higher densities in the northern areas.

South of Michigan, the Chestnut-sided has a rather limited distribution. In northern Indiana and western Ohio it is restricted to the northern two tiers of counties. Its preferred habitat there is brushy areas near or inside forest, notably woodland borders and openings in forests caused by lumbering or windfall (Whitehead 1998). In southern Michigan it uses similar habitat, not making much use of the dense shrubby successional vegetation preferred by such species as Eastern Towhee and Blue-winged Warbler (pers. obs.). Farther to the north, it is able to tolerate a substantial variety of habitats. During atlasing in Wisconsin, it was found in numerous habitat types but showed a strong preference for deciduous over coniferous vegetation (Gostomski 2006). Over most of its range, it is found at high density in regenerating tracts of deciduous woodland and tends to remain in these areas until the trees are quite large (pers. obs.).

Breeding Biology

The Chestnut-sided Warbler generally arrives in the state during the first week of May; at Whitefish Point Bird Observatory the greatest abundance of migrants typically occurs during the third week of May (Granlund and Byrne 1994). Nests, located near the ground, are generally completed by late May (Richardson and Brauning 1995). In Wisconsin young were observed as early as 13 June (Gostomski 2006); southbound migration begins in late August.

Abundance and Population Trends

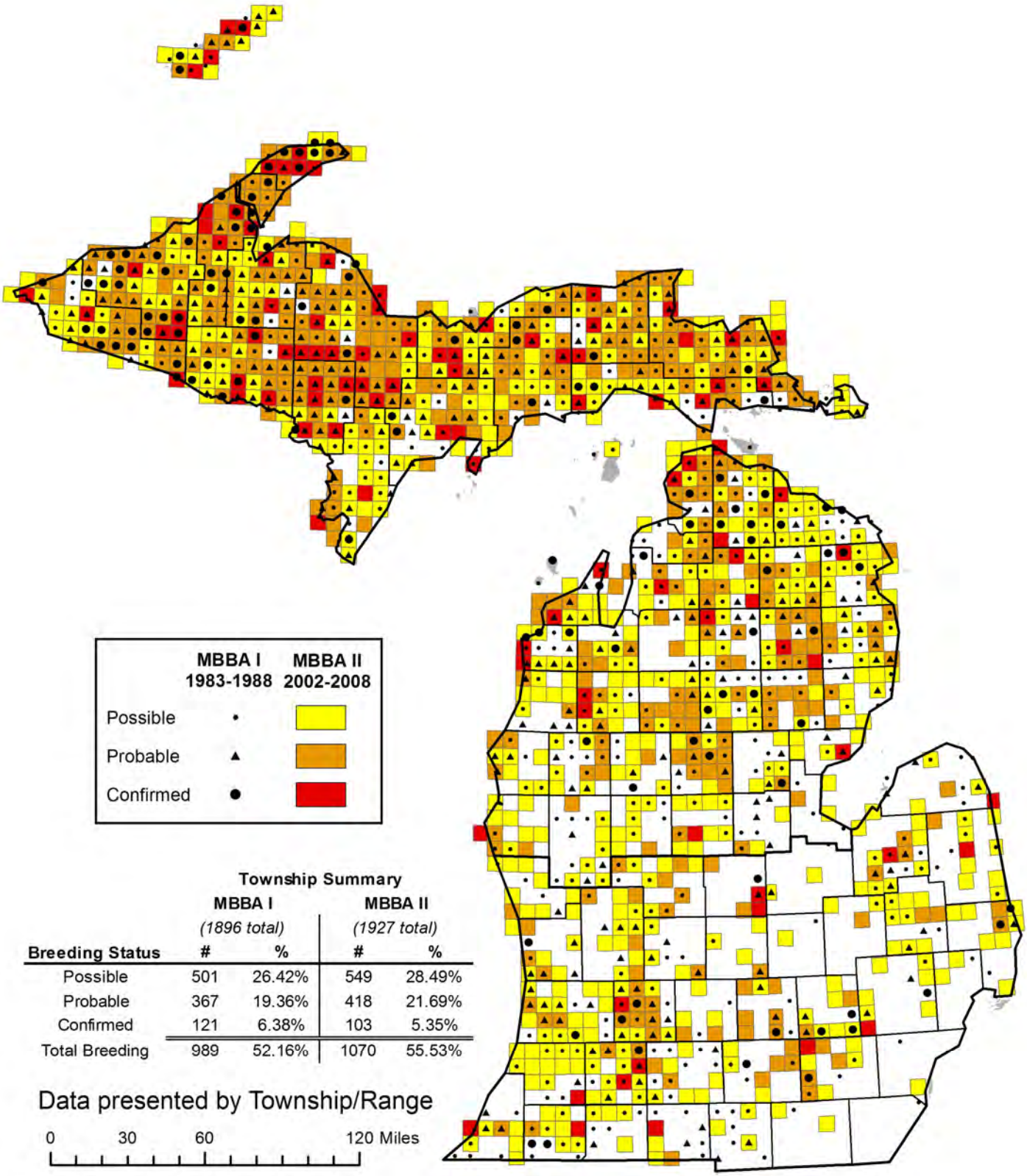
As expected of a species that favors transient habitats, population trends for the Chestnut-sided Warbler are mixed. BBS data from 1966 to 2003 show the Chestnut-sided Warbler as declining across most of the Lower Peninsula, increasing in the eastern Upper Peninsula, and slightly declining across the entire state (Sauer et al. 2008). Consistent with this, the percentage of blocks in which this species was detected increased from MBBA I to MBBA II in the Upper Peninsula and decreased from MBBA I to MBBA II in the northern Lower Peninsula.

Ontario BBS data demonstrate that the Chestnut-sided Warbler reaches its greatest provincial density at the latitude of Lake Superior, with numbers declining to the north as coniferous forests come to dominate (McLaren 2007). Regionally, BBS population trend maps show increases of the species in most of Wisconsin and Ontario east of Lake Superior and decreases in eastern Ontario and along the north shore of Lake Superior (Sauer et al. 2008).

Conservation Needs

The Chestnut-sided Warbler is not presently considered at risk. Partners in Flight regards the species as requiring "additional stewardship" in order to maintain its current population (PIF 2007). Post (2008) suggests that this warbler is declining in undeveloped areas of New York due to "maturation of forests [and] loss of early-successional habitat." This is a likely explanation also for the fact that the Chestnut-sided Warbler, as shown by BBS data, is declining more rapidly in New England than elsewhere in North America. State populations are likely to remain healthy if stewardship continues to provide early successional habitat within the great variety of land use in Michigan for this highly adaptable species.

Chestnut-sided Warbler *(Setophaga pensylvanica)* ***Jack Reinoehl***



Black-throated Blue Warbler *(Setophaga caerulescens)* ***Kimberly Hall***



Darlene Friedman ©
Species sponsored by: Loretta Gold.

Although the name of this warbler aptly describes the males, the olive-green females were originally described as a different species by prominent early naturalists (Holmes et al. 2005). Black-throated Blue Warblers are fairly common breeders in the northern hardwood and mixed conifer-hardwood forests of the UP and northern LP, and are primarily found in forest-dominated landscapes at sites with dense understory vegetation. The breeding range of this warbler comprises a sideways "V" shape, with the point centered in New England and southeastern Canada, and extensions that comprise a narrow band in the Appalachian Mountains, and a western band across southern Canada into northern Michigan, Wisconsin, and Minnesota. This Neotropical migrant winters primarily in forested habitats within the Caribbean islands that make up the Greater Antilles (Holmes et al. 2005). As reviewed in detail by Holmes et al. (2005), this species is one of the best studied songbirds in North America. As described in their review, Holmes and colleagues (2005) have engaged in intensive work over several decades on topics such as demographic patterns, habitat use, survival, mating behavior and paternity, and connectivity of winter and summer habitats.

Distribution

In both the first and second Michigan Atlas efforts, the distribution of Black-throated Blue Warblers showed strong correspondence to the region described by Partners in Flight (PIF) as the "Boreal Hardwood Transition", or Bird Conservation Region 12 (Matteson et al. 2009). The distribution of Black-throated blues documented in the Michigan Atlas efforts is overall consistent with the range representation in Holmes et al. (1995), although the Atlas data suggests a slightly wider distribution in the Lower Peninsula, with birds also regularly detected along the southwestern edge of the state, especially in forested habitats in the cooler micro-climates near the shore of Lake Michigan. Black-throated Blue Warblers are nearing the western edge of their range in Michigan, with fairly narrow distributions along the northern edge of Wisconsin and eastern Minnesota, with occupancy rates, and likely densities, increasing across southern Ontario and in the mountains of New York (Howe 2006, Collins 2008, Joos 2007). As Michigan represents part of the southern range limit of this species (in the non-mountainous, western half of its range), this species appears likely to show a range contraction toward the north as the climate warms.

When the two sets of Atlas data are compared, summaries by block and by township for all regions of the state suggest some increases in areas used by this warbler during the breeding season. This may reflect continued re-growth of hardwood forest systems, especially in the UP, following the widespread harvest that occurred around the turn of the previous century. Further, shifts by many forest managers toward harvest methods that promote more diversity in forest structure may be benefiting this bird in Michigan. A slight increase in area occupied is suggested by the two sets of Atlas data for Ontario as well (Joos 2007), though the distribution in New York across two Atlas efforts appears to contract somewhat, especially in the southwest portion of the state (Collins 2008). The understory layer in most hardwood forest of northern Michigan is predominantly comprised of small seedlings and saplings of overstory tree species, rather than dense patches of shade tolerant shrubs such as the abundant rhododendron species and mountain laurel in parts of the Appalachians (Guzy 1995), or hobblebush in New Hampshire. In general, warbler densities in Michigan are quite a bit lower than in these areas with dense native shrubs. Further, in managed forests, the time since the thinning/selection cutting was done is likely to have a particularly strong impact on shrub density, and patterns of habitat occupancy shown by shrub-nesters like this warbler (Borque and Villard 2001, Holmes and Pitt 2007).

Although primarily found in upland hardwood-dominated and mixed hardwood forests, Black-throated Blue Warblers can sometimes be found in lowland hardwood or mixed forests, and even in pine plantations if there is a dense hardwood understory. Pairs may also shift into different habitat types when tending fledglings; for example, birds may move into dense regenerating aspen stands that are adjacent to hardwood stands with low structural complexity, perhaps because these stands provide more cover and perch sites for young that are still learning to fly.

Breeding Biology

The Black-throated Blue Warbler typically arrives at Michigan breeding grounds in early to mid-May, and migrating birds can be detected in the state from late April through mid-June (Binford 1991), although some of these late birds may be shifting territories rather than simply continuing along a migratory path (Betts et al. 2008). Relative to estimates for New Hampshire, territories for this warbler can be quite large in Michigan, and typically range from about 2 to 7.5 acres (Hall 2002). Black-throated Blue Warbler nests in Michigan are often found in patches of small seedling and sapling trees, with the nest placed in low branches about 0.5 to 2.5 feet high. When available, fir,

spruce, or Canada yew seedlings and saplings are often used for nesting and may be preferred, as these small trees can provide strong, low branches, and dense cover for nests. Presence of fir and spruce in the understory may be particularly important in hardwood forests where much of the hardwood understory has been removed by abundant deer (Hall 2002). Where hardwood regeneration is present, nests are also commonly seen in seedling/saplings of dominant hardwoods such as sugar maple, red maple, ironwood, and beech, and rarely may be placed in large ferns or within patches of *Rubus* spp. As has been described in New Hampshire (Holmes et al. 1992), this species will attempt a second brood during breeding seasons with favorable conditions (e.g., warm periods in early spring, abundant caterpillars). Rates of successful double brooding ranged from fewer than 10% of pairs to a high of 40% of pairs in a five year study by Hall (2002, 2008) in the Hiawatha National Forest. As a result of second brood attempts, and the typical practice of renesting after nests fail, pairs may be actively tending nestlings into early August in Michigan. Clutches for this species usually include four eggs, although three egg clutches become more common later in the season, and five egg clutches are occasionally seen. Both adults actively feed nestlings and tend to fledglings, and family groups are quite conspicuous in dense, low vegetation in the post-fledging period.

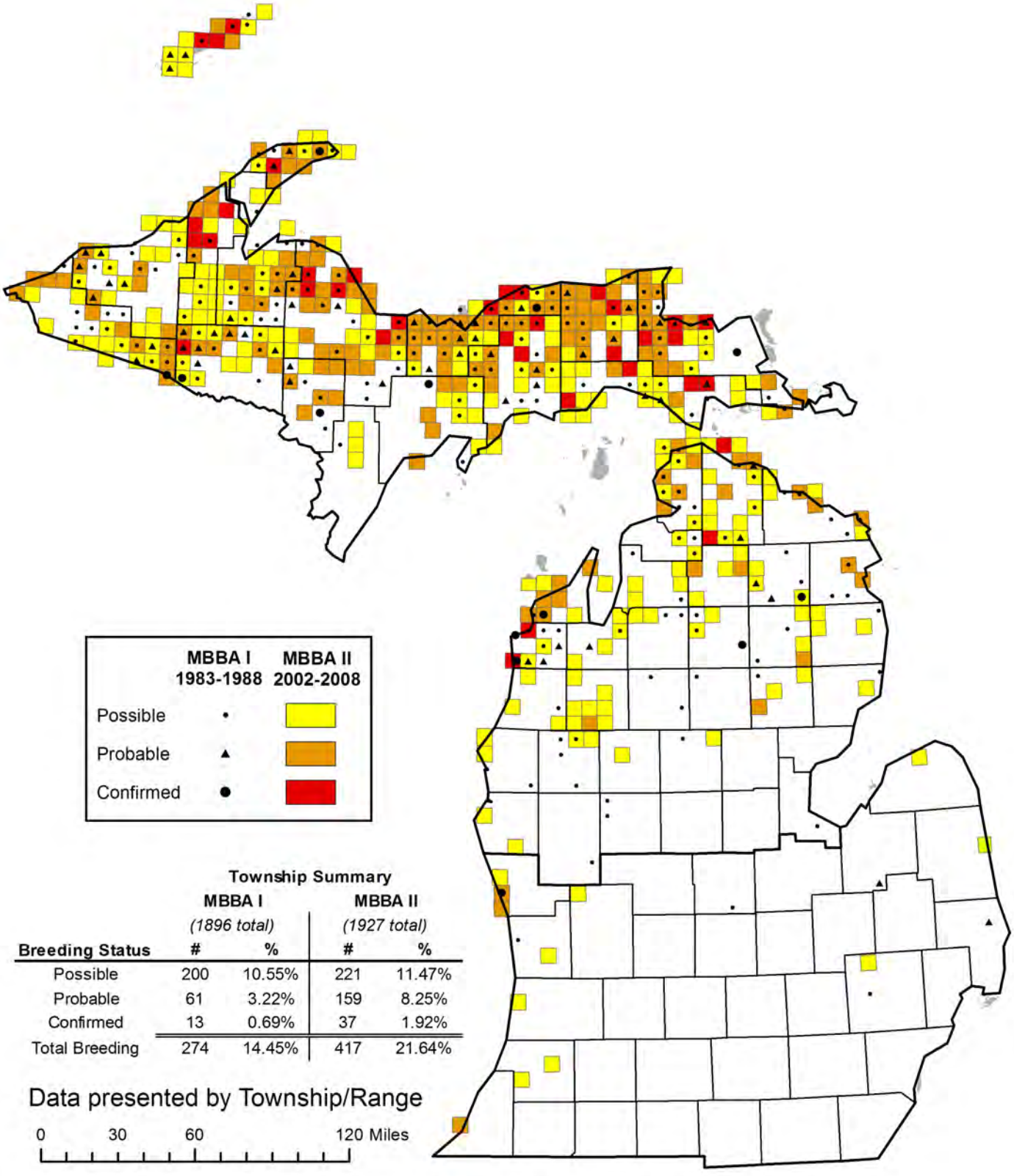
Abundance and Population Trends

Partners in Flight estimates a Michigan population of about 50,000 Black-throated Blue Warblers, or roughly 2.4% of the global population (PIF 2007). For Michigan, this estimate is based upon 19 Breeding Bird Survey routes where this warbler was detected in the 1990s, and the average detection rate for all routes (N=75) was 0.35 birds per route; PIF (2007) ranks this estimate in its second tier of data quality, which is likely due to small sample sizes with relatively high variance across samples. Black-throated Blue Warblers are identified as a priority bird species for deciduous forest habitats in Bird Conservation Region (BCR) 12, which covers the U.S. portion of the boreal-hardwood forest transition zone (upper Great Lakes region, including the Michigan population and birds in Wisconsin and Minnesota). Analyses conducted on USGS Breeding Bird Survey data from 1996-2007 suggest no significant trend in the population within this BCR (Sauer et al. 2008). The population objective for this species as outlined in this plan is to maintain the estimated 64,000 birds that occur across this part of the range.

Conservation Needs

In general, this species is viewed as being an interior forest specialist that is highly sensitive to forest fragmentation, and this is likely particularly true in landscapes where only small forest patches remain. However, in some forest-dominated parts of the Great Lakes region where dense understory vegetation is often sparse due to a legacy of even-aged forest management and forest simplification, this species may often be found along forest edges where understory is most dense. In addition to even-age management approaches, abundant white-tailed deer often compound the problem of a lack of understory vegetation/low structural complexity. One native, shade-tolerant shrub, Canada yew, is still an important understory species for this songbird in Ontario (Holmes and Pitt 2007), but is a preferred food for deer, and has been locally extirpated in many northern forests where deer are or have been abundant (Beals et al. 1960, Alverson et al. 1988, Van Deelen et al. 1996). In areas where deer densities are particularly high, species such as balsam fir and white spruce that are typically not heavily browsed in our region are likely to play a key role in providing nest sites and habitat for newly fledged young, and protection of these habitat elements during timber harvest practices should benefit this species (Kearns et al. 2006, Hall 2008). Overall, efforts to promote structural diversity in forests that lead to a mosaic of canopy gaps within intact forest, and efforts to maintain deer at levels that allow trees to successfully regenerate, should benefit this songbird in Michigan. On a broader scale, work to protect key habitats, both on the breeding grounds and wintering grounds, is essential to protecting this species over the long term.

Black-throated Blue Warbler *(Setophaga caerulescens)* ***Kimberly Hall***



Palm Warbler *(Setophaga palmarum)*

Skye Christopher G. Haas



Darlene Friedman ©

Best known in Michigan as a common migrant, this engaging species is one of the first warblers to return in the spring, and one of the last to leave in autumn. The Palm Warbler is an active bird, continually bobbing its tail as it forages on the ground or in low shrubbery. Its coloration is plain compared to most of the warbler clan, and its subtle song (a personal favorite) is a low see-saw-like trill that can be easily overlooked amidst such champion songster boreal cohabitants as Hermit Thrush and Lincoln's Sparrow. Still, what the Palm Warbler lacks in flash, it makes up for in personality and conspicuous presence, often allowing for a careful study of its plumage and behavior.

Distribution

Recorded only as a migrant a century ago (Barrows 1912), the Palm Warbler was not confirmed breeding in Michigan until 1931 in Crawford County in the NLP (Evers 1991). The habitat used was young jack pine forest on a dry glacial outwash plain, the same habitat used by its larger close relative, the Kirtland's Warbler. Additional nesting records were recorded in the 1950s by Walkinshaw in the stunted muskeg bogland of the eastern Upper Peninsula (Evers 1991). This northern wetland habitat is the primary breeding habitat for the species across most of northern Canada (Wilson 1996).

In MBBA I, the Palm Warbler was primarily confined to the extensive peatlands of Luce and Chippewa Counties, with the majority of the breeding population found within Tahquamenon Falls State Park. However, MBBA II has shown that Palm Warblers are just as likely to be found in young jack pine plains and have expanded their distribution in the UP. Also impressive is the extent to which Palm Warblers were found in the NLP. Whereas no birds were recorded in the LP during MBBA I, and only a handful of post-MBBA I breeding records from Oscoda County were reported, MBBA II atlas observers were surprised to find Palm Warblers in six NLP counties, including a breeding confirmation from Clare County. Expansion of the UP distribution of Palm Warblers is no less impressive, with birds found in 13 counties with 14 breeding confirmations, compared to MBBA I when Palm Warblers were found in nine counties with only four breeding confirmations.

Breeding Biology

Palm Warblers are early spring migrants, with birds appearing in many open and semi-open habitats in the SLP in April, and the majority of migrants returning to the UP by mid-May (Chartier and Ziarno 2004). Breeding birds have a preference for semi-open bogland with stunted or young black spruce, tamarack and pines growing upon an extensive bed of sphagnum moss with plentiful low shrubs such as Labrador tea, leatherleaf and other bog shrubs and heaths (Wilson 1996). Wilson (1996) noted an exceptional record of Palm Warblers nesting on sandy plains on the north shore of the Gulf of St. Lawrence. Atlas efforts in Wisconsin, Ontario and New York also found Palm Warblers essentially restricted to peatland habitats (Epstein 2006, Sutherland 2007, McGowan and Corwin 2008).

However in Michigan, Palm Warblers can regularly be found nesting not only in sphagnum based muskeg, but also as a localized inhabitant of young jack and red pines, with a blueberry understory, usually on dry sandy soils. During MBBA II, breeding birds were found using jack pines between the ages of 5-15 years, occasionally in slightly younger or older stands (pers. obs.). Birds using forested bogs are typically in a more open parkland setting; birds on jack pine plains will often use a more dense forest with a sparser understory of blueberries and lichens. An interesting combination of upland and lowland habitats can be found in certain outwash plains in the western UP, particularly on the Yellow Dog and Sands Plains in Marquette County. Here, rock outcroppings have bowls that have filled with acidic sediment, allowing for the growth of sphagnum under the jack pines. When such spots are discovered, there is inevitably a Palm Warbler singing on territory nearby (pers. obs.).

Abundance and Population Trends

Partners in Flight (PIF 2007) estimates that there are 14,000 Palm Warblers in Michigan, or 0.1% of the global population. While possibly somewhat high, this estimate is likely near correct, as many blocks that contained suitable breeding habitat were not surveyed in northern Michigan. Atlas efforts in both Ontario and New York found a notable increase in their populations of Palm Warbler; in Ontario, a 74% increase was noted for the province between atlases (Sutherland 2007, McGowan and Corwin 2008).

Within Michigan, a marked increase between atlases has been recorded as well. In MBBA I, Palm Warblers were recorded in 0.90% of all townships surveyed, whereas in MBBA II, birds were recorded in 4.36% of all townships surveyed. This represents an impressive 484% increase in the rate of detection of the species. However, what this actually means is a matter for debate. Are Palm Warblers increasing in population in Michigan, or have biologists and birders just gotten better at recognizing potential breeding habitat and detecting singing males? Certainly coverage during MBBA II in remote boglands was good, allowing for discoveries of nesting colonies not previously known, but

Palm Warbler *(Setophaga palmarum)*

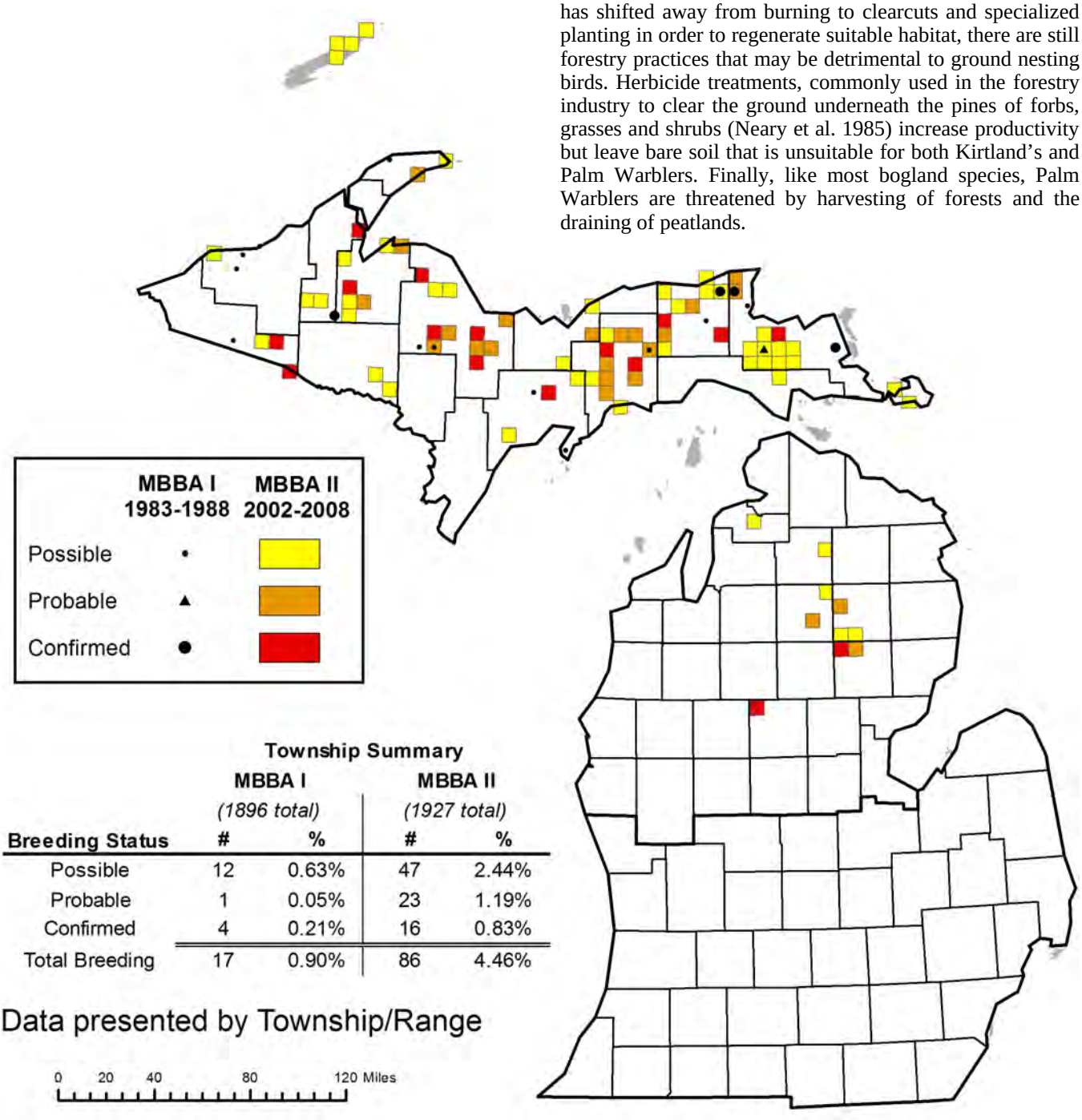
Skye Christopher G. Haas

likely always present, such as in the Cyr Swamp, a remote and very inaccessible wetland complex in south-central Marquette County. Another question is whether Palm Warblers have recently adapted to dry jack pine barrens as readily as they do sphagnum bogs for breeding, or if increased efforts in northern jack pine forests have better documented this occurrence. The Palm Warbler is one of the most understudied of the *Setophaga* (formerly *Dendroica*) warblers, and worthy of further research on its breeding habits (Wilson 1996).

Conservation Needs

The Palm Warbler has an ally in terms of its conservation needs in Michigan: its relative, the Kirtland's Warbler. The highly publicized plight of this endangered species has resulted in the creation of a federal management plan to maintain tracts of jack pine forest 5-15 years of age, which also seems to benefit the Palm Warbler.

Maintaining a habitat that is fire based in its ecology is not without complications. A change in management policies away from the natural fire based regeneration system in jack pine plains could prove to have a negative effect on the Palm Warbler. While much Kirtland's Warbler management has shifted away from burning to clearcuts and specialized planting in order to regenerate suitable habitat, there are still forestry practices that may be detrimental to ground nesting birds. Herbicide treatments, commonly used in the forestry industry to clear the ground underneath the pines of forbs, grasses and shrubs (Neary et al. 1985) increase productivity but leave bare soil that is unsuitable for both Kirtland's and Palm Warblers. Finally, like most bogland species, Palm Warblers are threatened by harvesting of forests and the draining of peatlands.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	12	0.63%	47	2.44%
Probable	1	0.05%	23	1.19%
Confirmed	4	0.21%	16	0.83%
Total Breeding	17	0.90%	86	4.46%

Data presented by Township/Range

0 20 40 80 120 Miles

Pine Warbler *(Setophaga pinus)*

Raymond J. Adams, Jr.



Elizabeth Rogers ©

This attractive green and yellow warbler is aptly named, as it is typically found in pines or in mixed hardwood-pine associations. It is common as a breeder throughout the northern LP and the UP and in scattered locations in the southern LP where adequate stands of mature pines are present. The Pine Warbler ranges over much of eastern North America from the northern Great Lakes states and southern Canada to the Gulf Coast. It is largely absent as a breeder from the southern edge of the Great Lakes through the eastern farm belt, where pines are scarce. In the southern United States it occurs in higher densities than in the northern portions of its range (Rodewald et al. 1999). In Michigan's SLP, it is uncommonly seen in migration where pines are absent. The Pine Warbler is casual in Michigan in winter, with confirmed records of overwintering. Unlike most other warblers breeding in eastern North America, this is a short distance migrant that winters in the southern United States, and seldom reaches the West Indies and Northern Mexico. Many birders are unfamiliar with this species despite its widespread distribution. Its song is similar to that of the Chipping Sparrow and Dark-eyed Junco which share much of the Pine Warbler's breeding range and preference for pines.

Distribution

Rodewald et al. (1999) reported this warbler as mostly absent from Michigan's LP as a breeding species. In reality, it is a common breeder from the tension zone in the LP north through most of the UP. It currently breeds in over 59% of the townships in the NLP and in over 49% of the townships in the UP. During MBBA I, Pine Warblers were noted in only 24% of the UP townships and 33% of the northern LP townships. There has been an increase in the southern LP from about 2.4% of the townships to over 12%. These numbers indicate a dramatic expansion in its Michigan range in 20 years. This expansion is no doubt related to the maturation of pine plantations in Michigan's National and State Forests. In addition, the Natural Resources Conservation Service (NRCS) provided millions of pines to private groups and citizens as part of efforts to restore land cover throughout the state (Bielecki et al. 2004). Rodewald et al. (1999) confirmed that the Pine Warbler is largely absent from coniferous forests dominated by spruce, fir, larch or hemlock. In Michigan, it is regularly found in mature white, red, and jack pines, especially where the stands have been thinned, but complete canopies or emergent canopies remain (pers. obs.). It is infrequent in deciduous forest with scattered large pines. The extensive stands of red pine throughout much of the northern LP support large concentrations of Pine Warblers.

Pine Warblers can be found in all the surrounding states and provinces, but the distribution varies dramatically. In Ontario, it occurs over most of the province, although it is largely absent in the southwest and Hudson Bay lowlands (Crins 2007). To our west in Wisconsin, this warbler is concentrated in the northwest, northeast, and west central counties (Elias 2006). To our south in Indiana, Illinois, and Ohio, the species is very local with few records outside of the southern portions of those states (Castrale et al. 1998, Kleen et al. 2004, Peterjohn and Rice 1991).

Breeding Biology

The Pine Warbler is one of our earliest warblers to return in the spring, with the first birds arriving during the third week in April and rarely earlier. Migrants move through quickly, with northern birds already on territory in late April or early May (Evers 1991). While nest building has been recorded by 28 April, most observations of nest building extend from late May into June. Only six reports indicated adults on the nest, all in late May and June. Other MBBA II breeding confirmations were of adults feeding young and fledged young with one observation of a nest with young. These observations ranged from the first week of June to about 10 August.

Abundance and Population Trends

One population estimate for the Pine Warbler in Michigan is 140,000 birds, or about 1.2% of the world population (PIF 2007). For perspective, this compares with 150,000 birds each for the Eastern Bluebird and Tufted Titmouse in the state. In the 20 years since MBBA I, the Pine Warbler appears to have more than doubled its population in the state. North American Breeding Bird Survey trend results for Michigan show a significant increase of 8.6% per year from 1983 to 2007. In USFWS Region 3, this species has increased 4.5% per year for the same time period. At the national level, this warbler has increased 1% per year over the past 40+ years (Sauer et al. 2008).

The extent of the population increase of the Pine Warbler within the state is well illustrated by the number of pairs reported by Atlas observers. During MBBA I, a minimum of 817 pairs was recorded. During MBBA II, with comparable effort, 2,876 pairs were counted, representing more than a three-fold increase. As indicated above, the Pine Warbler uses pine trees in migration as well as during breeding. At Kleinstuck Preserve, Kalamazoo County, where spring migrants have been surveyed over a period

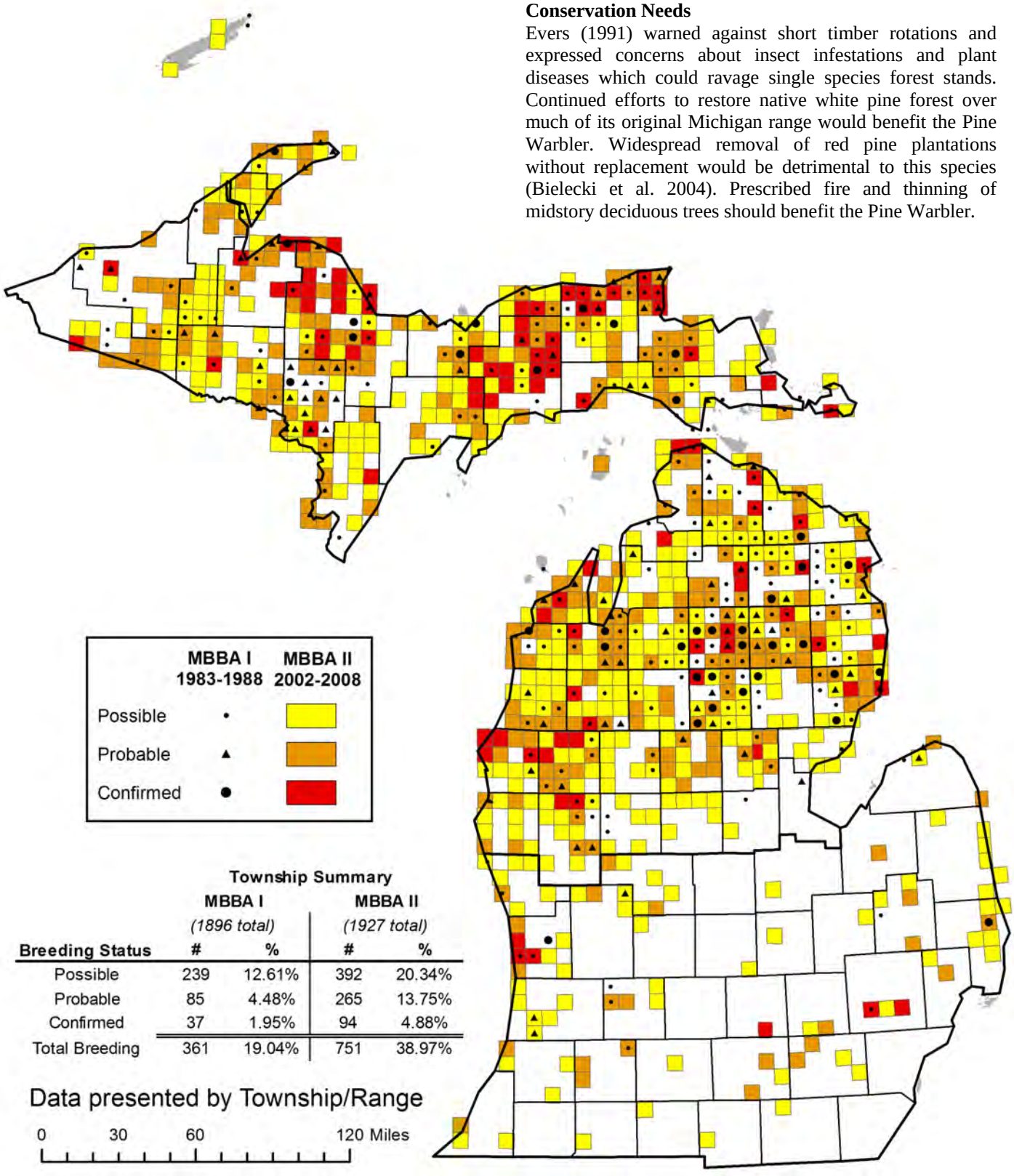
Pine Warbler *(Setophaga pinus)*

Raymond J. Adams, Jr.

exceeding 35 years, 118 Pine Warblers have been tallied, with most of those occurring in recent years coinciding with the maturing of the pine plantations on the perimeter of the 50 acre site. By contrast, fall banding records from the Kalamazoo Nature Center over the same period only include seven Pine Warblers out of 396,000 birds. There are no conifer stands anywhere in proximity to the primary banding stations at the center.

Conservation Needs

Evers (1991) warned against short timber rotations and expressed concerns about insect infestations and plant diseases which could ravage single species forest stands. Continued efforts to restore native white pine forest over much of its original Michigan range would benefit the Pine Warbler. Widespread removal of red pine plantations without replacement would be detrimental to this species (Bielecki et al. 2004). Prescribed fire and thinning of midstory deciduous trees should benefit the Pine Warbler.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	239	12.61%	392	20.34%
Probable	85	4.48%	265	13.75%
Confirmed	37	1.95%	94	4.88%
Total Breeding	361	19.04%	751	38.97%

Yellow-rumped Warbler *(Setophaga coronata)* ***Skye Christopher G. Haas***



Willie McHale ©

Michigan's birdwatchers are lucky to have such a beautiful bird be so plentiful. This abundant migrant is often the nucleus of mixed foraging flocks, and whether it is the arresting adult males with their dapper markings or the sublime brown streaks of the young of the year, Yellow-rumped Warblers are always a delight to behold. There may actually be two (or more) species within the complex of Yellow-rumped Warbler. Currently recognized as a subspecies, the form found in Michigan is known as the Myrtle Warbler (*S. c. coronata*), aptly named for its habit of consuming wax myrtle berries. Myrtle Warblers range far, breeding from Newfoundland to Alaska, and from the treeline south to the Great Lakes and northern Appalachians. However the western counterpart, the Audubon's Warbler (*S. c. auduboni*), breeds along the West Coast and throughout the Rocky Mountains from British Columbia south into the mountain ranges of Mexico and Guatemala. Debate about the validity of two species continues, and the pair may be elevated to full species status yet again. In Michigan, the Audubon's Warbler is only known as a rare vagrant, and confirming such individuals is difficult due to the existence of hybrids from a narrow hybrid zone in the Canadian Rockies.

Distribution

Yellow-rumped Warblers nest in the northern half of Michigan, are a low-density wintering species in the southern third, and are a common migrant throughout. While this species' presence in Michigan likely dates back to the Pleistocene when the last glaciers retreated, it was considered to be uncommon at the turn of the 20th century (Barrows 1912). This is likely an artifact of the extensive logging that occurred in the late 19th century when northern Michigan was cleared of its mature pine forests. Extensive tracts of scrub brush land were created, and while many species thrived or even expanded their range into Michigan, many forest species undoubtedly suffered a decline in numbers (Brewer 1991). By the mid-twentieth century, their numbers had rebounded with the return of mature coniferous forest, and by MBBA I, Yellow-rumped Warblers were considered to be one of the most plentiful breeding species in the north woods.

There was no significant change in the distribution of Yellow-rumped Warblers between MBBA I and MBBA II but there was a definite increase in the number of townships where the species was found. In the UP, townships with documented Yellow-rumps increased by 14.2% over MBBA I, certainly suggestive of a population increase, though a similar increase in observer effort in the UP may also account for these trends.

BBS data show that the species may be more abundant on Lake Superior watersheds, though significant concentrations were found in the Sylvania Recreation Area in Gogebic County, likely due to the extensive mixed mesic mature forests (Sauer et al. 2008, Eastman 1991, S. Haas and R. Rutherford pers. obs.). Yellow-rumped Warblers become more sparse as one travels southward in the Lower Peninsula. Breeding in the NLP tends to be concentrated along the Manistee and Au Sable River watersheds. These cool water drainages, as well as the prevalence of red pine plantations on National Forest lands, likely contributes to their abundance in these areas. The jack pine barrens managed for Kirtland's Warbler in the eastern NLP are also good places to locate breeding populations of Yellow-rumped Warbler. The species remains nearly absent from the SLP with only two possible breeding records noted, which is not surprising considering the lack of coniferous forest.

Breeding Biology

Yellow-rumped Warblers are dependent upon mature coniferous or mixed forest; however, within this broad designation Yellow-rumped Warblers will use a wide variety of forest composed of differing coniferous species. Yellow-rumped Warblers tend to use mature mesic forest habitats, though xeric forests that are composed of white, red, and jack pine also seem to concentrate this species. They also use hemlock groves located within tracts of northern hardwood forest. Hunt and Flaspohler (1998) indicate that they prefer mature forests, though in Michigan the species is regularly found in young jack pine managed for Kirtland's Warbler (pers. obs.). They are also generalists when foraging, gleaning for insects in trees and shrubs, hawking for aerial insects, and consuming fruit and berries, though the latter food source may be used more during migration and on the wintering grounds.

Yellow-rumped Warblers are typically one of the first species of warblers to be found singing on territory in northern Michigan. Nesting occurs from June through late July (Eastman 1991). Surprisingly, it is not known if there are two clutches per season; it is certainly possible, given the species' early arrival to the breeding grounds, but more data are needed to test such a hypothesis. Adults feeding prejuveniles on 24 August 1997 at McLain State Park, Houghton County was thought to suggest a second brood (Binford 2006). The cup nest is typically placed at a mean height of 6.1 m above ground, frequently on the outer half of a horizontal branch in a conifer tree. The clutch size is

four to five eggs and incubation takes just under two weeks from the last egg laid (Harrison 1975, Hunt and Flaspohler 1998).

Abundance and Population Trends

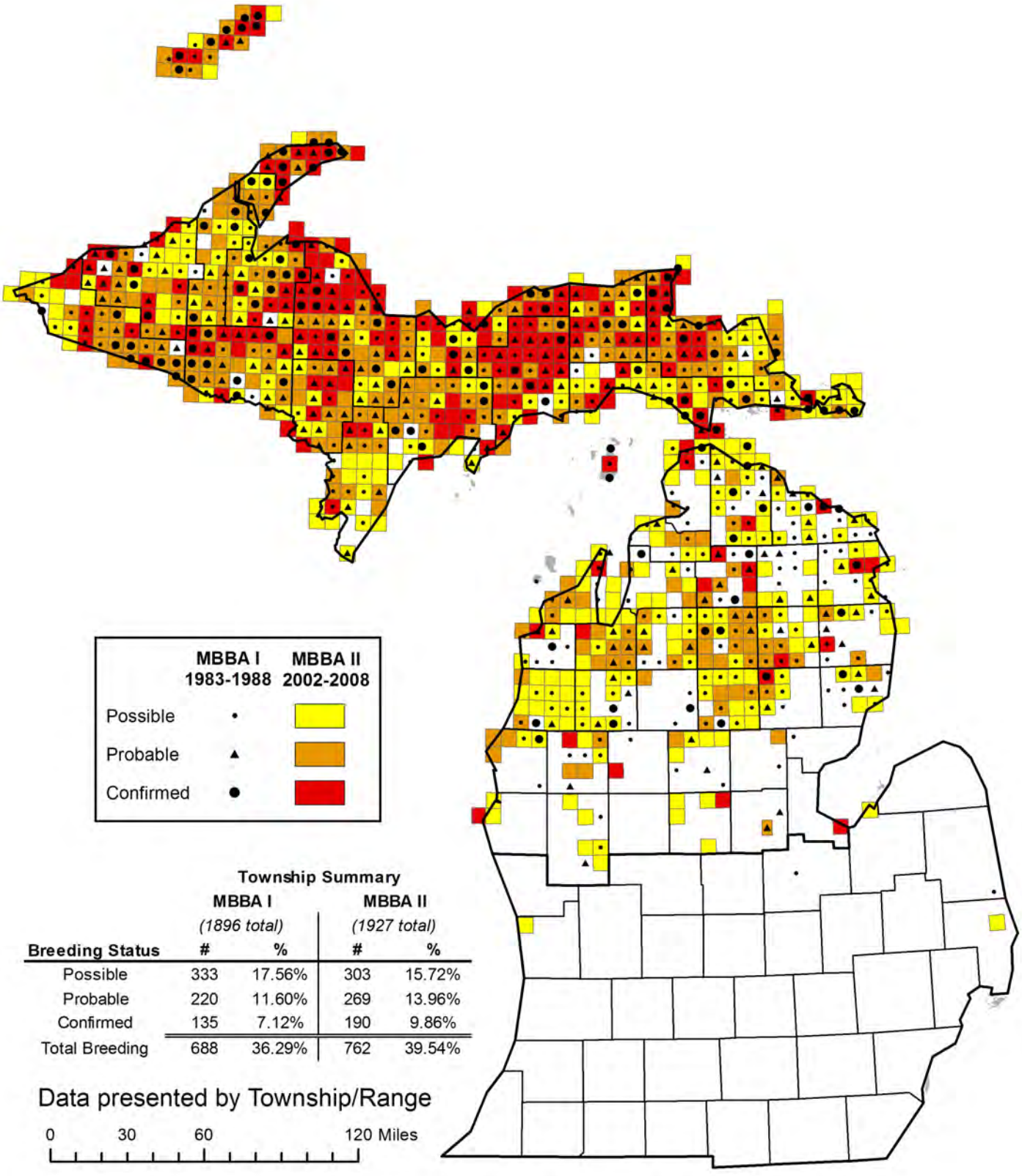
The status of Yellow-rumped Warblers in Michigan is that of a year-round resident, albeit in low numbers during the wintertime. As a migrant, fewer warbler species are more readily observed or have as protracted a migration period, particularly in the fall. Spring migrants return early. Yellow-rumped Warblers are regularly seen throughout the state by the end of April and males have set up territories by mid-May. In the fall, post-breeding dispersal is noted as early as late July and early August (pers. obs.). Flocks of juvenile birds are noted at migration locations along the Great Lakes in northern Michigan during this early period; however, the bulk of migrants, possibly from further north in Canada, move through in late September and early October (Chartier and Ziarno 2004). Birds are regularly seen into November, even in the UP, and by December most have left the state except for the small number of birds that will attempt to overwinter.

Partners in Flight have estimated that a healthy total of 400,000 Yellow-rumped Warblers nest in Michigan, 0.3% of the world's total population (PIF 2007). BBS data found a 0.6% per year national increase from 1966 to 1999 (Sauer et al. 2008). Binford found an even more striking increase on the Bootjack BBS route in northern Houghton County with a 310% increase between the periods of 1967-1973 (1.29 birds per count) and 1992-2005 (5.29 birds per count), thought to be a direct result of forest maturation, especially of the required scattered conifers within mesic mixed forest (Binford 2006). There was only a 10.7% increase in the number of townships between atlases in Michigan. Ontario experienced a similar 11% increase in the probability of detection between their two atlases (Crins 2007).

Conservation Needs

The state of the Yellow-rumped Warbler in Michigan appears to be good, both currently and for long-term trends. Possible threats to this species are logging of mature forest, particularly selective cuttings of conifers for pulpwood, and collisions with communications towers. It was the most abundant warbler in tower kills in Florida, constituting 7% of all causalities (Hunt and Flaspohler 1998). No management plan is currently required for this species; any program to enhance other coniferous forest species will likely benefit Yellow-rumped Warblers as well.

Yellow-rumped Warbler *(Setophaga coronata)* ***Skye Christopher G. Haas***



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	333	17.56%	303	15.72%
Probable	220	11.60%	269	13.96%
Confirmed	135	7.12%	190	9.86%
Total Breeding	688	36.29%	762	39.54%

Yellow-throated Warbler *(Stephaga dominica)* ***Mike Sanders***

Status: *State Threatened*



Darlene Friedman ©

This species was formerly known as the Sycamore Warbler because of its close association with mature sycamore trees (Hall 1996). Mark Catesby, the well-known English naturalist referred to this bird as the 'yellow-throated creeper" (Harrison 1984), because its habit of creeping along limbs and tree trunks is similar to the Black-and-white Warbler. The Yellow-throated Warbler is primarily a species of the southeastern United States (Evers 1991). Its breeding range extends from Missouri, east Texas and eastern Oklahoma eastward to the Atlantic coast (Gehring 2006). The northernmost extent of the Yellow-throated Warbler's breeding range is southern Wisconsin eastward to southeastern Pennsylvania (Gehring 2006). Michigan's population probably winters along the Gulf coast (Evers 1994).

Distribution

The Yellow-throated Warbler was first recorded in Michigan in 1879 (Wood 1951). Considered a rare summer resident (Barrows 1912) it was extirpated from the state by 1900 probably due to habitat destruction (Evers 1991). Wood (1951) reported only one record during the 40-year period from 1911-1951, a singing male in Berrien County. Early literature reported this bird from stream valleys (e.g., Raisin River and Huron River) and floodplain forests due to the species partiality to sycamores where these trees occur (Barrows 1912, Wood 1951). A small self-sustaining breeding population was discovered in the southern Lower Peninsula in 1988 during MBBA I (Evers 1991). Evers (1994) reported that the only known breeding population in Michigan was near the Galien River in Berrien County. Gehring (2006) reported Muskegon County as the northernmost distribution for this species in the state.

Data from the MBBA II indicates a slight northward expansion in the Yellow-throated Warbler's distribution in the state; however it is still largely concentrated in the three southernmost tiers of counties. The species was reported from eight counties compared with five during the first atlas effort. These new discoveries included singing males in pines at Stinchfield Woods and Waterloo State Recreation Area, Washtenaw County, singing males in 2003 and 2005 along the Raisin River in Tecumseh, and one near Morenci, Lenawee County, one along the Swan Creek Trail in Allegan State Game Area, one along the Paw Paw River in Waverly Township, Van Buren County, one found dead in late June along Lake Huron in St. Clair County, and a record from Marquette County in the Upper Peninsula. The Upper Peninsula record may be an overshoot rather than a bird on territory.

There were no breeding confirmations during the second atlas period compared to two from the first atlas. As can be expected from a canopy nester in tall trees, rates of breeding confirmation were low during both atlas periods. Yellow-throated Warbler occurrences by township nearly doubled; 0.22% of townships reported Yellow-throated Warbler presence during MBBA II compared to 0.13% reported during MBBA I.

Breeding Biology

In Michigan, the Yellow-throated Warbler is generally limited to bottomland and river floodplain forests because of its strong affinity for mature sycamore trees (Evers 1994, Bruner 1998). Yellow-throated Warblers are one of the earliest warblers to return in spring and are most easily observed through vocalizations because it inhabits the upper branches of trees. Males are incessant singers throughout the day, singing from tree tops after leaf-out (Gehring 2006). The loud, persistent musical song is often compared to the Indigo Bunting. Nests are normally located high in the forest canopy, 25-30 m (80-100 ft) above the ground (Hall 1996), and normally near the end of a branch concealed by leaves (Harrison 1984). No eggs have ever been collected in Michigan (Evers 1991).

Abundance & Population Trends

Population trends based on 76 Breeding Bird Survey routes in the upper Midwest indicate a statistically significant increase of 3.90% annually for the 1966-2007 period (Sauer et al. 2008). BBS data for North America showed a significant increase of 0.98% annually during the same period (Sauer et al. 2008). Although Michigan represents a small portion of its range, populations of the Yellow-throated Warbler appear stable throughout the remainder of its range. The Yellow-throated Warbler is state threatened in Michigan and has an S1 natural heritage ranking indicating it is critically imperiled in the state (MNFI 2007). This species is endangered in Wisconsin where only one breeding confirmation has been recorded (Hansen 2006). Hall (1996) suggested the range of this species was increasing northward, which Gehring (2006) offered as a possible link to global climate change. In addition, the fact

Yellow-throated Warbler *(Stephaga dominica)*

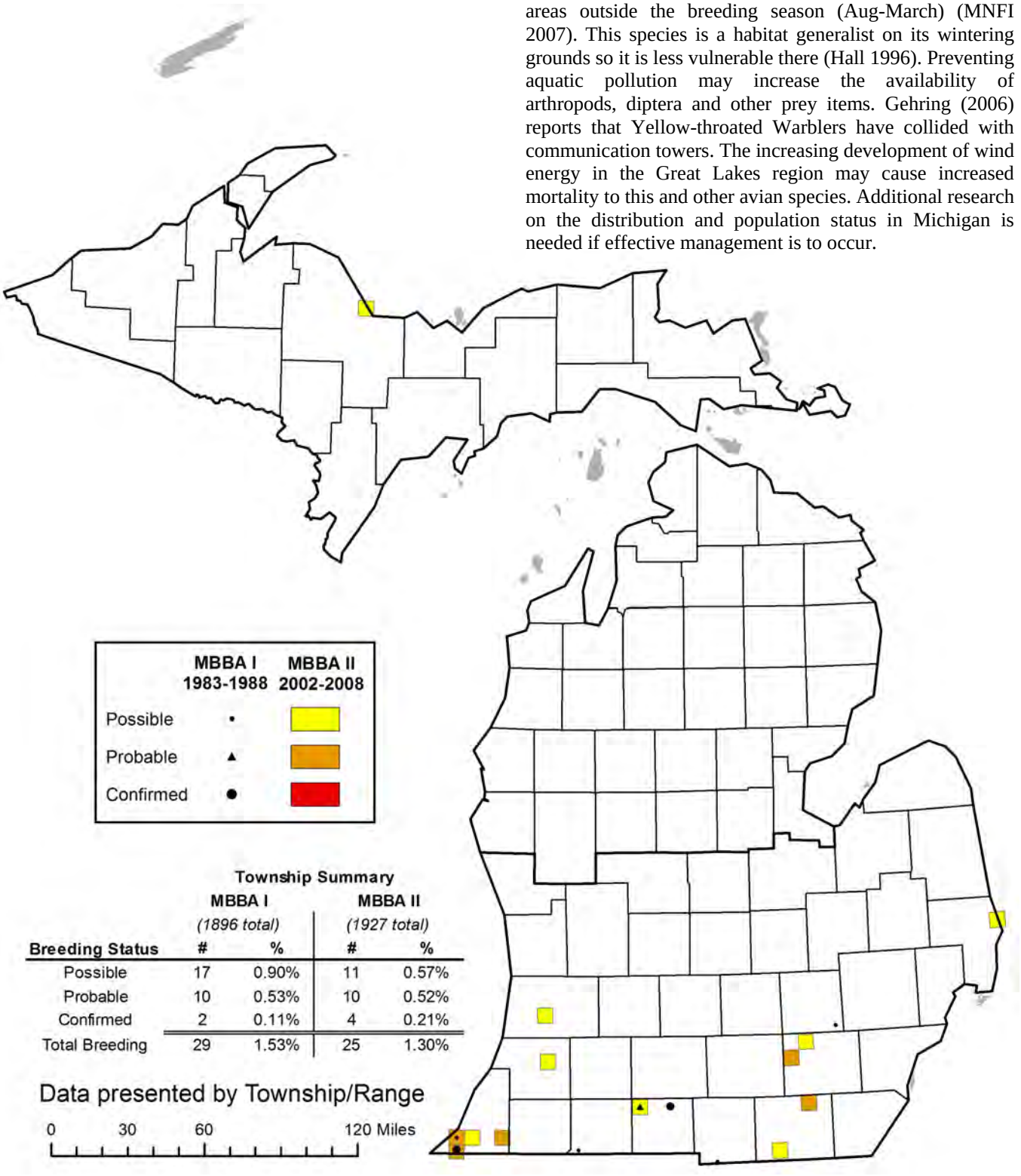
Mike Sanders

Status: *State Threatened*

that numbers and densities depend on habitat availability (Hall 1996) may indicate that secondary growth of floodplain forests are contributing to this northern expansion in Michigan. However, no observations occurred in Ontario during their first or second atlas periods (Bird Studies Canada 2009).

Conservation Needs

Preservation and expansion of existing floodplain habitat is critical in protecting the Yellow-throated Warbler in Michigan. Management strategies include no logging of sycamores within floodplain habitat and restriction of construction activities within a half mile of known breeding areas outside the breeding season (Aug-March) (MNFI 2007). This species is a habitat generalist on its wintering grounds so it is less vulnerable there (Hall 1996). Preventing aquatic pollution may increase the availability of arthropods, diptera and other prey items. Gehring (2006) reports that Yellow-throated Warblers have collided with communication towers. The increasing development of wind energy in the Great Lakes region may cause increased mortality to this and other avian species. Additional research on the distribution and population status in Michigan is needed if effective management is to occur.



Prairie Warbler *(Setophaga discolor)*

Michael E. Petrucha

Status: *State Endangered*



Robert Epstein ©
Species sponsored by:
Richard Brewer & Katy Takahashi
And also by: Benzie Audubon Club

This yellow-breasted, black-striped jewel with the rising, buzzy song is not aptly named. Instead of grassy prairies, it breeds in shrubby old fields and early successional forests and dunes. In Michigan, the Prairie Warbler is extremely rare in the UP and rare in the LP. It breeds throughout most of the eastern United States and southern Ontario. Prairie Warblers winter in Florida, Caribbean islands including The Bahamas, Cuba, Bermuda, and Hispaniola, and the Caribbean coast of Central America (Nolan et al. 1999).

Distribution

Prairie Warblers are found in all of the surrounding states and Ontario. In Ontario, they are primarily found along the southeastern shore of Georgian Bay with no substantial changes between their first and second atlases (Southerland and Harris 2007). In New York, Prairie Warblers have their highest concentration in the southern half of the state (Smith 2008). Pennsylvania has Prairie Warblers throughout the state absent only from the highly urbanized Coastal Plain and Eastern Lake sections (Leberman 1992). Ohio's Prairie Warblers are mainly found in the southern and unglaciated eastern part of the state (Peterjohn and Rice 1991). Bruner (1998), states that Prairie Warblers are found almost exclusively in the southern half of Indiana with only four records for the northern third of the state. Prairie Warblers in Illinois are found mainly in the extreme southern part of the state (Kleen et al. 2004). In Wisconsin, they are found scattered throughout the state, being found on 17 of 1,132 (1.5%) atlas quads (Frank 2006). This is similar to Michigan's Prairie Warbler distribution with records in 25 of 1,925 (1.3%) townships.

Barrows (1912), characterized Prairie Warblers as "not common" in Michigan, but common in certain locations. It was considered an uncommon local resident in Berrien, Ottawa, Crawford, Oscoda, Otsego, and Cheboygan Counties by Wood (1951). Payne (1983) described the Prairie Warbler as uncommon and local in the UP, and most numerous in the LP jack pine plains. During MBBA I, Prairie Warblers were still being found in Lake Michigan dunelands and sandy abandoned farmlands, but scarce or absent from the jack pine plains and Kirtland's Warbler censuses, despite finding many nests there in the middle decades of the 1900s (Walkinshaw 1991). Currently, Prairie Warblers are very rarely found on the Kirtland's Warbler census (pers. obs.).

Distribution is virtually unchanged from MBBA I. Presently, Prairie Warblers breed in 0.16% of UP townships, 2.35% of northern LP townships, and 1.27% of southern LP townships. This compares to 0.49% of UP townships, 2.37% of northern LP townships, and 1.72% of southern LP townships during MBBA I. All three regions showed a decrease from MBBA I, continuing a decline noted by Walkinshaw (1991).

Michigan's Prairie Warblers are found in three distinct scrub-shrub habitats: 1) early successional Lake Michigan dunelands where shrubs are intermixed with dune grass; 2) jack pine barrens burnt 10-20 years prior, such as Kirtland's Warbler breeding habitat; and 3) recently burnt areas of former pineries dominated by shrubs and small trees (Walkinshaw 1991). All three are characterized by dry, sandy soils. K.J. Kahl (pers. comm.) found that territories varied from north-to-south. Low woody cover assemblages were more often utilized in the northern study areas, such as Sleeping Bear Dunes. Study areas further south, in areas like Warren Dunes and Saugatuck Dunes State Parks, tended to be dominated by grasses and herbaceous plants.

Breeding Biology

Prairie Warblers leave their wintering grounds starting in March, with most gone by the end of April arriving in Michigan by the first half of May (Southwell 2001). MBBA II recorded only four townships with confirmed breeding. One was a nest with young on 27 June. The other records were of adults feeding young with dates ranging from 17 June to 9 July.

Research by K.J. Kahl (pers. comm.) in 2004 and 2005 identified 38 breeding territories along Michigan's west coast (K.J. Kahl, pers. comm.). The average territory radius ranged from 19 – 56 m with larger survey areas tending to have larger breeding territories. Territories tended to be clustered within the sites surveyed with territory boundaries often abutting (K.J. Kahl, pers. comm.).

Abundance and Population Trends

Walkinshaw (1991) considered Prairie Warbler peak population years as the 1950s and early 1960s. Partners in

Prairie Warbler *(Setophaga discolor)*

Michael E. Petrucha

Status: *State Endangered*

Flight estimates Michigan's Prairie Warbler population at 160, which is 0.01% of the 1,400,000 global population (PIF 2007). Atlas block data shows a decrease in every region from MBBA I to MBBA II. In the MBBA I period, Prairie Warblers were found in 0.09% of the UP blocks, 0.86% of the NLP blocks, 0.52% of the SLP blocks, and 0.49% of the total blocks. In MBBA II however, they were found in 0.05% of the UP blocks, 0.67% of the NLP blocks, 0.40% of the SLP blocks, and 0.38% of the total blocks. Breeding Bird Survey data also shows a decrease in Prairie Warblers of 4.45% in Region 3 from MBBA I to MBBA II. During the MBBA I period, BBS routes found 0.8-0.9 Prairie Warblers per route, during the MBBA II period, numbers dropped to 0.5-0.6 birds per route. From 1966 to 2007, BBS numbers show over a 2% decrease for North America (Sauer et al. 2008). New York, which has shown an unexplained increase of 4%, is an exception (Smith 2008).

Conservation Needs

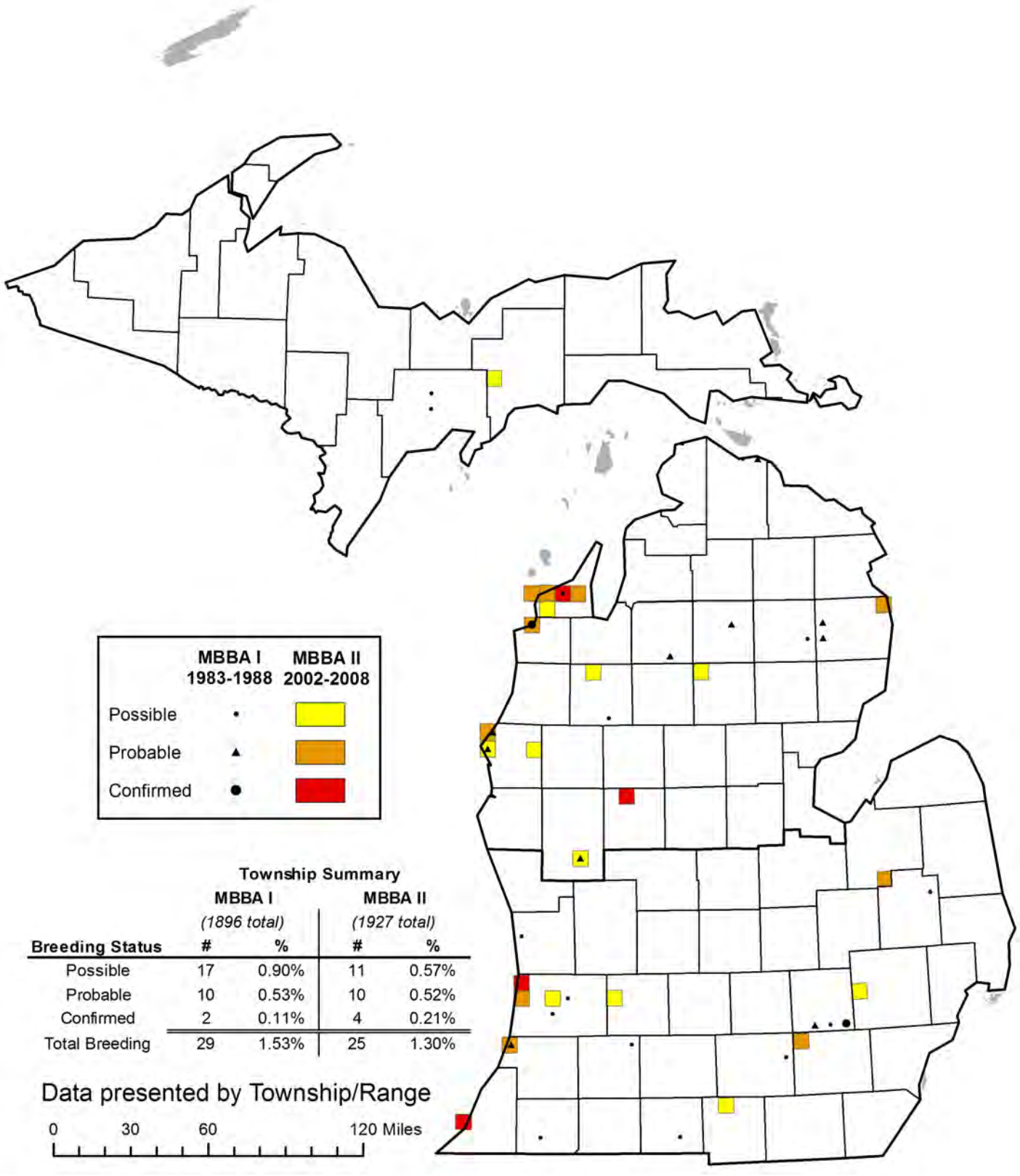
Data from MBBA I was used in the 1989-1990 DNR review of Michigan's listed species, and it was recommended that Prairie Warbler be upgraded to threatened status (McPeek and Brewer 1991). It was classified as threatened in 1990 (Felsing 1994) and elevated to endangered in 1999 (MDNR 1999). The National Audubon Society has included the Prairie Warbler on its Watchlist 2007 as a yellow species, indicating declining or rare status (NAS 2009). Habitat loss and cowbird parasitism are two commonly mentioned reasons for population decline (Cooper 2000, NAS 2009, Southwell 2001).

For Michigan, other unknown factors seem to be in play as Prairie Warblers were at one time far more numerous in Kirtland's Warbler habitat than currently. Mayfield (1960) found Prairie Warblers in at least 30% of Kirtland's Warbler sites. Walkinshaw (1983) noted Prairie Warblers in 12% of Kirtland's Warbler territories. Walkinshaw (1959) observed Prairie Warblers on 43 of 49 days in the Lovells area for an average of 3.24 (0-18) birds per day for the years 1932-1953. Currently 38,000 acres are suitable for Kirtland's Warbler in Michigan (Byelich et al., 1985). Portions of this habitat could be suitable for Prairie Warblers based on past use records. However, understanding the additional plant composition and structure requirements for the Prairie Warbler could help identify and narrow suitable areas within Kirtland's Warbler habitat for Prairie Warblers. Comparisons to territories in west Michigan counties bordering Lake Michigan where the majority of casual observations are currently noted for Prairie Warbler may be useful (Brewer et al. 1991, Michigan Natural Features Inventory 2011). Another positive quality of this area is that Cowbirds have been removed annually in these areas since 1972 (USFWS 2008).

Essential information to better understand the status of Prairie Warblers in Michigan, such as plant composition distribution during the Michigan breeding season, has been specifically identified as a critical information need for this species (Nolan et al. 1999, Cooper 2000, Southwell 2001).

Prairie Warbler *(Setophaga discolor)* ***Michael E. Petrucha***

Status: *State Endangered*



Black-throated Green Warbler *(Stephaga virens)* ***Robert Doepker***



Darlene Friedman ©

The assertive and frequently repeated "*zee zee, zee zoo zee*" of the Black-throated Green Warbler is one of the most distinctive and recognizable bird songs heard during the breeding season in the UP and NLP. This Neotropical migrant is a widespread and common inhabitant of coniferous and mixed coniferous–deciduous forests throughout its breeding range which extends from central Canada south and west of James Bay, through the northern portions of the Great Lakes states, most of New England, and through the Appalachian Mountains into Georgia (Bent 1953, Morse and Poole 2005). The breeding range generally corresponds to the forested region of the Appalachians (Erskine 1977) and the hemlock-white pine-northern hardwood region (Braun 1950). The winter range encompasses Mexico and most of Central America with smaller numbers wintering in the West Indies, especially Cuba.

Distribution

The Black-throated Green Warbler is associated with mature, mesic forests containing white spruce, balsam fir, or preferably hemlock, either in pure stands or mixed with deciduous tree species (Erskine 1977). This warbler exhibits considerable differences in breeding habitat across its breeding range (Collins 1983). The presence of middle-aged or mature conifers is an important component of breeding habitat. Suitable habitat for the Black-throated Green Warbler appears to contain fewer conifers compared to breeding habitat requirements for the Blackburnian Warbler (Collins 1983, Doepker et. al. 1992, Morse and Poole 2005). MacArthur's (1958) pioneering studies of niche partitioning among several species of wood warblers occupying coniferous forests indicated different warbler species use different feeding niches based on the vertical structure of the forest vegetation. The Black-throated Green Warbler forages primarily in the middle portion of branches in the mid-canopy. In contrast, the Blackburnian Warbler forages higher in the canopy and the Yellow-rumped Warbler forages in foliage nearest the ground. The Black-throated Green Warbler primarily gleans insects from conifer and hardwood trees, and although less common, has been observed hawking insects.

The distribution of the Black-throated Green Warbler increased in all three regions of the state over the 20-year period between MBBA I and MBBA II. In the UP, NLP and SLP, respectively, approximately 83%, 44% and 16% of the townships surveyed exhibited possible, probable or confirmed evidence of breeding during MBBA II. This represents an increase of 15%, 20% and 125% for the UP, NLP and SLP, respectively. Although suitable habitat is dispersed and fragmented in the southeastern LP, it is important to note that this warbler has rapidly expanded into this region of the state. The number of townships where evidence of breeding was confirmed tripled in the UP and remained relatively constant for the LP and SLP between Atlas projects.

Breeding Biology

Birds begin to arrive in the SLP in early May and in the UP a few days later. Singing males are heard in mid-May with territories established and nesting activity occurring by late-May and early June. Nests are difficult to locate as they are most often near the top of coniferous trees, and usually out towards the tips of the branches. Hemlock trees are preferred for nesting and foraging, however Blackburnian Warblers also forage on deciduous species, especially sugar maple. Both parents share nest building and feeding of young, however, only the female incubates the three to five (average four) eggs for about 12 days. As with most members of the wood warbler group, this warbler exhibits strong fidelity to its natal area (Morse and Poole 2005).

Abundance and Population Trends

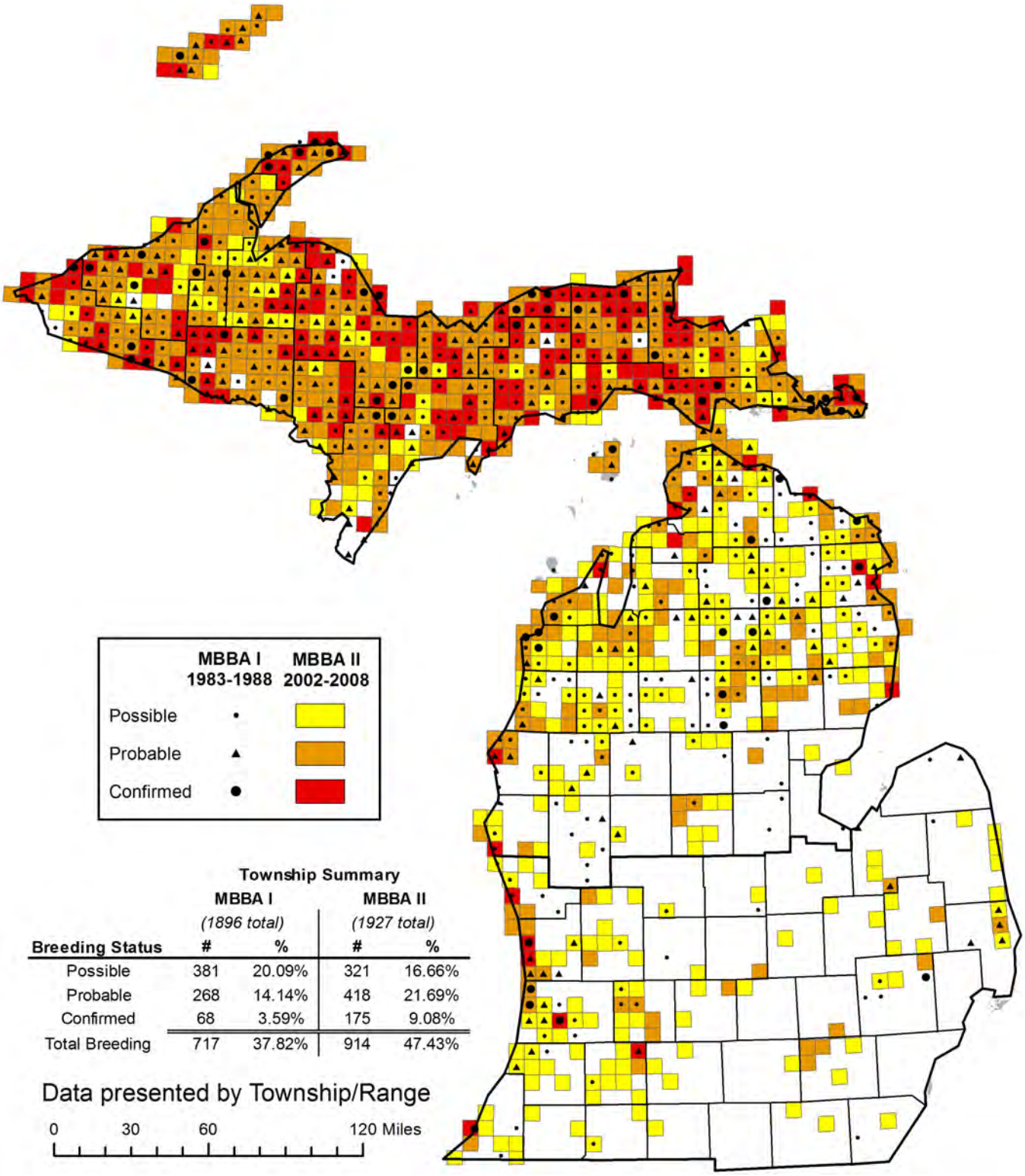
The Breeding Bird Survey (BBS) provides strong evidence supporting the increasing abundance of the Black-throated Green Warbler in Michigan. The number of singing males heard on BBS routes in Michigan has approximately tripled over the period from 1966 through 2007. The number of males recorded singing on BBS routes in the Northern Spruce–Hardwood Physiographic Region approximately doubled over the same period. From 1966 through 2007, the average number of singing males counted was 2.3 and 2.7 in Michigan and the Northern Spruce–Hardwood Physiographic Region (Sauer et al. 2008). The average annual increase was 4.3% in Michigan and 0.9% in the Northern Spruce–Hardwood Physiographic Region. The Black-throated Green Warbler increased approximately 4.9% annually on BBS routes in Michigan between MBBA I and MBBA II.

Black-throated Green Warbler *(Stephaga virens)*

Robert Doepker

Conservation Needs

The future for Black-throated Green Warblers appears secure as long as pressure to manage forests more intensively, resulting in shortened harvest rotations and increased emphasis on deciduous species for fiber production, does not negatively impact suitable and sustainable quantities of habitat for the Black-throated Green Warbler. The bigger conservation problem may be with the accelerated forest harvesting on the winter range in Central and South America which may adversely impact many of the Neotropical warblers.



Canada Warbler*(Cardellina canadensis)* ***Jack Reinoehl***



Darlene Friedman ©

Nearly the entire population of the Canada Warbler spends the winter in northwestern South America, within a rather narrow elevational range on the east slope of the Andes. The summer range extends from New York and New England west across the northern Great Lakes and southern Canada to the Alberta – British Columbia border. South of the primary range, small populations occur in the Appalachians and around the shores of Lake Michigan (Conway 1999). In Michigan, it is found in most counties in the northern LP and UP with decreasing frequency as one moves south. With its clear, vigorous and fast-paced song, this species is likely to be noticed by those nearby, but it could still be overlooked due to its low density of population and restricted habitat.

Distribution

In MBBA I, the Canada Warbler was one of four warblers classified as having the southern edge of its range extending below "the middle of the LP in the east and west" (Brewer 1991). The present range is similar; this warbler was found throughout the northern LP in MBBA II, with greatest density in the northern three tiers of counties in the LP and in the UP. In MBBA I, there were scattered birds found even away from the vicinity of Lake Michigan, south almost to the state's southern border. The greatest decrease in numbers for this warbler between MBBA I and MBBA II was in this small southern LP population, which declined by over 50% between atlases. In southern LP counties not adjacent to Lake Michigan, the drop was most pronounced, from 24 townships in MBBA I to just seven in MBBA II.

This species is found in forest of various types, both deciduous and coniferous. However, it is not a bird of unbroken forest, preferring wet shrubland, generally characterized by alder and bordering wetlands of various types (Conway 1999).

In states to the south of Michigan, the Canada Warbler is very rare as a nesting species. In Ohio, the largest population is in the northeast, which has an impressive diversity of northern warbler species; some of the Appalachian population also occurs in scattered locations in central and southern Ohio. Habitat preference in Ohio seems mostly to be "hemlock forests, especially . . . where the understory and ground cover are relatively dense" (Peterjohn and Rice 1991). In Indiana and Illinois, the very small populations there (Castrale et al. 1998, Kleen et al. 2004) may be considered as a continuation of the Lake Michigan population, the southernmost population of the Midwest.

In Ontario and Wisconsin, the southern edge of regular occurrence is almost the same as in Michigan. In Wisconsin the population, according to BBS surveys, has been steady (Sauer et al. 2008); in Ontario, the probability of observation decreased somewhat from the first to the second atlas, but occurs at relatively high density for a species considered "uncommon throughout its range" (McLaren 2007).

Breeding Biology

The average arrival of the Canada Warbler in Michigan is during the second week of May. Individuals are occasionally encountered during the first week of May but almost never in April. This warbler's migration regularly extends into early June in the southern LP and this is one of the more likely of our warblers to be found as a nonbreeding wanderer during the summer. Hence, sightings in the possible class need to be regarded with more caution for this species than for just about any other passerine.

This species is single brooded with eggs laid in June and young fledging in late June and early May (Conway 1999). There were only 16 confirmed nestings during MBBA II, a result of the density of habitat occupied by the Canada Warbler and its quick nesting cycle. Fall migration extends from August through the first half of September.

Abundance and Population Trends

Michigan is not the center of abundance for this species. Population density maps produced by the USGS based on BBS data from 1994 to 2003 show the greatest numbers to the east and west of Lake Superior from Minnesota to the Maritime Provinces. Another area of high density is northwest of Great Slave Lake, Northwest Territories (Sauer et al. 2008). In Michigan, the greatest population density is in the UP and NLP. The maps for MBBA I and MBBA II show that the rate of detection was similar in these areas for both atlases.

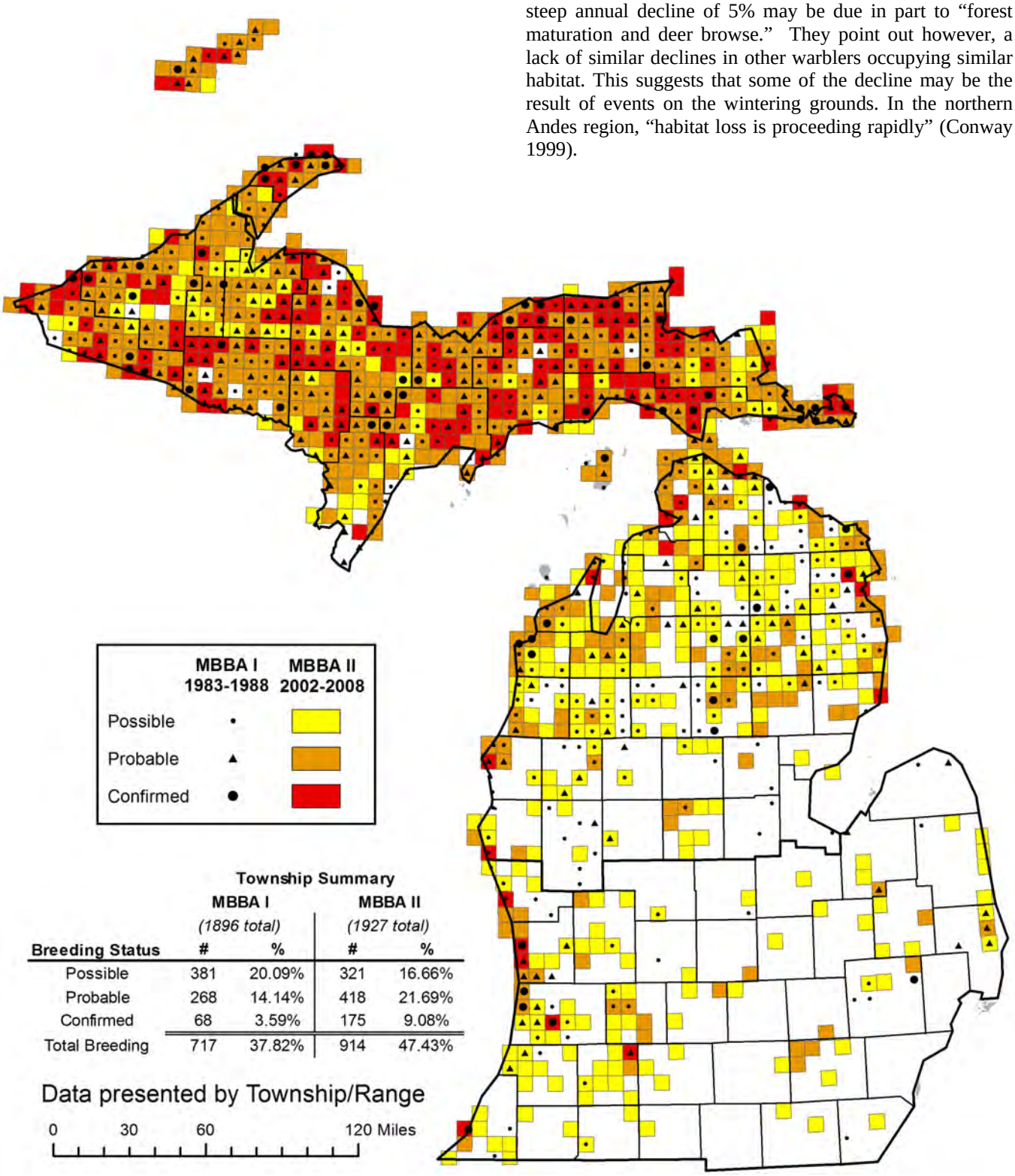
The Canada Warbler population in Michigan is estimated by Partners in Flight (PIF 2007) to be relatively small. Their estimate of 12,000 is smaller than that for seemingly scarcer species such as Palm and Cape May Warblers, and only a small fraction of estimates for the commonest warblers. Population trend maps from the BBS, based on data from 1966 to 2003, showed this species decreasing in the western UP and increasing in the eastern UP and near Lake Michigan. In the period encompassing MBBA I and MBBA II, BBS data showed constant populations across the state

Canada Warbler*(Cardellina canadensis)* ***Jack Reinoehl***

(Sauer et al. 2008). This is generally consistent with results of the atlases, but these indicate a clear decline of this species in the interior of the LP, where populations were small even during MBBA I.

Conservation Needs

Though the Michigan population of the Canada Warbler appears stable, this species is in decline over much of its range. The American Bird Conservancy has placed it on their Yellow List, meaning that it is a declining species (ABC 2010). The greatest declines are in the northeast. In New York, McGowan and Corwin (2008) suggest that the steep annual decline of 5% may be due in part to "forest maturation and deer browse." They point out however, a lack of similar declines in other warblers occupying similar habitat. This suggests that some of the decline may be the result of events on the wintering grounds. In the northern Andes region, "habitat loss is proceeding rapidly" (Conway 1999).



Wilson's Warbler *(Cardellina pusilla)*

Skye Christopher G. Haas



Darlene Friedman ©

Few sounds were as exciting to atlas observers as the chattering song of a Wilson's Warbler coming from an alder thicket in the swamplands of the Upper Peninsula. A cheery bird, males and females are similar in appearance with olive-yellow upperparts and a bright lemon yellow underside; the males are brightest and sport a fetching black cap. A small and active warbler, one can separate it in the field from other yellowish warblers by its small size and long tail that is frequently flipped and raised. Its habit of foraging low in shrubbery also endears it to birders suffering from warbler-neck, provided the bird holds still long enough to provide a good look. The majority of spring migrants pass through in May, frequently extending into early June. In fall, migration occurs from August through October, with a peak in early September (Chartier and Ziarno 2004). Wilson's Warblers winter in Mexico and Central America south to Panama. Small numbers also overwinter in the southern United States (Ammon and Gilbert 1999).

Distribution

Walter Barrows (1912) speculated that in addition to its status as a migrant, Wilson's Warblers may breed in the far northern reaches of the state. However, it was not until July 1980 that two singing males were discovered on Isle Royale providing the first evidence of potential nesting in the state (McPeek 1994). During MBBA I, there was an increase of reports with birds found in nine UP blocks in the summer of 1985. Notable that year was the discovery of four singing males and an agitated female in a shrub swamp along the Dollarville Flooding in Luce County (Evers 1991). Also that summer, a singing male was discovered in a willow-alder wetland south of the Tahquamenon River mouth in Chippewa County. This location continued to be used annually for the next three summers. In 1988 a total of five singing males were present there and, in late June, a female was discovered feeding young, providing the first confirmed breeding record for Michigan (Evers 1991). In all, Wilson's Warblers were recorded in 14 blocks in the UP during MBBA I, the majority in the central-eastern UP. An intriguing post-MBBA I record is of a female with an obvious brood patch that was captured and banded at Seney National Wildlife Refuge, Schoolcraft County in July 1992 (McPeek 1994).

MBBA II paints a picture of a species that has either increased in number or has been detected more frequently. Certainly, some of the likely breeding colonies found in MBBA II are in remote wilderness shrub-swamps, where coverage may have been sparse or absent in MBBA I. The Tahquamenon River mouth site continues to be a consistent location for birds on territory, with singing Wilson's Warblers found there in most years of MBBA II. Other likely viable colonies include the location where breeding was confirmed in the Betsy Lake Wilderness Area in Tahquamenon Falls State Park, with birds found along both Betsy and Sheephead Lake; the Bête Gris area in Keweenaw County, and areas scattered throughout the extensive wetlands of Luce County. A post MBBA II record of note comes from the Sleeper Lake area in Luce County where an agitated pair of birds was found in June 2009 (Z. Gayk, pers. comm.).

Breeding Biology

Wilson's Warblers are most familiar to Michigan birdwatchers as migrants, when they are often common and widely distributed across the state. Tending to be a later spring migrant, birds are frequently still seen migrating in early June, which can complicate the determination of breeding status (Binford 2006). Some of the sightings recorded for MBBA II may be migrants, which have a tendency to sing on migration, such as one male that sang in a lilac hedgerow in the author's suburban Marquette backyard into late June in 2005.

Wilson's Warblers prefer shrub swamps for nesting. Despite an abundance of this habitat in Michigan, probable and confirmed breeding was only found in a handful of areas. It is likely that the presence of sphagnum moss as the understory bed may be of interest to Wilson's Warblers since several of the MBBA II records found birds in such habitat (pers. obs.). Sphagnum is typically a sign of an older shrub swamp, and poor drainage and acidic water may lead to a stunted growth of the willows, alders and bog birch that Wilson's Warblers find attractive (Ammon and Gilbert 1999).

Abundance and Population Trends

Wilson's Warblers are abundant across much of North America, though in the eastern United States they are usually only encountered as a transient. Wilson's Warblers are common nesters in the Rocky Mountains of the western U.S. and Canada, but in the east they are mostly restricted to Canada, with outlying breeding populations just barely reaching Minnesota, Wisconsin, New York, Maine, and New Hampshire (Ammon and Gilbert 1999). One of Michigan's rarest nesting warblers, this species is restricted as a breeder to the Upper Peninsula. Partners in Flight

Wilson's Warbler *(Cardellina pusilla)*

Skye Christopher G. Haas

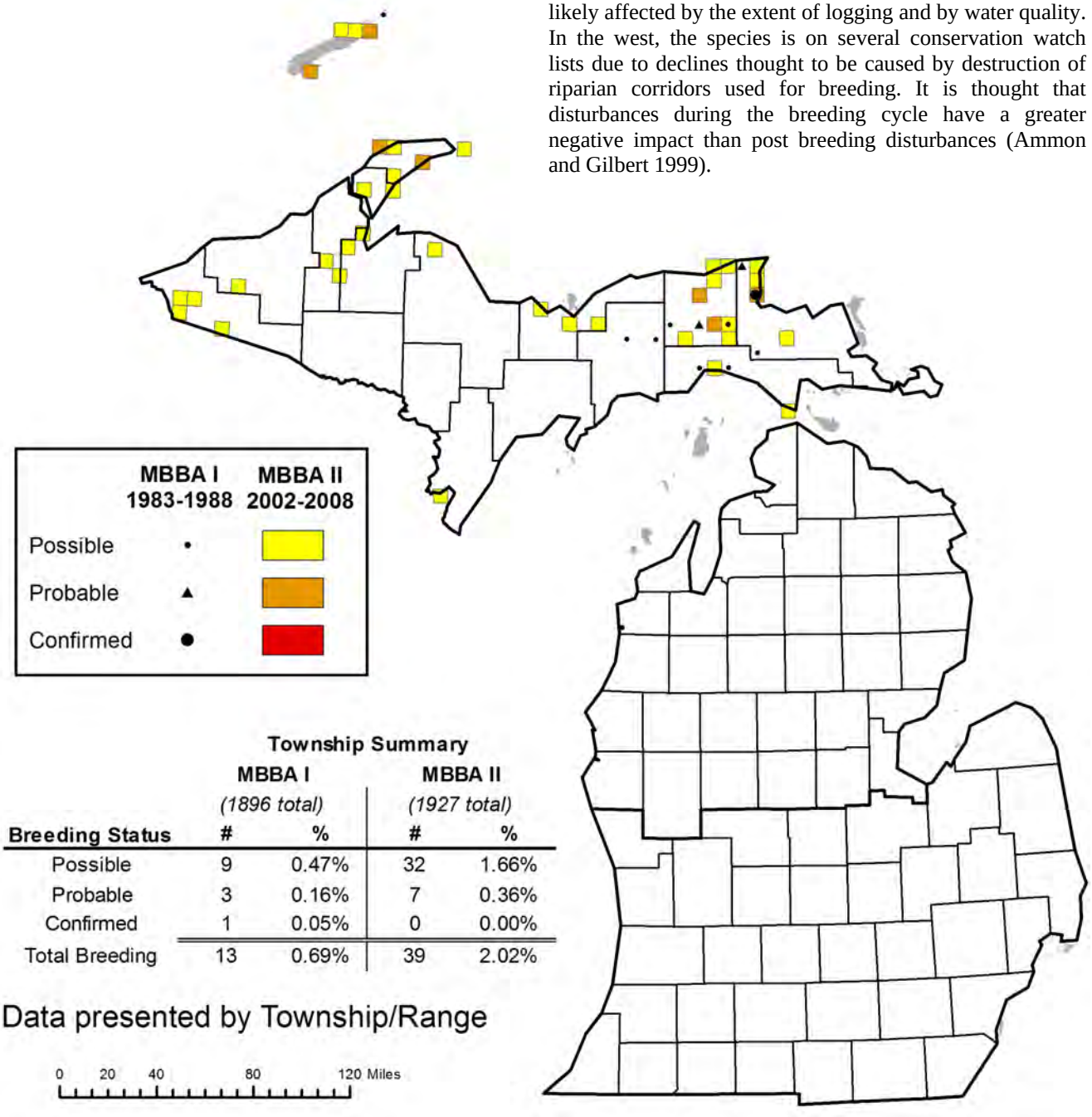
estimates that there are 200 pairs of Wilson's Warblers in Michigan, likely an over-estimation (PIF 2007).

The species is more common farther north across Canada and Alaska; 74% of the breeding population was found in the Hudson Bay Lowlands and was not found south of Georgian Bay in Ontario (McLaren 2007). Other Atlases in the region also documented an increase in nesting records during the late 1970s and throughout the 1980s, with expansions in Minnesota and Ontario, as well as into the Adirondacks in upstate New York (Ammon and Gilbert 1999, McGowan 2008).

The species has been detected breeding more frequently in Michigan over the last few decades, likely due to an increase in both observer effort and sophistication. As long as there are birders willing to trek out into remote wilderness swamps, it is likely Wilson's Warblers will continue to be found in small numbers on breeding territory in the UP.

Conservation Needs

Very little is known about the conservation needs of the Wilson's Warbler. The eastern North American subspecies has not been well studied, and more information is needed to better understand its breeding biology (Ammon and Gilbert 1999). Like all boreal wetland inhabitants, they are likely affected by the extent of logging and by water quality. In the west, the species is on several conservation watch lists due to declines thought to be caused by destruction of riparian corridors used for breeding. It is thought that disturbances during the breeding cycle have a greater negative impact than post breeding disturbances (Ammon and Gilbert 1999).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	9	0.47%	32	1.66%
Probable	3	0.16%	7	0.36%
Confirmed	1	0.05%	0	0.00%
Total Breeding	13	0.69%	39	2.02%

Data presented by Township/Range

Yellow-breasted Chat *(Icteria virens)* ***Jack Reinoehl***



Willie McHale ©
Species sponsored by: Cecil Kersting

The secretive Yellow-breasted Chat is usually hidden even while singing; it is most often spotted when its odd song is punctuated by a brief floppy-winged display flight. Its summer range is primarily the southeastern United States, but it also nests in riparian areas of the western United States and northern Mexico (Eckerle and Thompson 2001). Breeding Bird Survey maps show that the abundance of this species increases as one moves south with greatest abundance in the lower Mississippi valley (Sauer et al. 2008). The chat winters through most of Central America and in Mexico primarily near the Pacific and Caribbean Coasts (Eckerle and Thompson 2001). Preferred habitats are characterized by thick brush, either in upland successional habitats or in damp areas. The Yellow-breasted Chat can be detected from long distances with its unique, if not bizarre song. However, a singing chat does not necessarily indicate nesting since this species often sings in an area for a few days and then moves on.

Distribution

In Michigan, the Yellow-breasted Chat is restricted to southern areas. In both atlases, there were very few chats north of the southern four tiers of counties. Within this small area, the distribution of the chat seems to have changed, with the stronghold of this species appearing now to be in southeastern Michigan.

In Wisconsin and Ontario, the chat is also almost entirely restricted to southern areas, though in Ontario it occurs slightly farther north than in Michigan as its range follows the north shore of Lake Erie (Cutright 2006, Eagles 2007). In states to our south, chats are found throughout Ohio and Indiana. A higher density of occurrence than what is seen in the MBBA II map appears just south of the Michigan state line. (Bruner 1998, Peterjohn and Rice 1991) However, the fieldwork for both of those atlases was completed in the 1980s and thus these maps should be compared to the map for MBBA I instead of that for MBBA II.

Chats have been observed in both dry and wet brush areas in Hillsdale County (pers. obs.). In Lost Nation State Game Area, there are two different sites where chats have been found regularly over the last two decades, both of them damp. One of these is a fen with tamarack trees and very thick brush at its edge. The other is an overgrown wet meadow. Curiously, both sites are also used by another species that is scarce locally, the Alder Flycatcher. The flycatcher is at the southern rather than the northern edge of its range. In spite of the general decline of the chat, these areas continue to be occupied regularly if not annually (pers. obs.).

Breeding Biology

The arrival of the chat in the spring is quite erratic. In the last 25 years, the first chat has been detected in Hillsdale County before 10 May on six occasions and after 15 May on nine occasions. In two of these years, none were found until June (pers. obs.). Only the cuckoos come close to matching this degree of variability in spring arrival. The chat appears to be a late nester in Hillsdale County. At Lost Nation SGA during MBBA I, adults were observed carrying food in early July. Between atlases a juvenile was observed on 4 August 1997 (pers. obs.). Eckerle and Thompson (2001) explain that although chats seem to disappear from their nesting areas after mid-July, they are present but "secretive and silent."

Abundance and Population Trends

The Yellow-breasted Chat shows a pronounced decline between the decade of the 1980s and the decade of the 2000s in Michigan. It was found in only half as many blocks in MBBA II as in MBBA I. In Hillsdale County, 31 chats were found in 11 blocks in MBBA I but only nine chats in seven blocks in MBBA II (pers. obs.). In some cases, this decrease was clearly due to maturation of vegetation at a particular site. A half-size block in Hillsdale County on the Ohio border had nine chats in MBBA I in brushy young second-growth, but by MBBA II the area where most of those chats were found had grown into dense woodland not suitable for chats.

A similar change was found in Ontario, where the decrease in the number of blocks in which the chat was found was near 50% between the two Ontario atlases (Eagles 2007). The most extreme decline observed in a nearby state was in New York. There the number of blocks in which the chat was observed dropped from 122 in the first atlas, in the 1980s, to 27 in the second, in the 2000s. McGowan (2008), speaking of this decline, doubts that a loss of shrub habitat "could explain a decline of this magnitude," but as discussed above, this explains some, perhaps much, of the decline in Michigan.

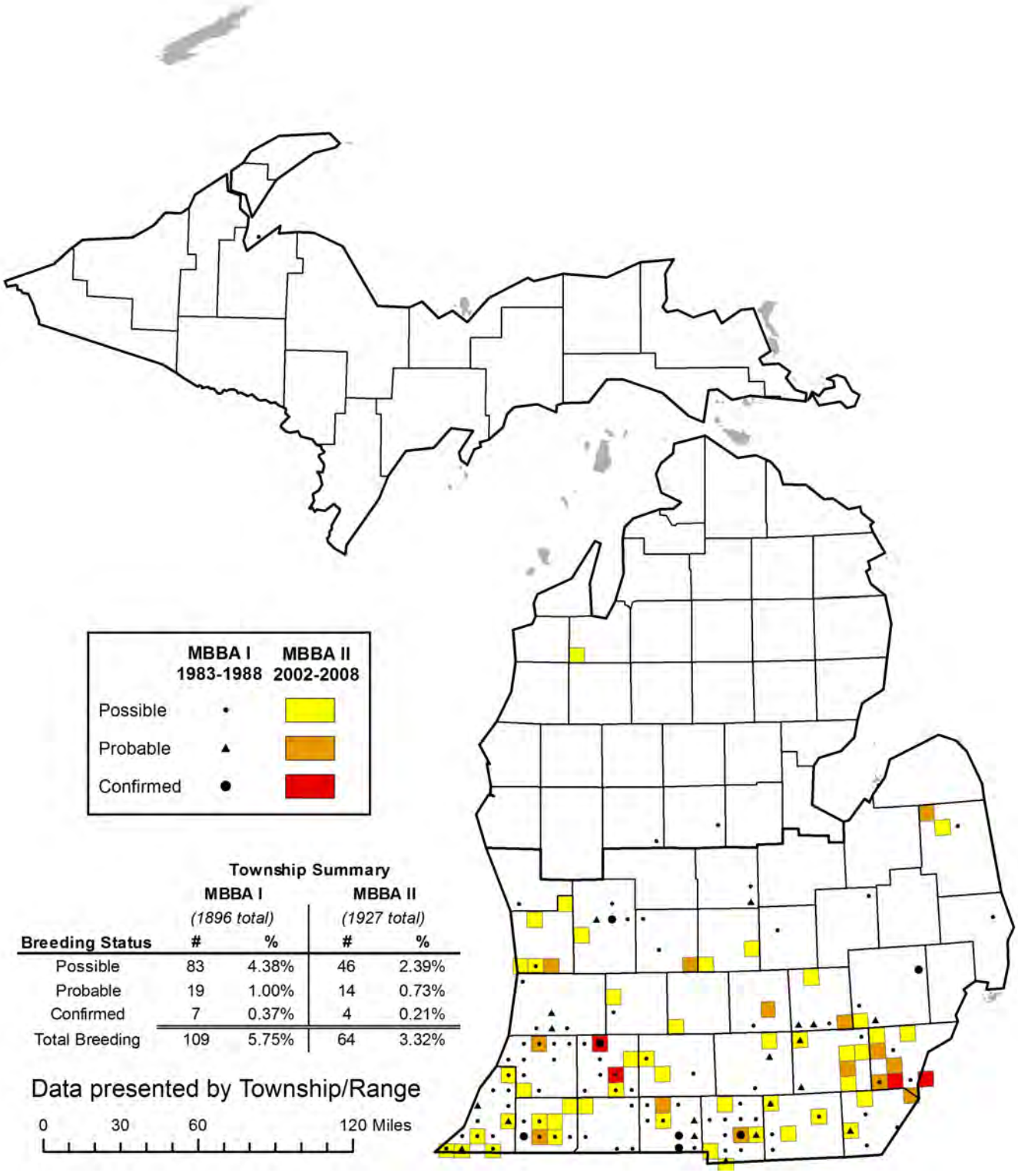
To the south, chat populations are much more stable than in Michigan. BBS data show a decline in nearby states; these declines are fairly strong in Ohio and Illinois over the last 40 years and very slight in Indiana (Sauer et al. 2008). Near the Gulf Coast, where this species is most numerous, most states show an increase in population over this same period.

Yellow-breasted Chat *(Icteria virens)*

Jack Reinoehl

Conservation Needs

Population increases where the species is most numerous have caused a cumulative increase in the Yellow-breasted Chat population over its full U. S. range, and the species is not on any national watch list. In Michigan, the Yellow-breasted Chat is among the most erratic and mercurial of our species; its recent decline could be reversed by the reversion of agricultural areas to shrubland or perhaps by increasing temperatures in the future, as suggested by Price (2000). Although this observation is only suggestive, after 1998, the warmest year on record worldwide, populations in Lost Nation State Game Area were high in 1999 and 2000 (both of these years also had warm spring weather), and have been consistently lower since (pers. obs.). A hint of a correlation between warm temperatures and higher numbers of chats was also noted in MBBA I (Reinoehl 1991).



Eastern Towhee *(Pipilo erythrophthalmus)* ***David Ewert***



Willie McHale ©
Species sponsored by: Lonnie & Sharon Kuntz

The Eastern Towhee is one of our most distinctive sparrows. The rufous sides, white belly and black (male) or brown (female) head and back coupled with its habit of flashing the white outer tail feathers as it flies through the scrub or forest make this common species readily identifiable. It is further distinguished by its habit of "double scratching", where it kicks the leaf litter on the forest floor with both feet to locate food such as invertebrates. The characteristic "*drink-your-tea*" song, and its many variants, and the "*chewink*" call note easily identify the towhee when it cannot be seen. The Eastern Towhee has a wide breeding distribution ranging from extreme southern Manitoba, southern Ontario and extreme southern Maine south to the Gulf Coast of Texas and Florida (Greenlaw 1996). It winters from southern New England, southern Pennsylvania, Ohio, Illinois, Iowa and Kansas south to the Gulf Coast (Greenlaw 1996). Michigan is at the northern limit of the Eastern Towhee's range (Brewer et al. 1991, Greenlaw 1996).

Distribution

The Eastern Towhee is relatively rare or uncommon across most of the UP and extreme northern LP but is common across most of the LP (Ewert 1991, McPeek and Adams 1994). During both MBBA I and II, many reports of towhees in the UP were from the south central region centering on Dickinson, eastern Iron, and southern Marquette counties with scattered sightings elsewhere across the UP. In the LP, towhees were broadly distributed except locally, such as highly agricultural Huron County and the northernmost counties of Emmet, Cheboygan, Presque Isle, Charlevoix, Antrim and Alpena where relatively few sightings occurred during the breeding season. The distribution of towhees did not change appreciably between MBBA I and MBBA II, nor is the breeding range much different from that described by Barrows (1912) or Wood (1951). Towhees use a wide range of early and mid-successional habitats that have a well-developed leaf or other ground cover litter. Breeding towhees can be found in oak woodlands, jack-pine barrens, early successional mesic forests, edges of wetlands and bogs and other habitats that have a shrub layer or low canopy height.

The Eastern Towhee was found in 94% of atlas blocks in Ohio (Peterjohn and Rice 1991), virtually all priority blocks in Indiana (Webster 1998), 64% of priority blocks in Illinois (Kleen et al. 2004), and 54% of priority blocks in Wisconsin (Harriman 2006). This species was found in Ontario mostly from the Bruce Peninsula and near shore areas of Georgian Bay south and east toward the St. Lawrence River (Timpf 2007). This towhee is relatively uncommon in intensively farmed areas where suitable habitat is scarce.

Breeding Biology

Towhees are relatively early spring migrants with some birds arriving in late March but most arriving in April. Nests are usually on the ground. Towhees are often double brooded with first clutches typically completed in late May and second clutches in July (McPeek and Adams 1994). Clutch size is usually four to five eggs. Although a few towhees overwinter in Michigan, most have left the state for wintering areas by October (McPeek and Adams 1994).

Abundance and Population Trends

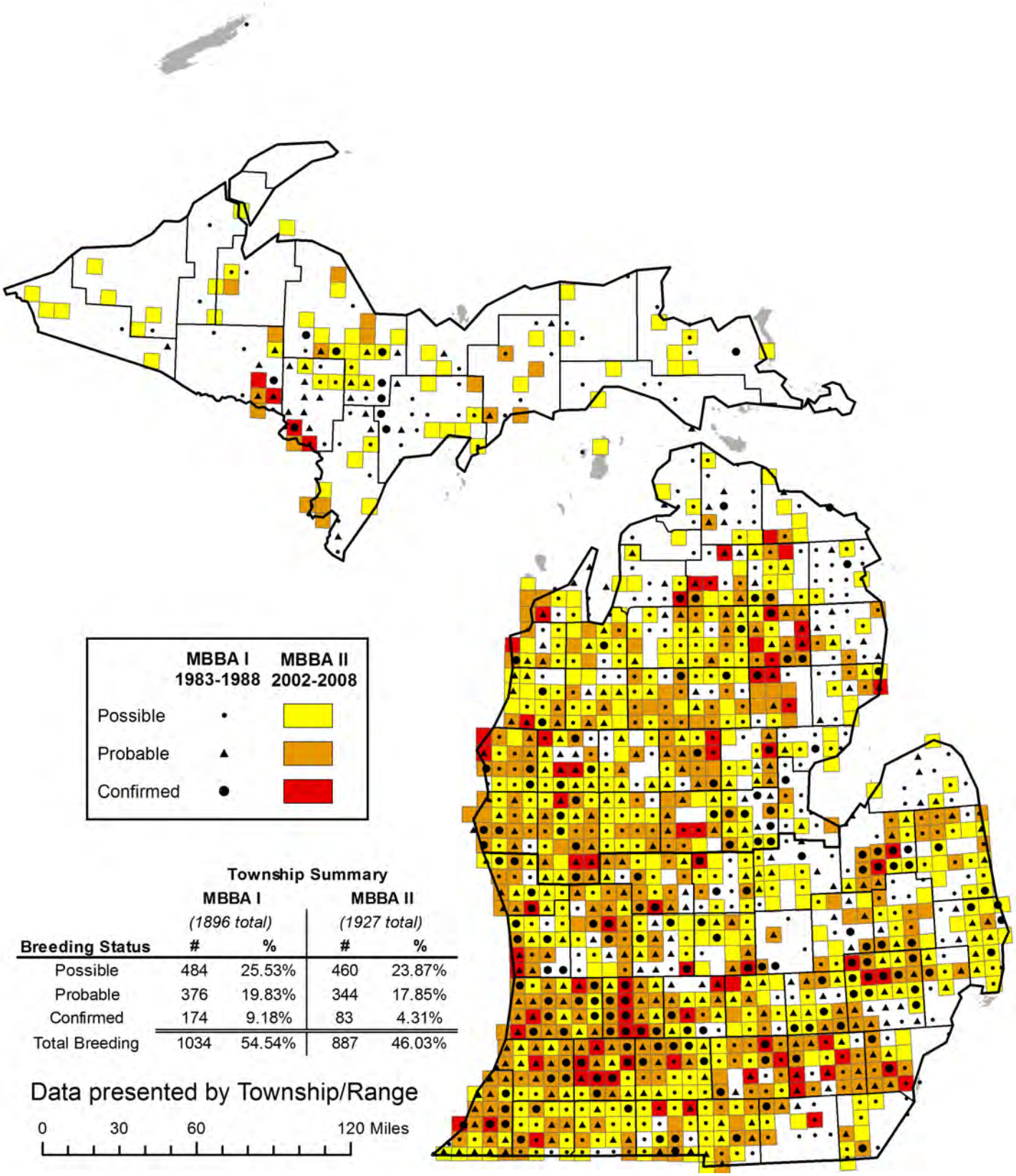
In the UP, northern LP, and southern LP, the percent of townships with towhees dropped from 16% to 12%, 66% to 55%, and 79% to 67% respectively between MBBA I and MBBA II. During the period 1983-2007, there was a non-significant decline of 1% per year in Michigan and 0.8% per year in the Great Lakes region based on Breeding Bird Surveys; the average number of towhees detected per route in Michigan was 1.8. Towhees appear to be occupying a smaller proportion of their Michigan range than before but neither the Michigan range nor abundance appears to have changed appreciably between MBBA I and MBBA II. In Ontario, towhees did not show any population trends province-wide (Timpf 2007). Declines in towhee detection in New York were attributed to habitat loss (McGowan 2008).

Conservation needs

The Eastern Towhee inhabits many habitats, does not appear to be area sensitive, and remains common. Although changes in towhees' distribution and abundance do not indicate any immediate conservation concern in most of Michigan, the reduced occurrence of towhees in some counties of the west central UP, far northern LP and agricultural lands near Saginaw Bay suggest there may be local decreases in numbers of towhees. These apparent decreases may reflect local changes in land use or maturation of forest but do not suggest any immediate state-wide concerns.

Eastern Towhee *(Pipilo erythrophthalmus)*

David Ewert



Chipping Sparrow *(Spizella passerina)*

Richard Brewer



John Van Orman ©

This small sparrow sings its trill and eats grass and weed seeds in Michigan's neighborhoods, campuses, and parks. But it also occurs far from our homes and is, in fact, one of the most widespread and common of North American landbirds. Its breeding range is from southern Alaska east to Newfoundland and south to northern Florida and Central America. However, it is absent from or rare in much of the southernmost U.S., large sections of the Great Plains, and arid or heavily forested zones in the West (Middleton 1998). Most of the birds that breed in the U.S. and Canada evidently migrate south for the winter, to the southern U.S. and northern Mexico. In Mexico, these winter birds overlap other populations of Chipping Sparrows that are year-round residents there. Other resident populations of Chipping Sparrows live farther south in Mexico and beyond, to Nicaragua and Honduras.

Distribution

Some things change and some stay the same. The status of the Chipping Sparrow in Michigan is in the second category. For MBBA I, the species was recorded in a little more than 90% of the townships; for MBBA II the percentage was almost identical.

The picture is of a common species able to find suitable habitat almost anywhere in the state. Occurrence by township is slightly higher in the SLP than the NLP. The difference is only about 3% but is consistent between MBBA I and II. For the UP, the percentage of townships reporting Chipping Sparrows is definitely lower and this also is consistent between the two atlas periods. Several factors may be involved, some of no biological consequence such as the fact that the UP, owing to a high ratio of shoreline perimeter to area, has many "townships" that are fragments of land more or less surrounded by Great Lakes water. These often received little or no coverage. In all three regions of the state, most of the townships lacking documented Chipping Sparrows are the fragmentary ones and occasional others that received scant coverage.

But it is also probable that fewer Chipping Sparrows live in the UP because of large blocks of unsuitable habitat, such as dense or wet forest and open wetlands, and because lower human populations result in less of the ornamental conifer and mowed grass landscape that seems near optimal for the species.

Chipping Sparrows are probably best thought of as savanna birds. A simple definition of savanna is grassland with scattered trees, but the vegetation type has a broad scope from nearly open to nearly forest. As a species, the Chipping Sparrow occurs over the whole range and, botanically, accepts a wide range of pines and other conifers, oaks, and herbaceous plants. Habitat data from MBBA I showed that the species preferred dry conifer forest, residential, roadside, and related vegetation, and dry mixed forest. It was one of the three leading species in residential, roadside, and related vegetation throughout the state.

It has been suggested that, prior to the deforestation accompanying European settlement, Chipping Sparrows were scarcer (Middleton 1998). In Michigan, it's probably true that the loss of large continuous stands of beech-maple, northern hardwoods, and certain conifers led to increases; however, savannas and open forests of oaks or pines occurred pretty much throughout the state and probably supported sizable populations of the bird. Based on acreages of original vegetation types (Albert and Comer 2008), my surmise is that at least a quarter of the state's presettlement land would have been favorable habitat.

Breeding bird atlases from surrounding states all show the species as common and widely distributed. It is also widespread in Ontario and is one of the ten most abundant species in the province (Cadman et al. 2007). Variations in abundance were more evident in Ontario than in Michigan, with lowest populations in the sparsely inhabited Hudson Bay lowlands of tundra, marshes, and salt-water shoreline.

Breeding Biology

Early in their breeding cycle, Chipping Sparrows sing frequently, but once pairs are formed singing rate drops considerably, except for the dawn chorus (Walkinshaw 1944, Liu and Kroodsma 2007). During this part of the summer, the species is less easily registered by voice on brief visits to a site. Visual observation is easy most of the summer because of the large amounts of time birds spend in plain sight in low vegetation and on the ground.

Depending on individual variation (in bird and observer), songs of Chipping Sparrows in Michigan can be confused with other species, particularly Pine Warbler and Dark-eyed Junco. For this reason, the identity of an unseen bird in northern Michigan singing a trill in dry pine, mixed forests, or savannas may be uncertain. Nevertheless, Chipping Sparrows are among the more easily and reliably tallied species.

Chipping Sparrow *(Spizella passerina)*

Richard Brewer

Historically, Chipping Sparrows arrived in southern Michigan around the second week in April, later farther north. The average first date at Battle Creek for the years 1918-1944 was 13 April (Walkinshaw 1944). As a result of global climate change, we might expect certain life history activities, including spring arrival, to be shifted forward. Short-distance migrants arrive disproportionately earlier in response to global warming compared to long-distance migrants (Butler 2003), so the change might be especially noticeable in a species like the Chipping Sparrow. Observations at Middleborough, Massachusetts, show that the spring arrival of Chipping Sparrows advanced significantly over the period 1970-2002 (Ledneva et al. 2004). The rate was about three-quarters of a day earlier per year.

Abundance and Population Trends

Chipping Sparrow abundance for MBBA I was well represented by a contour map based on BBS routes. Lowest densities, below 20 birds per route, were in the eastern part of the LP and large sections of the UP. Scattered routes, mostly in the LP, recorded more than 40 birds.

Based on BBS data for the state as a whole, Chipping Sparrow numbers have been nearly level since MBBA I (1989-2007) (Sauer et al. 2008). In the years preceding MBBA I (1966-1982, numbers had increased significantly, with the biggest increase occurring in the decade just before the first atlas (1976-1985).

The Partners in Flight landbird population estimate for the Chipping Sparrow based on BBS survey routes for 2004 is approximately two million birds for the whole state of Michigan (PIF 2007).

Conservation Needs

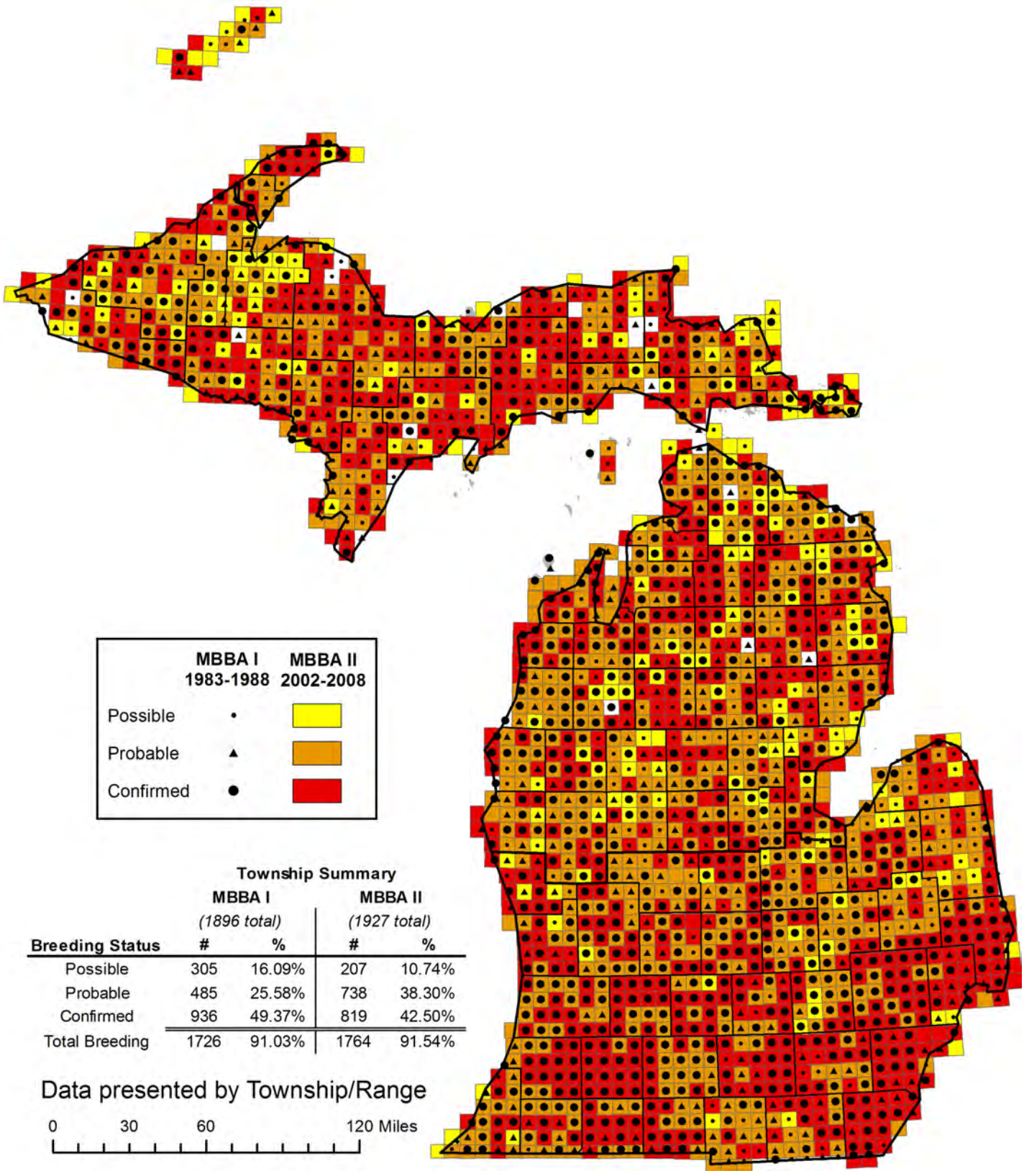
There are a few faintly troubling signs, such as lowered success where native foraging habitat is replaced by spotted knapweed (Ortega et al. 2006) and indications of declining abundance in the West (Audubon California 2006). Nevertheless, the species is placed in the Least Concern category by the International Union for the Conservation of Nature and Natural Resources (Birdlife International 2008).

Of the 150 species of eastern North American birds considered in a large study of the potential effects of climate change, the Chipping Sparrow was ranked as the 19th most abundant species (Matthews et al. 2004). Even continued climate change seems not to be a serious threat in Michigan. Although computer models indicate that a doubling of atmospheric carbon dioxide would produce a substantial decline in abundance over eastern North America as a whole, the most serious effects would occur south of Michigan.

Barring major changes in the landscape, the status of the Chipping Sparrow in Michigan seems highly secure.

Chipping Sparrow *(Spizella passerina)*

Richard Brewer



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	305	16.09%	207	10.74%
Probable	485	25.58%	738	38.30%
Confirmed	936	49.37%	819	42.50%
Total Breeding	1726	91.03%	1764	91.54%

Data presented by Township/Range

0 30 60 120 Miles

Clay-colored Sparrow *(Spizella pallida)*

Julie Gibson



Willie McHale ©

This subtly attractive sparrow forages away from its breeding territory in nearby fields, and is typically found in open brushy grasslands interspersed with shrubs, pine barrens, and young conifer plantations. As Beaver (1991) anticipated, the Clay-colored Sparrow appears to be an increasingly common summer resident as favorable habitat grows throughout Michigan's northern LP and UP. While numbers are also rising in the southern LP, birds there remain widely scattered and uncommon. Breeding ranges from eastern British Columbia across southern Canada and the northern Great Plains, through the central Great Lakes east to southern Ontario and New York (Knapton 1994). Highest densities are found in the Prairie Provinces (Alberta, Saskatchewan, and Manitoba). In Michigan, it goes largely undetected as a migrant. This sparrow winters in deserts and upland plains in southern Texas and Mexico, often forming loose flocks or mixed flocks with other *Spizella* sparrows, such as its close relative, the Chipping Sparrow.

Distribution

With the exception of Illinois, Indiana, and Ohio, Clay-colored Sparrows can usually be found in all the states neighboring Michigan and into Canada. In Ontario, this uncommon summer resident occurs in scattered locations in the south and the extreme north in the province (Cadman et al. 2007). In Wisconsin, this sparrow populates most suitable habitat throughout the northern two-thirds of the state, with few birds detected in the south (Cutright et al. 2006). At the southeastern extent of its breeding range, New York is host to increasing numbers of Clay-colored Sparrows, where it still remains a very uncommon breeder (McGowan and Corwin 2008). Just one atlas record exists for this sparrow in Illinois (Kleen et al. 2004), while no breeding records are available from Indiana or Ohio.

Wood (1951) described the Clay-colored Sparrow as a local summer resident in the northern LP and scattered in the UP. Knapton (1994) showed it as absent from Michigan's southern LP as a breeding species. Even though records have increased three fold in the southern LP since MBBA I, the species remains uncommon, with just six confirmed breeding records from that region. It is possible that some or many of the singing males detected throughout the southern LP were unpaired. While outside of the MBBA II survey period, nesting was confirmed for the first time in Oakland County on 17 June 1996 (Brierly 1997).

Total detections have more than doubled throughout the state since the first atlas. In MBBA II, Clay-colored Sparrows were recorded in 26% of townships in the northern LP and 33% of UP townships. During MBBA I, birds were noted in just 13% of northern LP townships and only 24% of the UP townships. This change denotes a dramatic increase in its distribution over the past 20 years and may be, in part, a result of reversion of marginal farmland to brushy habitat, planting of Christmas tree farms, intensive forest management, and drought.

Clay-colored Sparrows require low shrubs for nesting, typically breeding in medium height density grasslands with forbs and a thick litter layer, and scattered or locally dense shrubs (Sample and Mossman 1997). They are often found in brushy fields on sandy soils, including, but not limited to, Kirtland's Warbler and Sharp-tailed Grouse management areas in the north central LP and the eastern UP. This sparrow prefers shrubby grasslands, shrubby wet old fields, pine barrens, regenerating clear-cuts, previously burned areas, and young pine plantations.

Breeding Biology

Although Clay-colored Sparrows go largely undetected during migration, spring migrants have been observed at the Fort Custer Training Center and Kellogg Forest in Kalamazoo County (R. Adams Jr., pers. comm.) and in the Tawas State Park area in Iosco County (Chartier and Ziarno 2004) to name just two locales.

One county, Alpena, reported a nest with eggs on 2 July. Atlas workers in twenty-three counties reported breeding confirmations of adults feeding young or carrying food on average 2 July, ranging from 13 June to 2 August. While data from seven counties indicate recently fledged young observed on about 9 July, ranging from the first week of July to 1 August.

Abundance and Population Trends

Clay-colored Sparrow populations continue to increase and spread eastward in Ontario, Michigan, and possibly New York. One population estimate for this species in Michigan is 30,000 birds, about 0.1% of the world population (PIF 2007). In the 20 years since MBBA I, Clay-colored Sparrow numbers have more than doubled in the state. North American breeding bird survey trend results using Estimated Equations for Michigan show a statistically significant increase of 7.4% per year from 1983 to 2007. However, at the national level, this sparrow has shown no significant trend over the past 40+ years (Sauer et al. 2008).

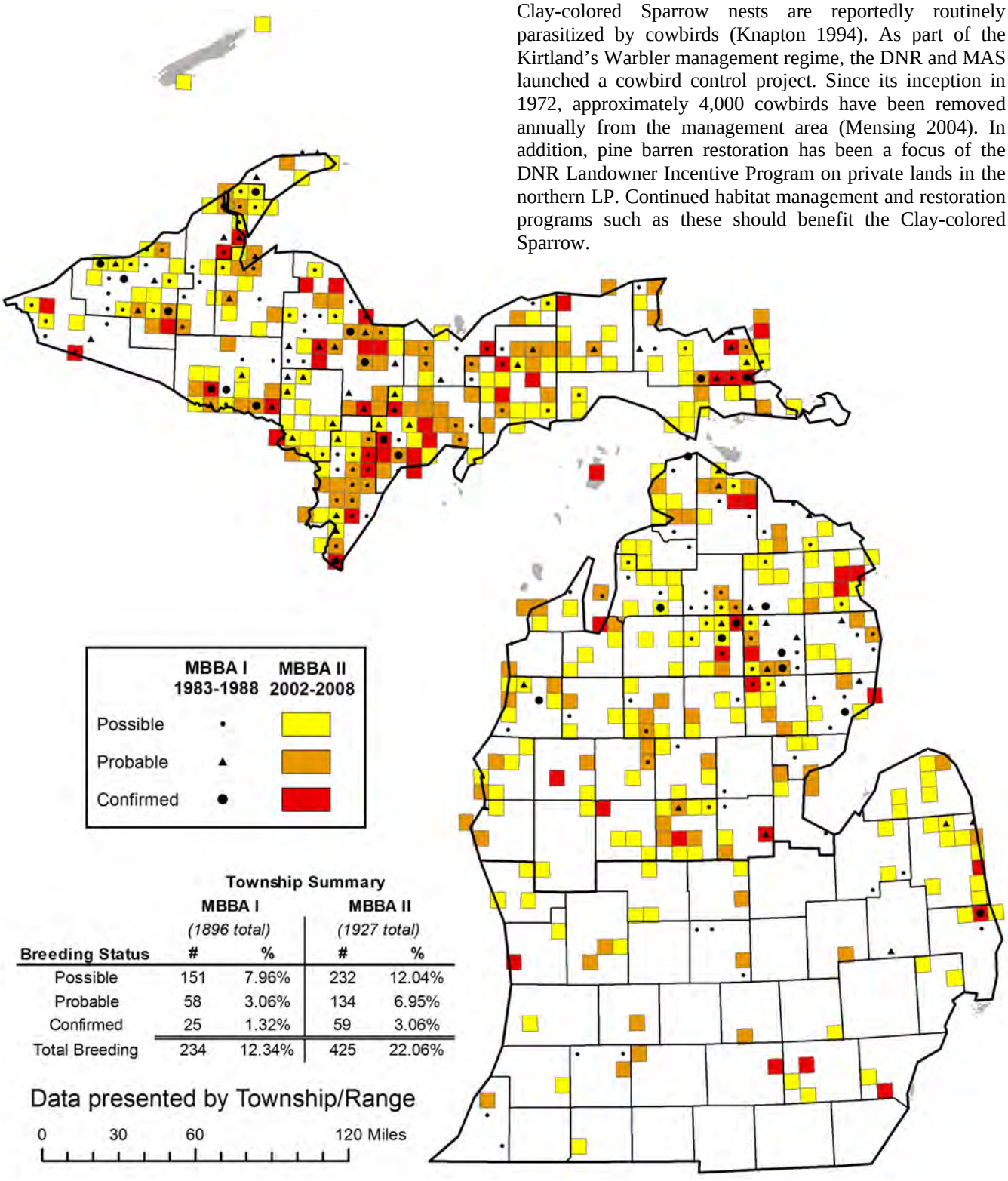
Clay-colored Sparrow *(Spizella pallida)*

Julie Gibson

The number of pairs reported by Atlas observers best demonstrates the extent of the population increase of the Clay-colored Sparrow. During MBBA I, raw atlas data totaled 471 pairs, compared to 1,341 pairs recorded during MBBA II. The highest numbers of pairs were reported in Isabella and Oscoda counties in the northern LP, and Marquette and Menominee counties in the UP. Management for pine barrens and Kirtland's Warbler habitat in the northern LP and UP are likely benefiting the Clay-colored Sparrow. In addition, some old fields in the northern LP are undergoing succession to young forest, and may be contributing habitat for this species.

Conservation Needs

Clay-colored Sparrow nests are reportedly routinely parasitized by cowbirds (Knapton 1994). As part of the Kirtland's Warbler management regime, the DNR and MAS launched a cowbird control project. Since its inception in 1972, approximately 4,000 cowbirds have been removed annually from the management area (Mensing 2004). In addition, pine barren restoration has been a focus of the DNR Landowner Incentive Program on private lands in the northern LP. Continued habitat management and restoration programs such as these should benefit the Clay-colored Sparrow.



Field Sparrow *(Spizella pusilla)*

Julie Gibson



Willie McHale ©

Driving along country roads where the landscape is fragmented by hedgerows, old fields, and woodland edges, the Field Sparrow can be readily identified by the male's distinctive song, likened to a bouncing ping-pong ball. When alerted, he typically flies to the top of a nearby bush or low tree, extending the opportunity to see this pink-billed bird. While it is a common summer resident across most of the Lower Peninsula of Michigan, especially to the south, it is rare and widely scattered across the UP. Abundance increased during forest clearing in the LP of Michigan, with populations peaking in the early 1970s. Over the past 40 years, BBS population trends in the United States indicate significant declines. Breeding extends from the northern Great Plains through the Great Lakes east to the Atlantic Coast, and south to Georgia and central Texas. Birds winter in abandoned fields and pastures from Kansas east to the Atlantic coast, south to the Gulf Coast and into northern Mexico. Field Sparrows are regularly detected in relatively low numbers on the Michigan Christmas Bird Count.

Distribution

Carey et al. (2008) shows breeding Field Sparrows occurring across Michigan's LP, north to the southern tip of the UP. Historic accounts noted this common summer resident throughout the LP and in the central and eastern UP, with breeding specimens collected as far north as Crawford and Leelanau counties (Wood 1951). Field Sparrows remain quite rare and widely scattered throughout the UP, with new atlas records from Houghton and Keweenaw counties.

Recent atlas efforts document a 10% decline in detections within both northern and southern LP townships. Counties reporting considerably fewer birds include Benzie and Osceola in the northern LP and to the south are Gratiot, Kalamazoo, Lenawee, Livingston, and St. Joseph counties. An even more notable discrepancy between the atlases is a 69% decrease in the number of southern LP townships with confirmed breeding records; 258 during MBBA I, and 82 during MBBA II. However, this decline may be partially mitigated by the considerable increase in southern LP townships reporting probable breeding, and to a lesser degree, those indicating possible breeding. Also, Berrien and Montcalm counties had notable increases in the number of birds detected.

The Field Sparrow breeds in dry, idle fields containing scattered shrubs or saplings in addition to idle fields undergoing succession to young forests. Their preferred habitat contains mid-height herbaceous vegetation, few forbs, some areas of patchy bare ground, a thick litter layer, shrubs and perch trees, and a moderate amount of residual standing dead vegetation (Sample and Mossman 1997). In Michigan, birds may be found locally in prairies and savannas, old fields, railroad right-of-ways, hedgerows, upland shrub, forest openings, and woodland edges (personal observation).

Field Sparrows are documented in all the surrounding states and in southern Ontario (Cadman et al. 2007, Carey et al. 2008). In Wisconsin, most records are from the west, central and southern portions of the state, with few birds scattered in the eastern and northern-forested regions (Cutright et al. 2006). To the south, atlas workers documented Field Sparrows in virtually all priority blocks surveyed in Indiana, Illinois, and Ohio (Peterjohn and Rice 1991, Castrale et al. 1998, Kleen et al. 2004). While distribution is fairly similar to that of the 1980s, this species has declined across New York State, with birds recorded in 16% fewer blocks, compared with their first atlas (McGowan and Corwin 2008).

Breeding Biology

Field Sparrows are generally found on territory mid-April to mid-May with some males arriving as early as the first week of April (Chartier and Ziarno 2004). More than one brood is common, with egg dates ranging from mid-May to mid-August and nestlings from late May to the end of August (KNC 2004). Based on recent atlas data averaged from 40 counties, adults were seen carrying food or feeding young on average 25 June. In addition, data from 27 counties report fledged young observed on average 2 July. Fall departure data from Kalamazoo County indicate peak migration occurs 28 September, ranging from late July to mid-November (KNC unpub. data).

Abundance and Population Trends

The North American Field Sparrow population is estimated at about 8 million birds, with Michigan supporting an estimated 200,000 individuals (PIF 2007). From the period 1966-2007, BBS trend data indicate a statistically significant average range-wide decline of 2.8% per year, with the steepest decline (5.5%) occurring during the period 1966 - 1979 (Sauer et al. 2008). Trend estimates for Michigan show similar statistically significant decreases: 5.1% annually from 1966 - 1979 and 4.8% annually from 1980 - 2007 (Sauer et al. 2008). To illustrate, during each survey year of MBBA I, an average of 1,420 pairs were recorded, whereas 1,363 pairs were counted annually during MBBA II. Lower Peninsula populations may continue to decline due to urbanization, intensive agricultural practices,

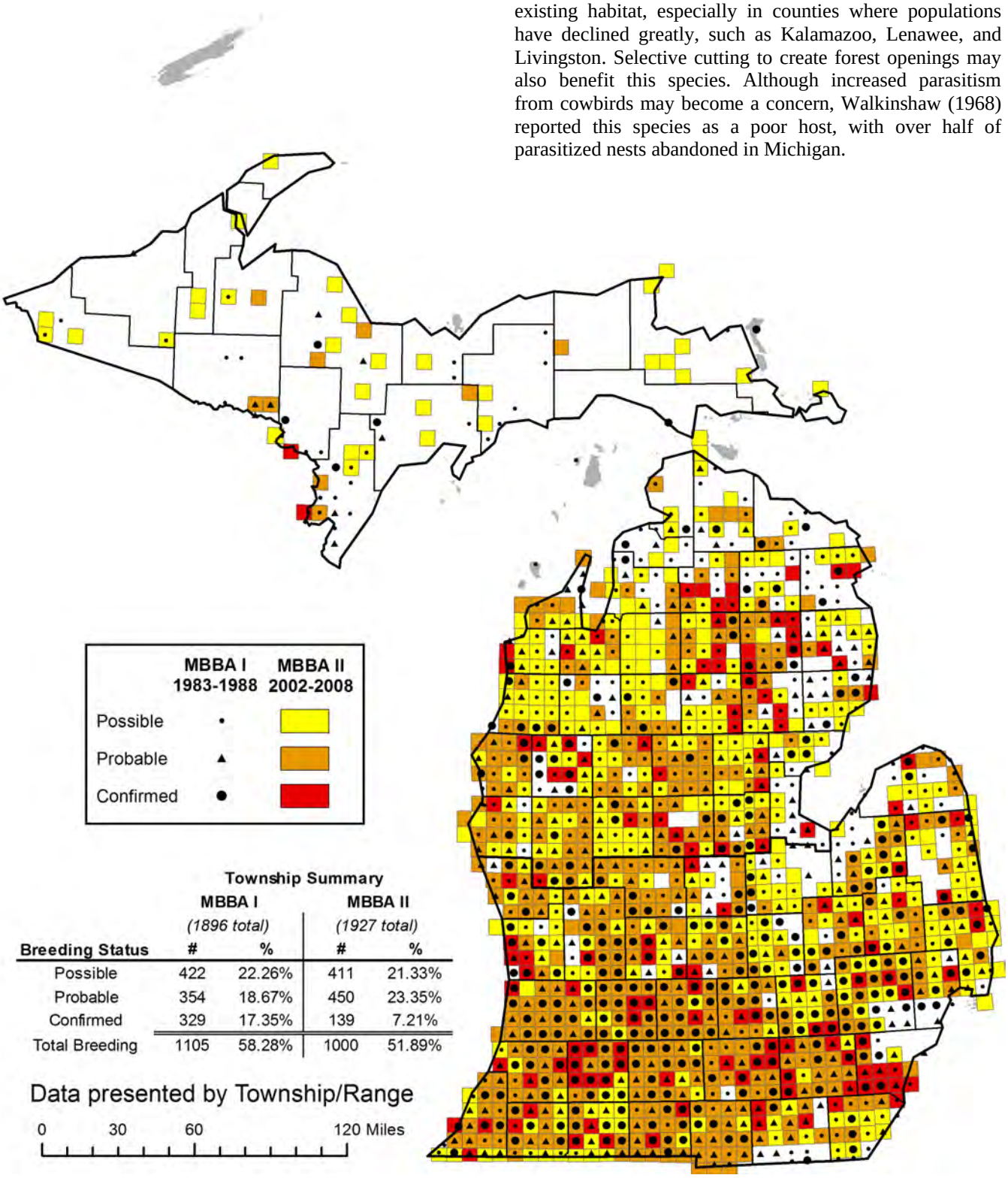
Field Sparrow *(Spizella pusilla)*

Julie Gibson

and habitat loss, including former grassland in the north-central LP undergoing succession to forest.

Conservation Needs

The National Audubon Society (NAS 2007) lists the Field Sparrow as one of the top ten common birds in decline. This sparrow avoids human-dominated landscapes, such as suburbs, and requires short-lived, successional habitats for breeding. These habitats are steadily being lost to agriculture as old fields are converted to row crops, forestry as young stands mature over the course of about 30 years, and new home construction specifically on small, several acre lots. Conservation considerations include protecting existing habitat, especially in counties where populations have declined greatly, such as Kalamazoo, Lenawee, and Livingston. Selective cutting to create forest openings may also benefit this species. Although increased parasitism from cowbirds may become a concern, Walkinshaw (1968) reported this species as a poor host, with over half of parasitized nests abandoned in Michigan.



Vesper Sparrow *(Pooecetes gramineus)* ***Joshua Haas***



Robert Epstein ©

One can hardly believe that such a warm and trilling song belongs to the cryptically colored Vesper Sparrow. This evening star (as suggested by its name) is a gentle reminder that warm spring evenings have arrived across the northern United States and southern Canada. Its beautiful song, sung well into late summer, open country habitat, and conspicuous white outer tail feathers make this species easy to detect. The Vesper Sparrow breeds from Alberta and southern British Columbia south in the western U.S. to Nevada and northern New Mexico, east across the northern Great Plains and the Great Lakes to New England and the Canadian Maritime provinces (Jones and Cornely 2002).

Distribution

Unlike some other open country bird species that moved into Michigan and increased in abundance following extensive deforestation in the 1800s, the Vesper Sparrow has always been considered common. Prior to European settlement, the Vesper Sparrow occupied open or disturbed sites that were created by fire, erosion, or bison (Best and Rodenhouse 1984). Barrows (1912), who also reviewed the historical works of Sager (1839) and Cook (1893), considered the species to be common. Wood (1951) provided a more comprehensive picture that the species was common throughout the LP and UP. More recent authors, including Payne (1983) noted that the species was still common statewide.

During MBBA I, the Vesper Sparrow was found to occupy 65.1% of all townships, and 36.4% of all blocks statewide. The LP was fairly uniformly occupied, with distribution gaps evident only around urbanized areas of the southeastern LP. In the UP it was less evenly distributed, being absent from heavily forested areas including Luce County, and large portions of the western UP, particularly Gogebic, Ontonagon, Baraga, and Iron counties. Distribution in MBBA II showed little change, with the exception that fewer areas in the southeastern LP were occupied, reflecting the expansion of urbanization in those areas. More significantly, the number of occupied townships declined to 55%, and number of blocks to 24.5%.

Cutright et al. (2006) shows the Vesper Sparrow occurring nearly statewide in Wisconsin, except for a large area in the northern forested part of the state where it is largely absent, which is contiguous with the gap in distribution in the western UP. In Ontario, the species occurs primarily south of the Canadian Shield, where it has declined between their two atlases, and with few occupied squares north of Lake Superior (Rising 2007).

Breeding Biology

Breeding begins in mid-May and continues through mid-summer with persistent singing throughout the entire period. Preferring open habitats with sparse patchy vegetation, Vesper Sparrows occupy a broad range of grassland habitats. Some birds have also been found in pastures, shrubby uplands, dry coniferous and deciduous forests, orchards, grasslands and roadside hedgerows. The MBBA I Habitat Survey indicated that old fields, row crops, and hayfields are used in that order (Beaver 1991). Vesper Sparrows place their nest on the ground in small hollows created by the female. In Michigan, it has been found that the nests orient to the north to protect nests from afternoon heat (Krueger 1981). The bulky nest is built with coarse grasses or other materials and is lined with fine grasses, rootlets, and hairs (Harrison 1977). The four to six eggs are incubated for 12-13 days, mostly by the female, and the young fledge at about 10 days of age (Jones and Cornely 2002). Nests are parasitized by Brown-headed Cowbirds, at an average rate of 10.1% in northern Michigan from 1911-1978 (Southern and Southern 1980) and a high of 34% in one Ontario county (Rising 2007).

Abundance and Population Trends

BBS data during MBBA I showed pockets of abundance in the south-central SLP and in the northern and western portions of the NLP (Droege 1988). Adams et al. (1988) noted a 58% decline in Vesper Sparrow numbers from 1966 to 1985. The greatest abundance was found in the western and northern LP, likely because upland grassland habitat is still present there. Statewide, BBS data from 1983 to 2007 show a statistically significant decline of 6.4% per year, with the average number of birds per route (n=64) declining from about five individuals per route during MBBA I to about two individuals per route during MBBA II (Sauer et al. 2008). Likewise, a smaller but significant decline of 1.85% per year has been recorded for the Upper Midwest, within the USFWS Region 3 (Sauer et al. 2008). Partners in Flight estimates Michigan's population of Vesper Sparrows as about 310,000, about 1% of the global population (PIF 2007). In Ontario, the probability of observation declined significantly between their two atlases (Rising 2007) and annual declines of 7.9% were reported between the two New York atlas efforts (Smith 2008).

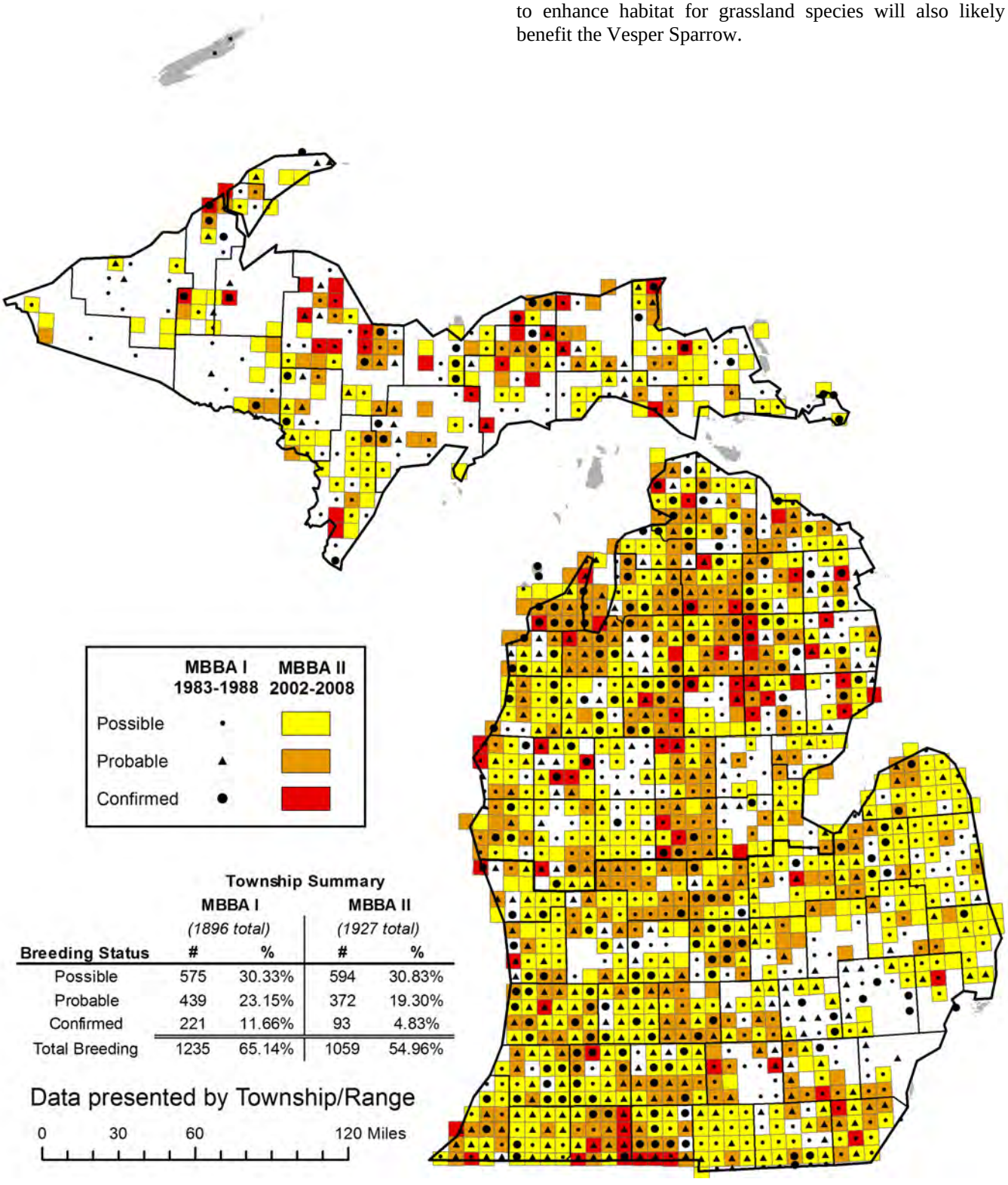
Vesper Sparrow *(Pooecetes gramineus)*

Joshua Haas

Conservation Needs

Habitat management efforts for the Kirtland's Warbler likely benefit this species locally. They have shown high population densities the first year after a burn in jack pine forest (Krueger 1981). Vesper Sparrows also occupy jack pine plantations in the NLP that have been clearcut and replanted for management of the Kirtland's Warbler.

Adams et al. (1988) suggest that declines due to changes in farming practices, including use of chemicals and large-scale tillage, most significantly in the SLP, may be the most important factor in the decline of the Vesper Sparrow, which likely continues today. Reforestation of open areas is also likely contributing to the decline of the Vesper Sparrow in Michigan, especially in the southeastern LP. Any efforts to enhance habitat for grassland species will also likely benefit the Vesper Sparrow.



Savannah Sparrow *(Passerculus sandwichensis)* ***Julie Gibson***



Darlene Friedman ©
Species sponsored by: Don LeDuc

This inconspicuous sparrow sings atop a blade of grass or a small shrub and has a short, notched tail. During the breeding season its yellow lores are often distinctive, but its habit of dropping down and running through the dense grass makes detection of birds difficult. Many observers are familiar with this species due to its ubiquitous presence in various open lands over most of North America. It breeds from Alaska and Canada, throughout the United States and Mexico, south to Honduras. Resident populations are found along the California Coast and in central Mexico. Most populations are long-distance migrants, wintering across the southern United States, and south throughout Mexico to the Caribbean. There are seven Christmas Bird Count records for Michigan during the period 1989-2008 (National Audubon Society 2002). It is common as a breeder throughout most of the LP of Michigan and in scattered locations in the UP where acceptable habitat is present.

Distribution

Wheelwright and Rising (2008), show the North American breeding range of the Savannah Sparrow as including the entire state of Michigan. Historic accounts note this species as uncommon and local in its distribution in the southern counties, with populations increasing over time (Wood 1951) and peaking in the 1970s (R. Adams Jr., pers. comm.). At present it is found within all favorable habitats in the state. Distribution appears fairly similar across both Atlas periods. Detections increased by at least 13% in the UP and the number of confirmed breeding records within UP townships nearly doubled, compared to MBBA I. However, survey effort in the UP increased by more than 5% during MBBA II, and was down by more than 10% in the NLP, which could explain some of these differences.

The Savannah Sparrow occupies a variety of grass-dominated habitats such as alfalfa fields, airports, Conservation Reserve Program (CRP) fields, hayfields, old fields, pastures, prairie, savannah, shoreland, and is present at low densities in no-till croplands. Although this species can be found in small, isolated grasslands, it is often more abundant in large contiguous habitats with few shrubs and small trees.

Savannah Sparrows are documented in all the surrounding states and Canada. In Ontario, the species is common across the province, and although it has seen slight fluctuations in abundance, distribution is similar over both Atlas periods (Cadman et al. 2007). Widely distributed in Wisconsin, the highest densities of this sparrow are found in open upland agricultural lands (Cutright et al. 2006). Indiana birds are primarily found in the northern two thirds of the state, concentrated centrally and to the northeast (Castrale et al. 1998). Savannah Sparrows are fairly common summer residents throughout the northern half of Illinois, with few records scattered across southern counties (Kleen et al. 2004). Distribution is wide throughout northern and central Ohio, with breeding populations expanding southward (Peterjohn and Rice 1991). Except at high elevations, forested regions and urban areas, this species is abundant and widespread across New York, maintaining relatively steady numbers and distribution over both their Atlas periods (McGowan and Corwin 2008).

Breeding Biology

Migrating Savannah Sparrows arrive as early as 13 March, but the majority reaches Michigan the last week of April (McPeek 1994, Chartier and Ziarno 2004). They have been observed as early as 7 April in Dearborn (Rouge River Bird Observatory 2010). If one or both birds of a pair survive winter, the previous year's nest site, or vicinity, may be reused. One or two broods are typical, with eggs dates from 5 May through July (Kalamazoo Nature Center 2004). Based on MBBA II data collected from seven counties, the average egg date is 9 June. In Chippewa County egg dates from 11 nests ranged from 17 May to 2 July (B. Johnson, pers. comm.). Atlas observers from 56 counties observed adults carrying food or feeding young on average 26 June, while data from 24 counties report recently fledged young observed on about 7 July. Fall banding dates from Kalamazoo County range from 12 August to 29 October, with migration peaking 26 September (R. Adams, pers. comm.). They are seen as late as 5 November in Dearborn (Rouge River Bird Observatory 1999).

Abundance and Population Trends

Based on 1990s BBS data, the global population is estimated at 80 million birds, with Michigan supporting about 1.1% or 900,000 individuals (PIF 2008). Breeding Bird Survey records since 1966 show Savannah Sparrow populations have persisted better than most grassland bird species. While other sparrows suffered staggering declines, this grassland generalist sustained small, albeit significant, annual declines of about 1% throughout its range. Between 1966 and 2007, North American BBS data indicate an average range-wide decline of 1% per year, with Michigan showing the same decline during this period (Sauer et al.

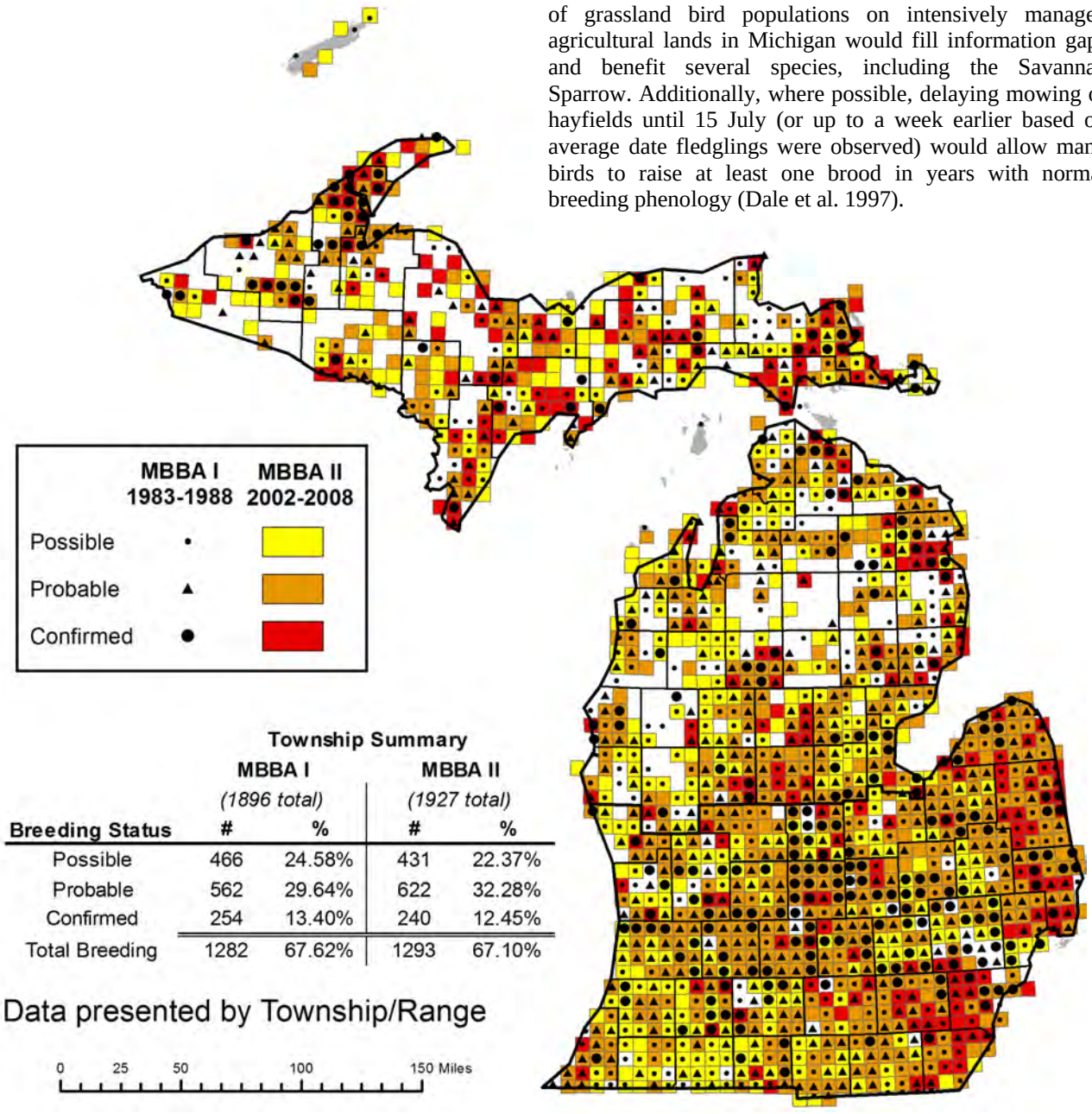
Savannah Sparrow *(Passerculus sandwichensis)* ***Julie Gibson***

2008). Looking at the time period from 1980 to 2007, populations underwent significant declines of just over 2% in FWS Region 3, which includes Michigan and neighboring states (Sauer et al. 2008). However, Michigan data show a non-significant decline of just over 1% (Sauer et al. 2008).

The average number of pairs recorded per year during both Atlas periods demonstrates this slight downward trend. During MBBA I, 1,876 pairs were recorded, compared to 1,728 pairs during MBBA II. These small, steady declines warrant caution since it is unclear what is attributable to actual population changes and what is due to differences in survey effort. Some counties appear to have sustained considerable declines; for example the total number of observations in Kalamazoo County during MBBA I was 787, compared with 304 during MBBA II. The same situation holds true for Calhoun County (492 in MBBA I, 134 in MBBA II). Conversely, increases were seen in some areas, such as Oakland County where the total number of birds detected more than doubled.

Conservation Needs

Savannah Sparrows are commonly associated with alfalfa and hay fields; some of these are mowed three times per season, which often destroys the nest and young or eggs. These agricultural habitat types are widespread throughout the LP and are likely ecological traps where reduced reproductive success may result in unsustainable populations. Research focused on ascertaining the viability of grassland bird populations on intensively managed agricultural lands in Michigan would fill information gaps and benefit several species, including the Savannah Sparrow. Additionally, where possible, delaying mowing of hayfields until 15 July (or up to a week earlier based on average date fledglings were observed) would allow many birds to raise at least one brood in years with normal breeding phenology (Dale et al. 1997).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	466	24.58%	431	22.37%
Probable	562	29.64%	622	32.28%
Confirmed	254	13.40%	240	12.45%
Total Breeding	1282	67.62%	1293	67.10%

Data presented by Township/Range

Grasshopper Sparrow *(Ammodramus savannarum)* ***Julie Gibson***

Status: *Special Concern (MNFI)*



John Van Orman ©
Species sponsored by: Brian Allen

There is a timeless beauty and peacefulness found among the dry patchy grasslands where the Grasshopper Sparrow sings his airy song, bringing richness to the landscape. A transient and uncommon breeder in Michigan, this small ground nesting sparrow builds a unique domed nest with a side entrance. Populations are uncommon and local in the LP, with few birds scattered in the UP. Following an eastward range expansion during the nineteenth and early twentieth centuries, BBS records from the period 1966-2007 show Grasshopper Sparrow populations underwent rangewide declines. Four subspecies currently breed in southern Canada and throughout the eastern United States and the Great Plains. Higher densities occur in the Great Plains, from North Dakota to northern Texas, and east to Illinois, where large areas of contiguous grassland provide adequate habitat for this area sensitive species. This secretive bird winters in the south central and southeastern U.S., and as far south as Panama.

Distribution

Vickery (1996) shows the Grasshopper Sparrow as breeding throughout Michigan's LP north to southern areas of the UP. Historic accounts and specimens noted this uncommon summer resident north to the Leelanau Peninsula and Cheboygan County, increasing in abundance with forest clearing in the southern LP, and found only very rarely in the eastern UP (Barrows 1912, Gibbs 1885, Wood 1951).

Compared to MBBA I, populations have decreased across the LP during MBBA II, particularly in the SLP. During MBBA I, 43% of SLP townships reported Grasshopper Sparrows, compared with just 27% during MBBA II. Decreases are evident in the southern three tiers of counties and the Thumb where cropland farming is extensive. The MBBA II map also shows decreases in the northern LP, notably in Osceola and neighboring counties where succession to young forest and changes in agricultural land use may impact grassland birds (pers. obs.). However, populations appear stable in the Leelanau Peninsula and along the tension zone dividing the northern and southern LP. Interestingly, the number of UP townships containing Grasshopper Sparrows has increased by over 50%. Although habitat is limited and some summer records could be vagrants, the overall numbers and distribution suggest that the species is a rare but probably increasing breeder in the UP. This secretive species was confirmed breeding in 38 townships statewide during MBBA I and 27 during MBBA II. An MNFI statewide grassland bird monitoring project from 2005-2007 documented 391 individuals (mainly singing males) in 42 counties, with highest densities in Montcalm, Leelanau, Manistee, and Muskegon counties (Gibson and Enander 2007).

Grasshopper Sparrows are documented in all the surrounding states and Ontario, but abundance and distribution varies locally. In Ontario, most birds occur south of the Canadian Shield (Cadman et al. 2007). In Wisconsin, distribution is wide, with fewer birds in the central and northern forested regions (Cutright et al. 2006). While Indiana birds are also widespread, there are few confirmed breeding records (Castrale et al. 1998). Grasshopper Sparrows are somewhat common in Illinois, with most confirmed breeding records in the central portion of the state (Kleen et al. 2004). In Ohio, this sparrow was documented in all but two counties (Peterjohn and Rice 1991). This species has declined significantly across New York, with similar but patchy distribution compared with their first atlas (McGowan and Corwin 2008).

Breeding Biology

When calm winds prevail, this secretive sparrow is easily identified from a distance by its high pitched, insect-like, buzzy song. A well concealed nest and foraging on the ground make detection of nests and birds difficult. The Grasshopper Sparrow is found in both native and cultivated grasses, will nest after mowing, and will tolerate light grazing and burning. Preferred regional habitat consists of short herbaceous vegetation, a moderate amount of forbs, patches of bare ground, a medium litter layer, some residual standing dead vegetation, and few to no shrubs (Sample and Mossman 1997). In Michigan, Grasshopper Sparrows may be found locally in cool and mixed warm season grassland, hayfields, weedy fields, and occasionally in low density switchgrass plantings. In addition, this bird is common in the wine country across the Leelanau Peninsula.

Migrants go largely undetected and are found on territory mid-April to mid-May. Reports from Muskegon County include singing males as early as 18 April (B. Johnson, pers. comm.). One to three broods are common. Egg dates range from mid-May through early August (KNC 2004). During MBBA II, atlas observers in 16 counties observed adults carrying food or feeding young on average 24 June. Data from seven counties reported recently fledged young observed about 12 July. Fall departure data are scarce, and the species is poorly represented at banding stations.

Grasshopper Sparrow *(Ammodramus savannarum)*

Julie Gibson

Status: *Special Concern (MNFI)*

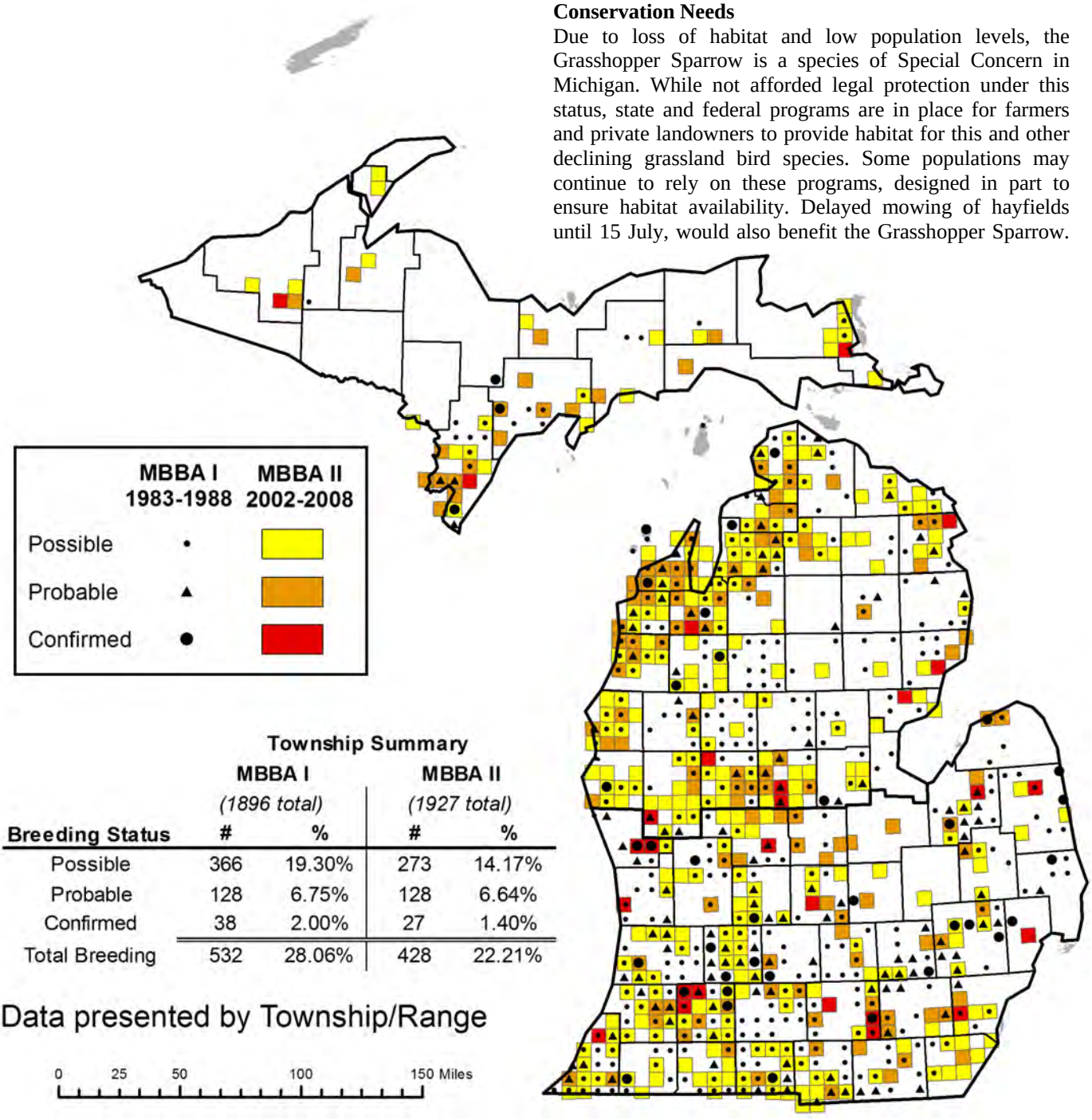
However, both juveniles and adults undergo a complete pre-basic molt on their breeding grounds (Pyle 1997), and at least some individuals remain in Michigan until mid and late September.

Abundance and Population Trends

Partners in Flight reported an estimated North American population of 14 million Grasshopper Sparrows in the 1990s (PIF 2007). Between 1966 and 2007, BBS data indicate an average rangewide decline of 3.6% per year (Sauer et al. 2008). Breeding Bird Survey results for Michigan show a similar downward trend of 4.0% per year from 1966 to 2007, including a larger, statistically significant decrease from 1966 through 1979 and a smaller, non-significant decrease from 1980 through 2007 (Sauer et al. 2008). Based on raw atlas data, an average 1,420 pairs were recorded during MBBA I, whereas 1,363 pairs were counted during MBBA II. Southern LP populations may continue to decline due to urbanization, intensive agricultural practices, and habitat loss, and northern LP populations may decline due to grassland succession.

Conservation Needs

Due to loss of habitat and low population levels, the Grasshopper Sparrow is a species of Special Concern in Michigan. While not afforded legal protection under this status, state and federal programs are in place for farmers and private landowners to provide habitat for this and other declining grassland bird species. Some populations may continue to rely on these programs, designed in part to ensure habitat availability. Delayed mowing of hayfields until 15 July, would also benefit the Grasshopper Sparrow.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	366	19.30%	273	14.17%
Probable	128	6.75%	128	6.64%
Confirmed	38	2.00%	27	1.40%
Total Breeding	532	28.06%	428	22.21%

Henslow's Sparrow *(Ammodramus henslowii)* ***Julie Gibson***

Status: *State Endangered*



Allen Chartier ©
Species sponsored by:
Michigan Audubon Otis Sanctuary

Breeding Bird Survey records since 1966 show that Henslow's Sparrow populations have suffered steep declines. A transient and uncommon breeder in Michigan grasslands, this state endangered sparrow is an exciting find for any birder. It breeds locally in the southern and central LP, with only a handful of sightings from the UP and the extreme northern LP.

The Henslow's Sparrow ranges over the Midwestern United States, from the Great Lakes states and southern Ontario south to the Gulf Coast. Its breeding and wintering areas are distinct. It is largely absent as a breeder north of central Wisconsin, central Michigan, and the eastern Great Lakes region. Higher densities occur in southern portions of its breeding range where remnant tall-grass prairie and surrounding open lands provide adequate habitat for this area-sensitive species. This short-distance migrant winters primarily in the southeastern United States in longleaf pine savanna. Many observers are familiar with the Henslow's Sparrow due to its state status, listening for the unique hiccup-like song among moist, dense grasslands and hayfields.

Distribution

The range map in The Birds of North America account shows the Henslow's Sparrow as absent from Michigan's northern LP and UP (Herkert et al. 2002). Historic accounts and specimens were noted mainly from the southern LP, periodically from Saginaw Bay north to Cheboygan County, and rarely from the southern UP (Wood 1951, Zimmerman and Van Tyne 1959). Despite concerted search efforts, birds were recorded primarily within southern LP townships during both MBBA I and MBBA II. Confirmed breeding was documented in 16 townships during MBBA I and seven during MBBA II. Although overall numbers remain low, changes in distribution over 20 years indicate a retraction from the UP and parts of the NLP.

Some southern LP grasslands formerly supporting this species presently lack breeding birds, such as Allegan State Game Area. Moreover, development of suburbs in Oakland and Livingston Counties has likely contributed to local declines of this area-sensitive species. A Michigan Natural Features Inventory grassland bird monitoring project from 2005 to 2007 documented 252 individuals (mainly singing males) in 28 counties, with half distributed among four southern LP counties: Berrien, Barry, Jackson, and Kalamazoo (Gibson and Enander 2007). One recognized IBA, the Sharonville State Game Area in Jackson and Washtenaw Counties, may support as many as 25 pairs of the globally significant Henslow's Sparrow.

Luckily for birders, this inconspicuous sparrow sings his distinctive song atop a blade of grass or a small shrub. Its well-concealed nest and habit of running through the dense grass make detection of nests and birds difficult. Henslow's Sparrow typically breeds in ephemeral grass habitats with tall, dense vegetation, tall standing residual vegetation, and a dense litter layer (Sample and Mossman 1997). In Michigan, it is found locally in old fields, cool and mixed warm season grasslands, medium density switch grass, and hayfields, especially of smooth brome (pers. obs.) It avoids small, isolated grasslands or those with sparse, patchy vegetation. Annual fluctuations in abundance and density are common.

Henslow's Sparrows are documented in all the surrounding states and in Ontario. Populations are sporadic and declining throughout the northeast portion of its breeding range. In Ontario, the species is now found only sporadically in the south (Cadman et al. 2007). In Wisconsin, distribution largely mirrors that of Michigan, with records scattered throughout the southern two-thirds of the state (Cutright et al. 2006). Indiana birds are mostly documented in the south, and concentrated southwest within reclaimed surface coalmine grasslands (Castrale et al. 1998). Henslow's Sparrows are scattered in Illinois, with increasing populations in southern counties (Herkert 2007). Except in the northwest, distribution is wide throughout Ohio (Peterjohn and Rice 1991). This species has declined dramatically in New York, with local populations remaining in the northwest and southwest (McGowan and Corwin 2008).

Breeding Biology

Migrant Henslow's Sparrows go largely undetected and are found on territory mid-April to mid-May. This species is often double-brooded, with egg dates from 17 May through mid-July, and fledglings from 19 June through 30 July (KNC 2004). MBBA II had breeding confirmations of adults carrying food or feeding young from 20 June to 9 July. Atlas workers observed recently fledged young in Hillsdale County on 27 July and in Jackson County on 6 July. Curiously, adults can be heard singing persistently again in August, with most birds departing the state by mid-October.

Abundance and Population Trends

Based on 1990s BBS data, the global population is estimated at 79,000 (PIF 2007), while recent analysis by

Henslow's Sparrow *(Ammodramus henslowii)*

Julie Gibson

Status: *State Endangered*

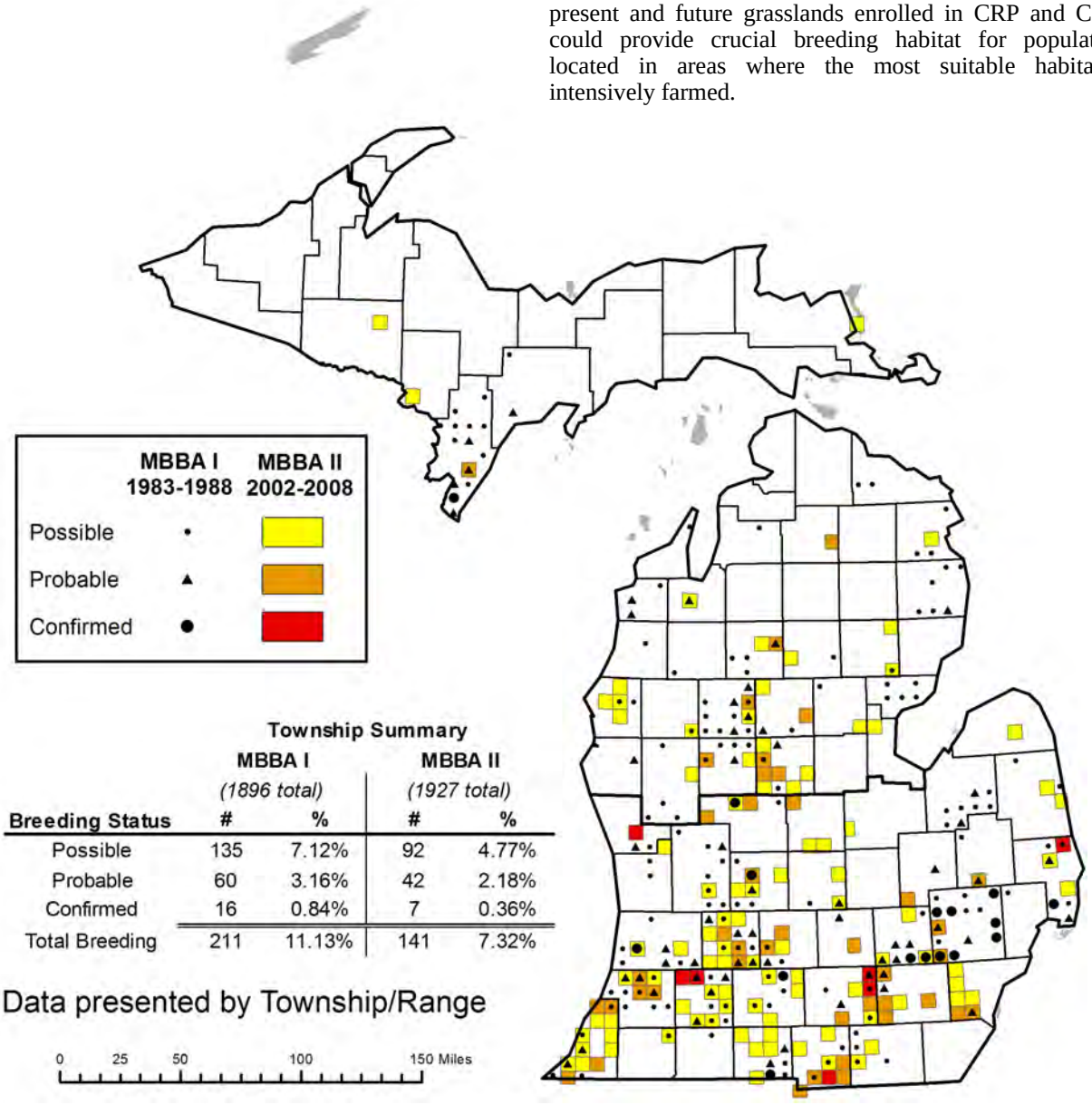
Thogmartin (*in* Cooper 2007) estimates 191,000 rangewide. The Henslow's Sparrow has undergone steady declines throughout the northeast, yet BBS data indicate stable southern breeding populations and a recent westward expansion (Cooper 2007). Small increases were also recorded in western Pennsylvania where reclaimed strip mines provide expansive grassland habitat (Mattice et al. 2005). In addition, local CRP grasslands in southern Illinois may support thousands of individuals (Herkert et al. 2002).

From 1966 to 2007, BBS data indicated a significant range-wide Henslow's Sparrow population decline of 8.1% per year, with Michigan showing a significant 12.6% annual decline (Sauer et al. 2008). The number of pairs reported by Atlas workers is illustrative: during MBBA I, a minimum of 574 pairs was recorded, while even with targeted survey effort, just 459 pairs were counted during MBBA II.

Conservation Needs

Henslow's Sparrows are listed as threatened, endangered, or special concern in numerous states, including Michigan. Audubon and several other bird conservation organizations identify this species as a high priority for grassland bird conservation in eastern and Midwestern North America. A critical threat to nests with eggs or young is short rotation mowing of hayfields. Unfortunately, many birds were detected in southern LP hayfields, some mowed three times per season. Assessing productivity in relation to hay management regimes is needed. The delayed mowing of hayfields until 15 July or later is imperative, especially on public lands: this would allow many birds to raise at least one brood in years with normal breeding phenology (Dale et al. 1997).

MNFI has mapped Henslow's Sparrow populations throughout the state. Careful targeting and management of present and future grasslands enrolled in CRP and CREP could provide crucial breeding habitat for populations located in areas where the most suitable habitat is intensively farmed.



Le Conte’s Sparrow *(Ammodramus leconteii)* ***Brian Johnson***



Elizabeth Rogers ©

Sharply garbed in patterns of white, ochre, pale brown, and black, the rather petite Le Conte's Sparrow ranks among the most attractive sparrows. However, this secretive denizen of northern grasslands is one of the scarcest and most elusive passerines in Michigan. Weak and reluctant flyers, Le Conte’s Sparrows habitually scamper through ground cover in a mouse-like fashion. Their peculiar songs, short, feeble and rasping, are ordinarily given from concealed perches. Nests, notoriously difficult to find, are superbly camouflaged beneath thick grass, and the attendant females do not flush until approached very closely (Walkinshaw 1968, Murray 1969). Le Conte's Sparrows breed across the Prairie Provinces of Canada and the north-central U.S. from eastern British Columbia to Quebec (AOU 1998). Loosely distributed across its summer range, the species occurs at its highest concentrations across the northern Great Plains, from central Alberta to northwest Minnesota (Sauer et al 2008). Populations eastward become increasingly sporadic. Due to its furtive behavior and its typically low population densities, very few detailed studies on Le Conte’s Sparrow have been conducted, and compared to other North American passerines, relatively little knowledge of its ecology and life history has been obtained (Lowther 2005).

Distribution

An uncommon and local summer resident in northern Michigan, the species is represented by relatively few known populations scattered among pastoral lands and large sedge bogs. It was first discovered in the state at Munuscong Bay in 1934 (Olsen 1935), and the following year Walkinshaw documented nesting at the same location during a ground-breaking study on the species (Walkinshaw 1937). By far the least encountered breeding sparrow during the first Atlas, the species was found in only thirty townships, of which three (10%) demonstrated confirmed breeding. The number of townships with breeding evidence during MBBA II improved to 51. However, positive breeding was again only obtained from three townships, and the confirmation rate dropped to a paltry 5.9%. Records were obtained from 14 of the 15 UP counties and from three LP counties. Although it was not detected in the LP during the first Atlas, one had been previously reported from Alpena County on 20 June 1964 (Harger 1965).

Breeding Biology

In general, Le Conte’s Sparrows prefer moderate to large, level, relatively undisturbed areas of sedge or grass (Walkinshaw 1968, Dechant et al. 2002, Lowther 2005). At such places as Seney NWR, Luce County, and Hiawatha National Forest, Le Conte's Sparrows inhabit sedge bogs or wet sedge meadows. However, in the Clay Lake Plain in the eastern UP and scattered cultivated lands westward, the species occupies moist or even dry fallow grasslands, Conservation Reserve Program (CRP) easements, and lush hayfields. Optimal conditions include dense, moderately tall vegetation and a moderate litter layer. Although Le Conte’s Sparrows were not sensitive to patch size or shrub density in Minnesota and North Dakota (Winter et al 2005), small, fragmented grasslands are used less frequently in Michigan. Scattered shrubs and saplings are tolerated on its UP breeding grounds, but the species avoids tree cover and moderate shrub densities. Species sharing the same habitats include Wilson's Snipe, Sedge Wrens, Savannah Sparrows, and Yellow Rail. When woody habitat becomes excessive, Le Conte's Sparrows are replaced by Clay-colored Sparrows (B. Johnson, unpub. data).

A mid-distance migrant, Le Conte's Sparrows completely vacate their breeding grounds during the winter. They return to their Michigan breeding grounds in late April, and territorial males have been found as early as 20 April 2006 at Seney NWR (B. Johnson, unpub. data). However, most birds appear in May. Le Conte’s Sparrow nests are situated on or just above the ground within litter or in a clump of grass, and they are extremely well-concealed beneath surrounding vegetation (Walkinshaw 1968, Winter et al. 2005). The nesting period extends from the latter part of May to early August. Males continue to sing later in the season than most other grassland species, but they cease at this latter time. Young Le Conte's Sparrows begin dispersing in late July, and most adults follow in August. Fall migration is underway by early September; the earliest fall migrant from the LP was recorded 11 September 1993 (Granlund 1993). Most birds have departed by the end of September, and only a few linger anywhere in the state after mid-October.

Abundance and Population Trends

Due to its low densities, secretive demeanor, weak and inconspicuous song, and frequent use of remote habitats, the Le Conte's Sparrow is inadequately sampled by the BBS across much of its range. This species has been recorded so sparingly on BBS routes (only two) in Michigan that trend estimates derived from the survey are meaningless. On its breeding grounds across North America, it has shown non-significant declines during both the entire 1966 - 2007 BBS period and the 1983-2007 period corresponding to the

Michigan BBA interval (Sauer et al. 2008). On its United States wintering grounds, the Le Conte's Sparrow, though poorly sampled, has exhibited an increase in birds per party-hour since the 1966/67 Christmas Bird Count (National Audubon Society 2002).

Relative to the first Atlas, Le Conte's Sparrows were recorded from almost twice as many townships during MBBA II. Similarly, over a span of two decades, the number of detections more than doubled between the first and second Ontario Breeding Bird Atlases (Coady 2007). While this increase may be supported by a rise in anecdotal observations reported to other sources, it is rather doubtful that a real population gain has occurred in Michigan. First, overall coverage in the UP was greater during MBBA II. Also, many detections during MBBA II came as a result of special surveys for this species (B. Johnson, unpub. data). Further, local populations seem to fluctuate considerably from year to year based on precipitation and resultant vegetation growth (Igl and Johnson 1999). Since Le Conte's Sparrows eschew overly sparse or dense cover, areas either too arid or wet to normally support them may be otherwise suitable, as seasonal moisture levels affect vegetation growth. Such patterns create erratic trends that may influence local detection.

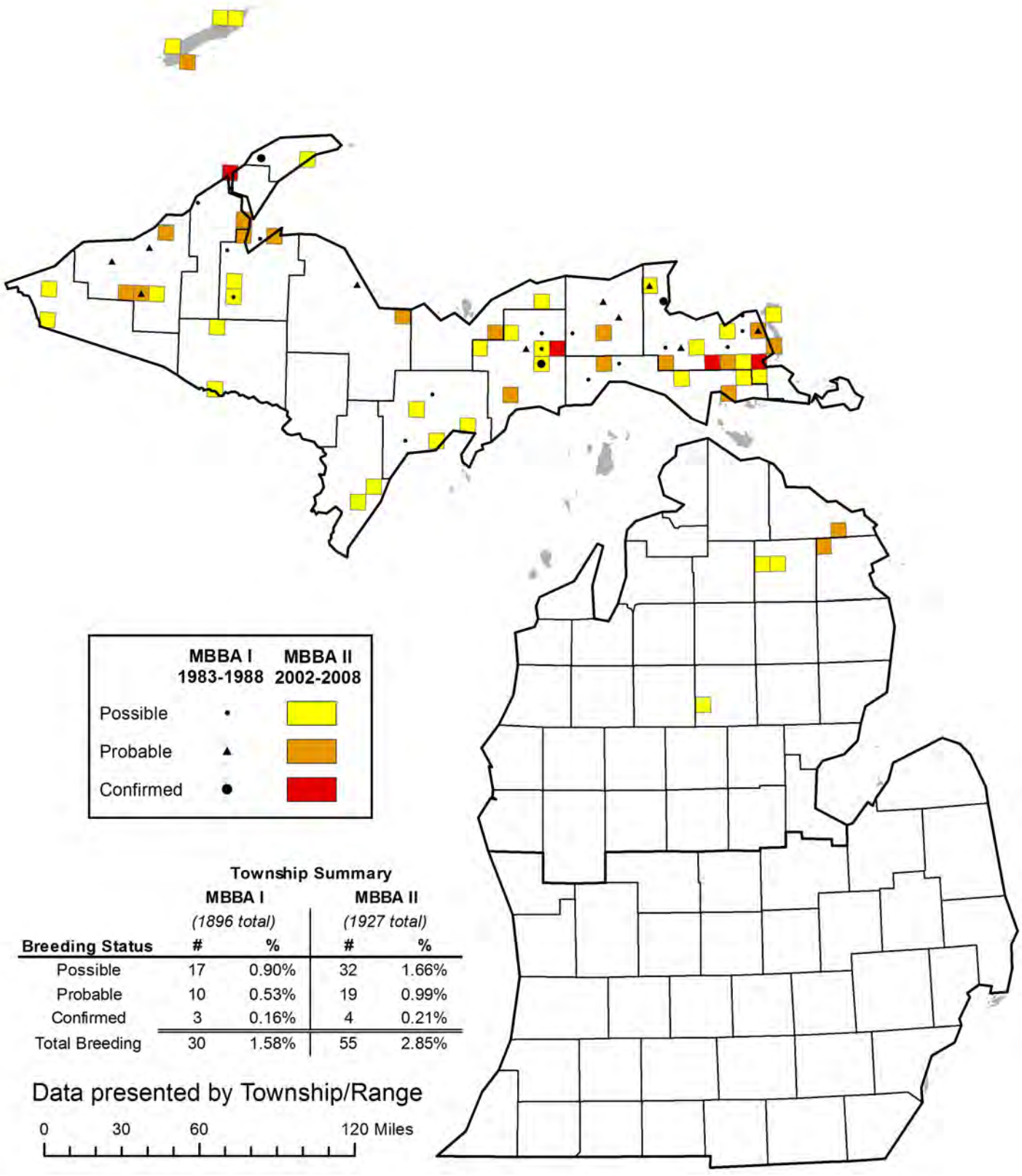
Finally, increasing observer familiarity with the habits, haunts, and songs of this furtive species has almost certainly boosted observations. Every major treatment of Michigan ornithology over the past several decades has presented an increasing picture of abundance among this species. Because our collective knowledge on the status and distribution of Le Conte's Sparrow has remained lower than that for most other species, we are on a learning curve that has resulted in an improving number of reports and familiarity. Although more birds are being seen and more breeding locations are being cataloged, this may be the result of newly discovered (as opposed to colonized) breeding sites, more awareness of such locations, and increased birding and censusing activity. This has produced an upward population trend that may be entirely artificial. As testament to either the elusive nature of this species or the instability of local populations, only five of 30 townships with Le Conte's Sparrows during the first Atlas also had them on the second. Likewise, at Munuscong WMA, Le Conte's Sparrows were not recorded during the first Atlas, even though the first records from Michigan were obtained nearby and the species has been present in large numbers every year since at least 2000. In 2006 and 2007, when coverage of the site was most consistent, 105 individuals were banded each year (B. Johnson, unpub. data). Because such high Michigan densities have been sparingly reported, they reveal that the total number of breeding birds, while still relatively low, may be considerably higher than established surveys indicate.

Conservation Needs

The encouraging but possibly misleading escalation in Le Conte's Sparrow reports may obscure a real problem. By and large, grasslands in northern Michigan are not increasing in either scope or quality. It would be strange indeed, that unlike other grassland denizens, Le Conte's Sparrows would have actually benefited from a general deterioration of their habitat. While densities may have improved at certain localities, habitat loss has eliminated the species from others. Whatever its population trend, the Le Conte's Sparrow is clearly uncommon and local in Michigan. Consequently, its present status, combined with the lack of reliable survey data, require that both natural and cultivated grasslands be maintained in sufficient quantity and quality in northern Michigan.

Since Le Conte's Sparrows require fairly lush grass/sedge and moderately dense litter yet shun woody encroachment (Walkinshaw 1968, Dechant et al. 2002, Lowther 2005), fairly intensive management schemes are needed to balance these successional parameters. Among the natural sedge meadows of Michigan, prescribed burns would best rejuvenate vegetation and curtail woody growth. Among the luxuriant, introduced grasslands of the eastern UP, mechanical removal of woody vegetation and periodic or rotational mowing may be a simpler, more suitable, and cost-effective means of controlling trees and shrubs, maintaining an adequate litter layer, and limiting grass densities. Depending on the rates of vegetative growth and litter deposition, burning and mowing treatments of suitable grasslands in Michigan should probably occur every three to six years, and patches of occupied habitat should not be burned or mowed in their entirety. Also, because Le Conte's Sparrows breed later in the season than most other grassland birds, encouraging that hayfield mowing be postponed as late as economically prudent will benefit both active nests and recently fledged young. Besides eliminating the losses of existing grasslands to development and succession, acquiring and enhancing both public and private tracts will also safeguard this and several other open-country species in northern Michigan. The establishment of CRP fields has proven beneficial in North Dakota (Igl and Johnson 1995) and has provided breeding sites in Michigan (B. Johnson, unpub. data). Various ducks and Sharp-tailed Grouse nest in the same fields as Le Conte's Sparrows, so programs that aid sparrows likely promote gamebird populations and vice versa.

Le Conte's Sparrow *(Ammodramus leconteii)* ***Brian Johnson***



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	17	0.90%	32	1.66%
Probable	10	0.53%	19	0.99%
Confirmed	3	0.16%	4	0.21%
Total Breeding	30	1.58%	55	2.85%

Data presented by Township/Range

0 30 60 120 Miles

Song Sparrow *(Melospiza melodia)*

Haley Breniser



John Van Orman ©

A leisurely float down any one of Michigan's many rivers confirms the Song Sparrow as one of our most common songsters. They seem to greet you at every bend perched atop a shrubby mass, faithfully singing an individual rendition of the traditional Song Sparrow melody. Many of our sparrows are referred to as LBBs or Little Brown Birds. This description could not be further from the truth for this avian creature. Their body coloration rather, is an intricate weave of chocolate, grey, auburn, black, beige, and white that creates fine lines and heavy streaking. There is great geographic variation, represented by 24 morphologically unique subspecies recognized in North America (Arcese et al. 2002). Because of this, the Song Sparrow is often regarded as the most physically diverse passerine in North America (Miller 1956) and is greatly studied. In fact, some scientists believe that by analyzing their geographic variation, we could learn something substantial about the evolution of biological species (Zink and Dittmann 1993). As a result, when a Song Sparrow is focused in our binoculars, we should be reminded of the complexity of nature, not just the simplicity of "another" little brown bird.

Although abundant along stream corridors and inland wetlands, the Song Sparrow is also found breeding in city parks, shrubby old fields, agricultural hedge rows, recent clearcuts, and coastal marshland throughout most of North America. From Texas through to the southern Great Plains and down into the deep South (Arcese et al. 2002), these birds only winter, leaving us to wonder how a Song Sparrow's southern twang might resonate down a southern stream corridor in early spring.

Distribution

In Michigan the Song Sparrow is widely distributed, ranging from the very western edge of the UP through to the southeastern corner of the SLP. Between MBBA I and MBBA II there was almost no change in distribution; they were recorded as breeders in nearly every township statewide (about 92% in both atlases), with the southern LP showing the highest breeding evidence (98% in MBBA I, 96% in MBBA II).

Breeding Biology

Song Sparrows arrive on breeding territory in late February, just in time to catch the last of Michigan's blizzards. In the SLP, it is more common for individuals to overwinter; the males establish a winter territory which they defend from the onset of fall to the following spring (Nice 1937). In fact, these territories can be six to ten times larger than the normal breeding territory (Nice 1937). Many studies show that defending this area is vital for occupancy of the same territory in the spring and that maintaining territory year round forecasts lifetime reproductive success (Knapton and Krebs 1974, Arcese 1989, Hochachka et al. 1989, Beecher et al. 2000). Once the breeding territory is established, the hunt for a mate begins, and the male does not stop singing until fall migration. Their songs are as confident, highly variable, and boisterous as their body language.

Abundance and Population Trends

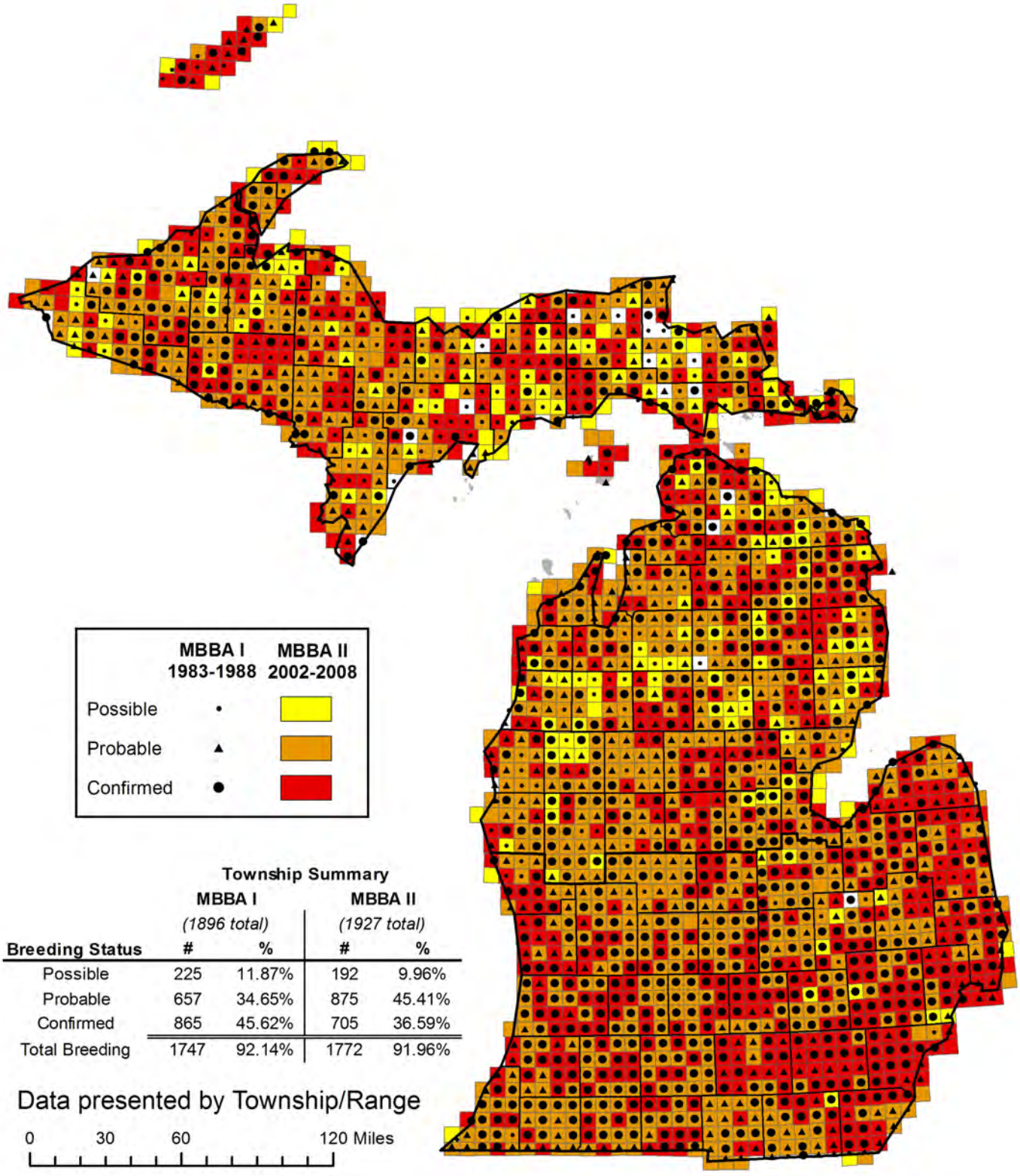
Michigan's population of Song Sparrows is estimated to make up about 2,200,000 (4.1%) of North America's total of approximately 53,000,000 (PIF 2007). They are abundant and continue to be widespread in light of the unrelenting urban sprawl and wetland alteration that has occurred over the past 20 years. In the Midwest (USFWS Region 3), Breeding Bird Survey data show a very small, yet significant, decreasing annual population trend of 0.76%; an average of 23 birds was recorded per route. In comparison, Michigan averaged 30 Song Sparrows per route and recorded a non-significant decline of about 1% (Sauer et al. 2008). New York and Ontario's BBS data illustrate similar decreasing population trends; however the Song Sparrow is still very common throughout the Great Lakes region.

Conservation Needs

This is one songbird that has adapted fairly well to urban sprawl and the natural succession of old fields. Moreover, Song Sparrows have likely benefited from federal and state habitat enhancement programs such as the Partners for Fish and Wildlife Program (USFWS) and the Conservation Reserve Program (USDA-NRCS) which were initiated about 20 years ago. The efforts of those organizations to restore stream corridors, wetlands, and agricultural land in order to increase wildlife habitat on private property have been extremely successful. Perhaps these restored lands have helped to offset suburban development, allowing this songbird's population to hold fairly steady. Currently, conservation concern is not high.

Song Sparrow *(Melospiza melodia)*

Haley Breniser



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	225	11.87%	192	9.96%
Probable	657	34.65%	875	45.41%
Confirmed	865	45.62%	705	36.59%
Total Breeding	1747	92.14%	1772	91.96%

Data presented by Township/Range

0 30 60 120 Miles

Lincoln's Sparrow *(Melospiza lincolnii)*

David Ewert



Robert Epstein ©

The Lincoln's Sparrow, unlike one of its close relatives, the Song Sparrow, is inconspicuous and rarely seen in developed areas except occasionally during migration. During migration and winter it tends to forage inconspicuously in shrubby or old field areas. During the breeding season, males can be found singing in muskeg or early successional habitat in conifer-dominated boreal forest. Even here, though, Lincoln's Sparrows can be difficult to find as they sing somewhat irregularly and their beautiful songs do not carry far. However, those familiar with their song can often find these elusive birds in fairly large numbers within their favored habitat.

The Lincoln's Sparrow breeds in boreal North America south to the Sierra Nevada in California, in the Rocky Mountains to New Mexico and Arizona, and in the northeast to northern Minnesota, northern Wisconsin, central Michigan, southern Ontario, the Adirondacks of New York and northern New England (Ammon 1995). Wintering Lincoln's Sparrows occur along the Pacific coast from extreme southwestern British Columbia to El Salvador and from the southern United States south to Honduras, Jamaica and The Bahamas (Ammon 1995). In Michigan, Lincoln's Sparrows breed in the UP and south, locally, to Clare and Sanilac Counties (Ewert 1991, McPeek and Adams 1994).

Distribution

In Michigan, summering Lincoln's Sparrows are primarily found in bogs and recently logged boreal forest in the west-central and eastern UP, jack pine plains and imbedded bogs of the northern LP, and a few isolated bogs south of the jack pine plains. The distribution of the Lincoln's Sparrow appears to have changed little between the MBBA I and MBBA II except for a possible southern expansion of range to Isabella County where the species was noted as a probable breeder for the first time. There are a few reports of singing Lincoln's Sparrows south of Isabella County in Allegan, Kalamazoo, and Oakland counties, but there has been no evidence of breeding this far south (McPeek and Adams 1994). The Lincoln's Sparrow summers in at least two distinct habitats in Michigan. It is found in bogs and muskegs in both the UP and LP. In the northern LP, Lincoln's Sparrows are fairly common in extensive jack pine plains and often co-occur with Kirtland's Warblers; use of this type of habitat by Lincoln's Sparrows has not been noted in Wisconsin (Howe 2006) or elsewhere. Some birds also inhabit recently logged lowland conifer forest that is dominated by black spruce, tamarack, white cedar, balsam fir and associated deciduous species such as balsam poplar and white birch (pers. obs.).

In Ontario the Lincoln's Sparrow is found during the breeding season throughout much of the province south to Lake Simcoe and just north of Lake Ontario and the St. Lawrence Valley (Zimmerling 2007). As in Michigan and Wisconsin (Howe 2006), there are isolated populations of Lincoln's Sparrows in bogs south of the boreal forest and transition zone (Zimmerling 2007). The Lincoln's Sparrow was found in 11% of the sampled quads during the Wisconsin Breeding Bird Atlas where it was largely restricted to the northernmost counties of the state (Howe 2006). In New York, the distribution of Lincoln's Sparrows centered on the Adirondacks and north and east to Quebec during both atlases (Peterson 2008). As expected, the Lincoln's Sparrow was not found during the Indiana breeding bird atlas (Castrale et al. 1998) nor the Ohio breeding bird atlas (Peterjohn and Rice 1991) where the species has never been reported to breed.

Breeding Biology

Lincoln's Sparrows arrive in Michigan primarily during the first three weeks of May (McPeek and Adams 1994). Nesting occurs in very late May through June (Walkinshaw 1983; pers. obs.). Nests are sunk into the ground; clutch sizes are typically 3-5 (Ammon 1995). The incubation period is about 13 days and young fledge in 9-10 days. Fall migration begins in late August and ends by mid-October except a few stragglers that may persist until December (McPeek and Adams 1994).

Abundance and Population Trends

The Lincoln's Sparrow is considered to be an uncommon to locally common summer resident in northern Michigan (McPeek and Adams 1994). Lincoln's Sparrows were found on approximately 12 Breeding Bird Survey routes per year in Michigan; a mean of 0.4 birds/route was counted during the period of 1983-2007. Population trends of this species in Michigan and elsewhere have been challenging to assess because the Lincoln's Sparrow is difficult to detect and, until quite recently, few observers have sampled habitats occupied by this species. Walkinshaw (1983) believed the increase in sightings of Lincoln's Sparrows since the early-and-mid 1900s (Barrows 1912, Wood 1951) reflected increased numbers and expanded distribution of the species rather than an increase in observer effort. Breeding Bird Survey results from 1983-2007 suggest that numbers of Lincoln's Sparrows may be increasing in both the upper Midwest (USFWS Region 3, which includes Minnesota, Wisconsin and Michigan) and Michigan alone although the trends were not significant. The proportion of townships in which Lincoln's Sparrows were found increased from 23% to 26% in the UP between MBBA I and MBBA II, was 10% in both MBBA I and II for the northern LP, and was less than 0.5% in both MBBA I and II for the southern LP. These data suggest that the distribution and perhaps the abundance of Lincoln's Sparrows in Michigan during the

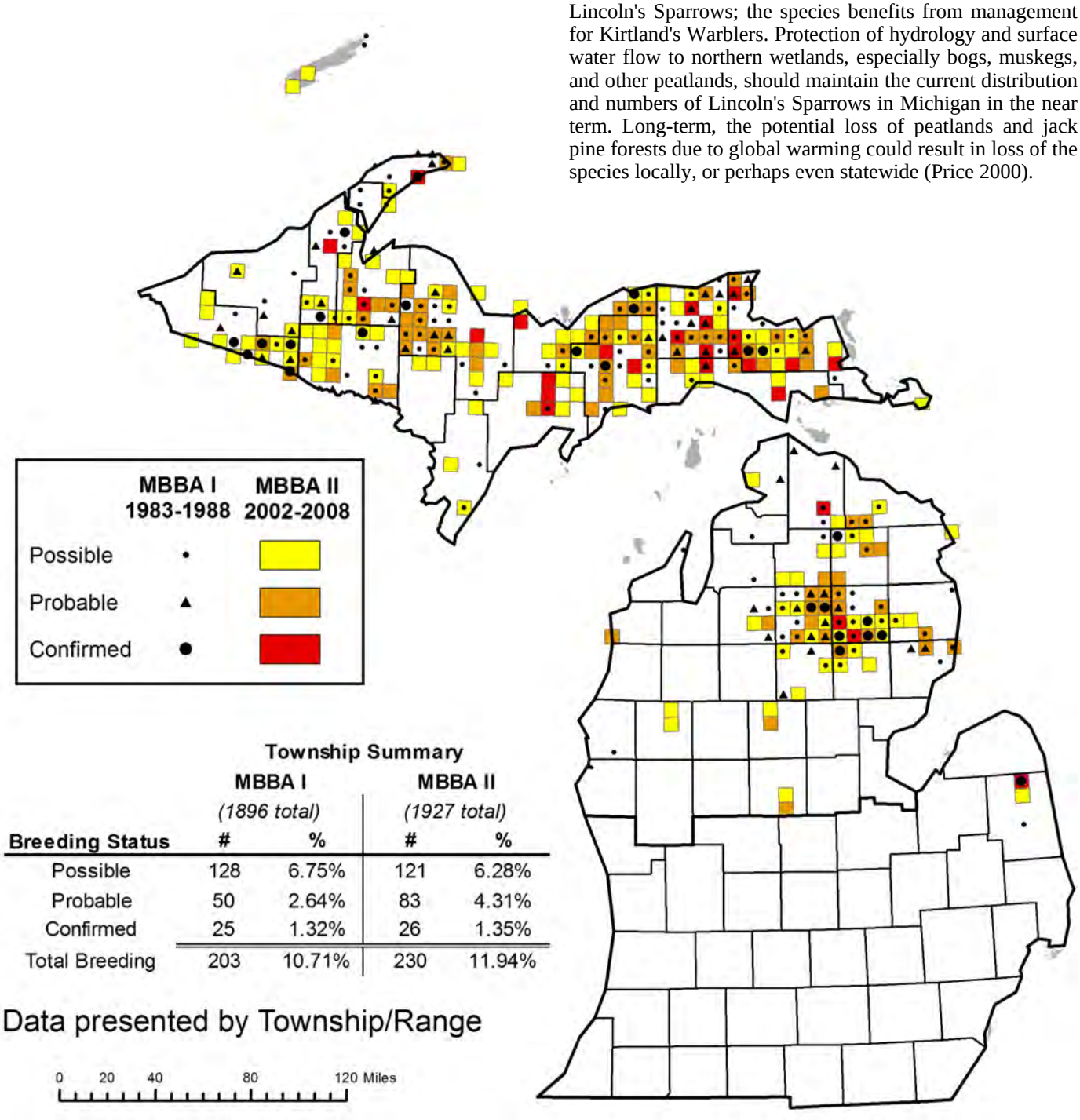
Lincoln's Sparrow *(Melospiza lincolnii)*

David Ewert

breeding season have changed very little from the early 1980s to the early 2000s. However, there was a significant increase (2.9%) in Lincoln's Sparrows in Wisconsin between 1966 and 2002 (Howe 2006). In Ontario, there was substantial increase in the probability of detection of Lincoln's Sparrows from the first to the second atlas (Zimmerling 2007). The population trend in New York, where the Lincoln's Sparrow breeds almost primarily in the Adirondacks north to Quebec, is negative but not significant (Peterson 2008). Collectively, these data suggest that Lincoln's Sparrows may have increased in the upper Midwest, including Michigan, in the last few decades although our confidence in these data is tempered by potential observer biases associated with detection of Lincoln's Sparrows.

Conservation Needs

In Michigan, Lincoln's Sparrows are most frequently found in habitats that are relatively undisturbed, such as bogs and muskegs, or habitats with relatively frequent disturbance, such as jack pine plains. Logging activities on jack pine plains create early successional jack pine stands suitable for Lincoln's Sparrows; the species benefits from management for Kirtland's Warblers. Protection of hydrology and surface water flow to northern wetlands, especially bogs, muskegs, and other peatlands, should maintain the current distribution and numbers of Lincoln's Sparrows in Michigan in the near term. Long-term, the potential loss of peatlands and jack pine forests due to global warming could result in loss of the species locally, or perhaps even statewide (Price 2000).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	128	6.75%	121	6.28%
Probable	50	2.64%	83	4.31%
Confirmed	25	1.32%	26	1.35%
Total Breeding	203	10.71%	230	11.94%

Data presented by Township/Range

Swamp Sparrow *(Melospiza georgiana)* ***John Brenneman***



Willie McHale ©

The Swamp Sparrow, so named for its affinity for water, has a distinctive but often overlooked trilling song. It is a very vocal bird that is most commonly identified by its voice since it stays well hidden in the cattail marshes, bogs, and swamps it calls home. During the breeding season it has dark rufous wings and a bright reddish crown; however in winter it will replace the reddish crown with a gray central stripe and streaking. Michigan is located at the southern edge of the Swamp Sparrow's breeding range which extends from the northeastern United States and Canada to the north central plains and central Canada. It can be found sporadically throughout southern Michigan during the winter (CBC data), but it is more commonly found throughout the southern United States from Florida to New Mexico, extending southward into northern Mexico.

Distribution

The Swamp Sparrow can be found all across Michigan and is a common bird in suitable habitat, such as cattail marshes and brushy meadows, and has increased its overall population in Michigan slightly since MBBA I. Approximately 61% of townships reported Swamp Sparrows in MBBA II, up from 58% in MBBA I. Regionally, the SLP showed the only decrease with 62% of townships reporting in MBBA I and 56% reporting in MBBA II. The NLP, on the other hand, shows a moderate increase from MBBA I, with 52% of townships reporting Swamp Sparrows compared to 58% for MBBA II. The most substantial increase in townships with Swamp Sparrows present was in the UP, with 70% of townships reporting in MBBA II, up from 59% in MBBA I.

Swamp Sparrows are detected in greater numbers in large wetlands that are not isolated from other wetland complexes (Brown and Dinsmore 1986). The UP has 15% of total land cover designated as wetland, the NLP has 20% wetland coverage and the SLP is the lowest with 9% wetland habitat (Eagle et al. 2005). While the difference in wetland coverage between the UP and the NLP compared with the NLP and the SLP is virtually the same, it is possible that the fragmentation and removal of wetlands in the SLP is reaching a critical point at which any further degradation of habitat will yield increasingly larger species losses.

The Swamp Sparrow was most frequently seen in the UP where 75% of all blocks that reported 50 or more species had a Swamp Sparrow. This is in contrast to the 41% of blocks that had 50 or more species found in the SLP. Very few blocks reported Swamp Sparrow in Genesee, Gratiot, Midland, Saginaw and the counties along the easternmost side of the state from the thumb to the Ohio border. Of the blocks that had 50 or more species in this area, only 27% reported Swamp Sparrow. These counties are highly populated and have extensive agricultural and industrial development.

Breeding Biology

Swamp Sparrows will nest in a variety of wetland types such as sedge and cattail marshes to open cedar swamps, however, the universal habitat factor is water (Greenberg 1988). They build a well hidden bulky cup nest that can be on the ground but is usually elevated above the ground or water (Peck and James 1987). The Swamp Sparrow's affinity for water can also be seen in their feeding behavior, from swimming in shallow water to submerging their entire head to find aquatic insects (Mowbray 1997). They will also look for insects on the ground or climb among thick marsh vegetation like a mouse (Mowbray 1997).

Abundance and Population Trends

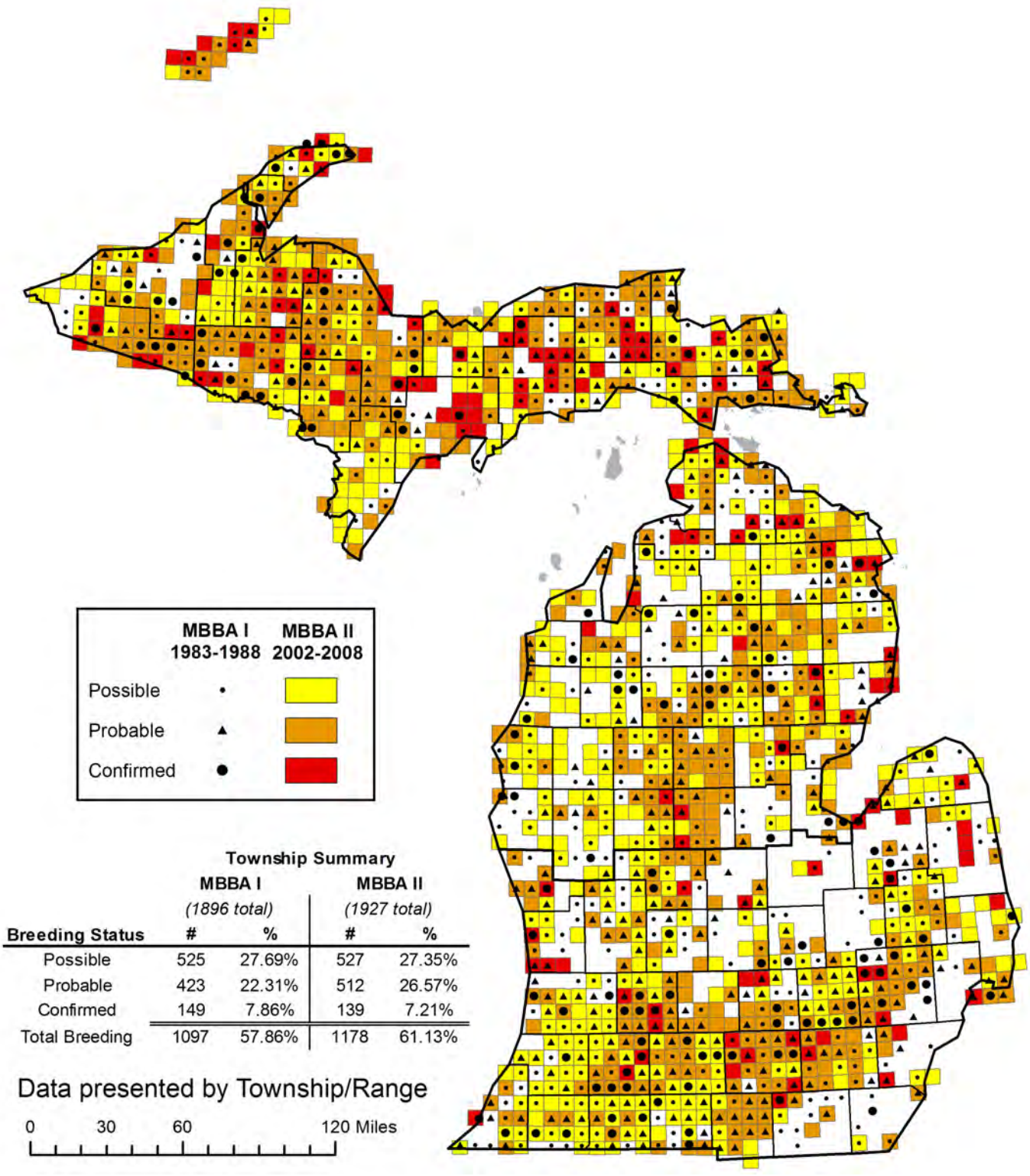
Partners in Flight estimates for Michigan suggest that there is a population of approximately 140,000 individuals (PIF 2007). In the Midwest (USFWS Region 3) since 1983, BBS data indicates a slight increase in population; however this trend is not statistically significant. In Michigan the average number of birds per route during the years of MBBA I was 1.66 and during MBBA II was 1.96 (Sauer et al. 2008).

Due to the inaccessible wet areas in which Swamp Sparrows prefer to nest, most of the atlas breeding sightings reported were either from the possible or probable categories. There were 138 townships that had reported confirmed nesting for the Swamp Sparrow. Of these 138 townships, only nine actual nests were found. Most of these confirmed records were reports of feeding young or nest building. A small number of confirmed reports were banded individuals that showed physiological evidence of breeding.

Conservation Needs

Although Swamp Sparrow populations are steady or possibly increasing, this species will merit close attention in the future. The need for more conservation attention is attributable to their specific habitat needs for breeding and the fact that wetlands are being threatened daily by human development. Draining, fragmenting, or eliminating wetland habitats of any type would most likely lead to a decline in this common but secretive bird.

Swamp Sparrow *(Melospiza georgiana)* ***John Brenneman***



White-throated Sparrow *(Zonotrichia albicollis)* ***David N. Ewert***



Darlene Friedman ©

The pure-toned whistled song of the White-throated Sparrow is just as iconic of the boreal forest as the Common Loon is of our northern lakes. Both species breed across much of the boreal forest, are well known, and their songs and calls are especially evocative at dawn and dusk. The White-throated Sparrow is also a familiar species south of the breeding grounds where the distinctively-plumaged birds frequent feeders.

It is a common and widespread species throughout much of North America east of the Rocky Mountains south to Texas. The White-throated Sparrow breeds from the tree line in Canada south to the northern limit of the aspen parkland in the Canadian Prairie Provinces, northern Minnesota, northern Wisconsin, central Michigan, northeastern Pennsylvania, New York, and central New England. It winters primarily in the southeastern United States, south to extreme northern Mexico and north to the southern Great Lakes region and southern New England (Falls and Kopachena 2010). A disjunct wintering population occurs in coastal California and Oregon (Falls and Kopachena 2010).

The White-throated Sparrow is polymorphic, with white-striped males mating with tan-striped females and tan-striped males pairing with white-striped females (Falls and Kopachena 2010); behavioral and genetic characteristics associated with the polymorphism are unique to this species.

Distribution

The White-throated Sparrow breeds in the UP and northern LP (Barrows 1912, Wood 1951, Ewert 1991, McPeek and Adams 1994) south commonly to Roscommon Co. and very locally to Muskegon, Montcalm, and Tuscola counties (Ewert 1991). The distribution of White-throated Sparrows was similar in both MBBA I and MBBA II. In the UP, the proportion of townships occupied was 84% in MBBA I and 87% in MBBA II; in the NLP, 54% in MBBA I and 49% in MBBA II; and only 1% in the SLP in both MBBA I and II. In the NLP, White-throated Sparrows were broadly distributed in the northernmost four tiers of counties. Breeding habitat includes coniferous or mixed habitats with low, dense strata: bogs, muskeg, and other wetland or moist habitats (McPeek and Adams 1994) and occasionally even on dry jack pine plains. In Ontario, this species is found throughout the province except for the Carolinian region of far southwestern Ontario and the Niagara Peninsula where it is very locally distributed (Falls 1987, McLaren 2007). In Wisconsin, White-throated Sparrows are most common during the breeding season in the northern third of the state with scattered evidence of breeding throughout the remainder of the state (Gostomski 2006). White-throated Sparrows were not recorded in the Indiana breeding bird atlas (Castrale et al. 1998) nor as confirmed breeders in the first Ohio breeding atlas, where a few nests have been found in that state (Peterjohn and Rice 1991).

Breeding Biology

Typically White-throated Sparrows nest on the ground in dense vegetation, rarely at short distances above ground; clutch sizes are typically four to five eggs (Barrows 1912). They nest from May through August (McPeek and Adams 1994). Spring migration typically occurs from mid-April through mid-May (McPeek and Adams 1994). Fall migration primarily occurs in September and October (McPeek and Adams 1994). The species regularly winters in southern Michigan in small numbers (McPeek and Adams 1994).

Abundance and Population Trends

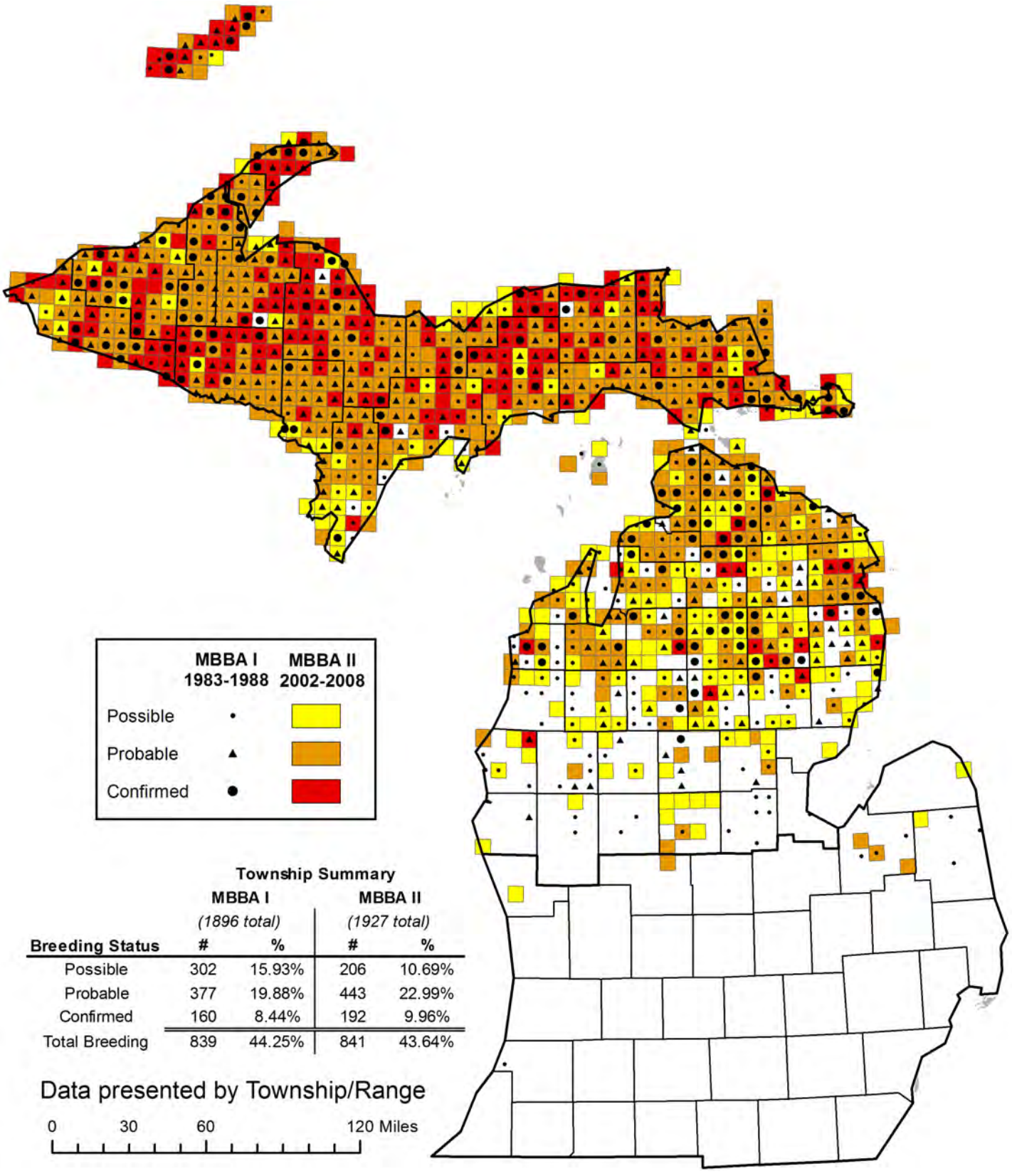
White-throated Sparrows were considered to be common breeders in their Michigan breeding range by Barrows (1912), McPeek and Adams (1994), and in MBBA I. The species remains common and, based on BBS data from 1987-2003, there were no significant population trends in the upper Midwest (USFWS Region 3) or Michigan. No significant population trends have been detected in Wisconsin (Gostomski 2006). Rangewide, the White-throated Sparrow has declined 0.5%/year from 1980 to 2007 based on the Breeding Bird Survey (Sauer et al. 2008).

Conservation Needs

White-throated Sparrows favor early and mid-successional forest, as well as the edges of wetlands and bogs with trees and shrubs. Consequently, forest practices and natural processes, such as wind throw, that create dense conifer thickets will likely provide good breeding habitat for this species. At this time, no specific management is needed to maintain White-throated Sparrows; the species is likely to remain common and widespread in northern parts of the state. Long-term, global warming might result in loss or considerable reduction in conifer habitat in Michigan and White-throated Sparrows could be lost from many areas where they are currently common in the state (Price 2000). Thus far, MBBA and Breeding Bird Survey data do not indicate a northward retraction of the White-throated Sparrow breeding range in Michigan.

White-throated Sparrow *(Zonotrichia albicollis)*

David N. Ewert



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	302	15.93%	206	10.69%
Probable	377	19.88%	443	22.99%
Confirmed	160	8.44%	192	9.96%
Total Breeding	839	44.25%	841	43.64%

Data presented by Township/Range

Dark-eyed Junco *(Junco hyemalis)*

Thomas A. Allan



Darlene Friedman ©

The Dark-eyed Junco is one of the most distinctive and easily recognized sparrows in Michigan. It is a taxonomic conglomerate of five previously distinct species and fifteen subspecies (Nolan et al. 2002). The Michigan form is part of the Slate-colored Junco group characterized by its slate gray body and distinctive white outer tail feathers. The Dark-eyed Junco can be found in Michigan throughout the year. Barrows (1912) found the junco to be a common summer resident of the northern half of the state and a common winter resident of the southern half of Michigan. Juncos are often referred to as "snowbirds" because they appear at bird feeders with the arrival of winter, stay through the winter months, and then depart for their breeding grounds with the arrival of spring. The song of the male junco is a long ringing trill and one has to listen carefully to discern it from the very similar Chipping Sparrow and Pine Warbler, which can often be found in similar habitat as the junco.

When considering all subspecies of the Dark-eyed Junco, its range covers almost the entire North American continent. It breeds across the northern boreal forest from Alaska to Labrador, into the south in montane forests of Arizona and New Mexico, and in the Appalachian Mountains of the east (Nolan et al 2002). The Slate-colored Junco group is distributed throughout much of northern and eastern North America. This migratory species breeds in the mid to high latitudes where suitable habitat exists and winters widely across the eastern portion of the continent (Root 1988).

Distribution

The breeding habitat of the Dark-eyed Junco of eastern North America is generally conifer or boreal forests and its distribution in Michigan appears to reflect this. The Dark-eyed Junco is a regular breeding bird of the northern two thirds of Michigan where suitable conifer habitat is found. There appears to be little difference in the distribution of junco breeding in Michigan from MBBA I to MBBA II. Both MBBA I and MBBA II found the greatest concentration of breeding juncos in the LP to be in the conifer forests of Crawford, Kalkaska, and Oscoda Counties and several of the counties surrounding them. The sandy soils and jack pine forests where Kirtland's Warblers breed are also good habitat for the Dark-eyed Juncos.

The southern distribution of Dark-eyed Juncos in Michigan drops off dramatically after leaving the conifer forests of the north and the probable or possible records of breeding juncos in southern Michigan may be associated with conifer plantings. MBBA II found possible juncos breeding in several counties farther south than MBBA I. The Dark-eyed Junco appears to be a fairly common breeder across the UP, with concentrations of confirmed breeding in the boreal forests and conifer habitats of the Lake Superior watershed. Both MBBA I and MBBA II found confirmed breeding concentrations of juncos on the sandy soils and conifer forests near Whitefish Point and the Raco Plains of Chippewa County, the conifer forests of northern Luce County, the Seney area, the conifer forests surrounding Marquette, and the boreal forests of eastern Gogebic County in the western UP.

The junco was absent in both MMBA I And MBBA II from the agricultural lands of Menominee County, uncommon in the grasslands and clay soils of the eastern UP, and very localized in the extensive hardwood forests of the far western UP.

Breeding Biology

Dark-eyed Juncos arrive on their Michigan breeding grounds in April and May, with courtship, nest building and egg laying occurring in May and June (Allan 1978). Juncos seem to prefer openings, clearings, and edges of the conifer forests rather than forest interiors. Their ground nests are often located along forest edges and are well concealed by a cover of grasses or brush. The nest bowl is often lined with fine grasses, mammal hairs, or other fine materials (Harrison 1975). Although generally very secretive around the nest, the parent juncos often become agitated when an intruder approaches their nest site. They conspicuously flash their white outer tail feathers as part of a predator distraction display. The typical clutch of four hatches in June, with young still being fed by parents up to several weeks after hatching.

Abundance and Population Trends

There was a slight increase in the number of junco records in MBBA II from all regions of the state (241 townships in MBBA I vs. 259 in MBBA II). The results of MBBA II confirm the Michigan distribution and abundance of the junco as found in MBBA I. The occurrence of possible junco breeding in southern regions of the state may be associated with better survey efforts for MBBA II, maturation of conifer plantations into suitable junco breeding habitat, or just very late migrants lingering into the breeding season. The results of the North American Breeding Bird Survey show a statistically significant slight downward trend for survey-wide junco populations but no statistically significant trend in the Michigan population (Sauer et al. 2008). The Michigan population of Dark-eyed

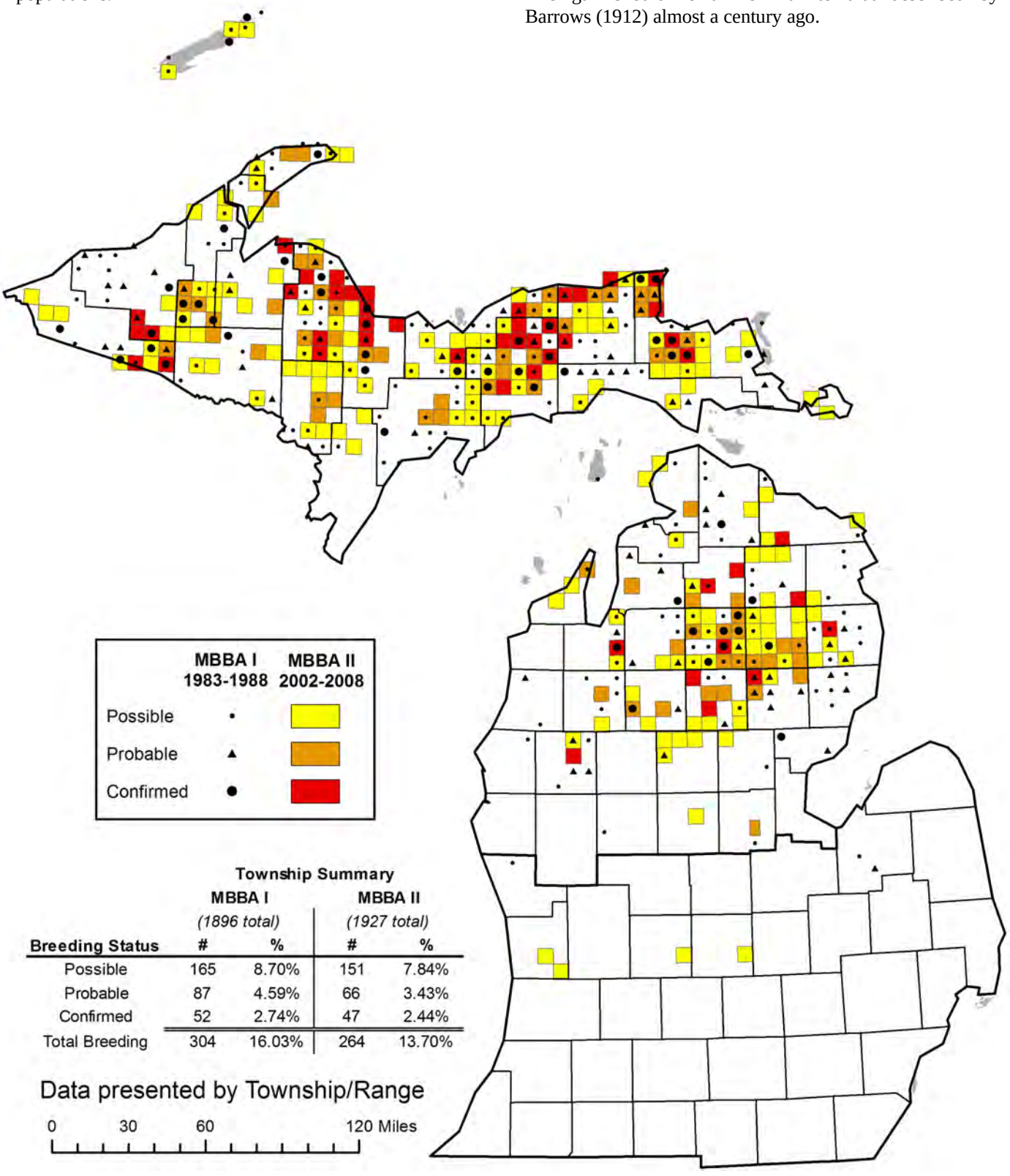
Dark-eyed Junco *(Junco hyemalis)*

Thomas A. Allan

Juncos appears to be stable with perhaps a slight southern expansion in its statewide breeding range. Breeding Bird Atlas surveys in other Midwest regions, such as Wisconsin and New York (Cutright et al. 2006, McGowan and Corwin 2008), have found no significant declines in junco populations.

Conservation Needs

With an apparently stable or slightly increasing population in Michigan and no serious threats to its widespread conifer habitat, there is no immediate concern for Dark-eyed Junco conservation. The distribution of the Dark-eyed Junco in Michigan should remain similar to that described by Barrows (1912) almost a century ago.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	165	8.70%	151	7.84%
Probable	87	4.59%	66	3.43%
Confirmed	52	2.74%	47	2.44%
Total Breeding	304	16.03%	264	13.70%

Data presented by Township/Range

0 30 60 120 Miles

Summer Tanager *(Piranga rubra)* ***Jack Reinoehl***



Elizabeth Rogers ©

The typical breeding range of this species is to the south of Michigan. The nominate race breeds in the deciduous woodlands of the southeastern United States and the western race *P. r. cooperi* in riparian habitat in the southwestern United States and northern Mexico (Howell and Webb 1995). Its winter range extends from Mexico to South America; this is the most likely tanager to be found in the eastern United States in winter (Robinson 1996).

Distribution

At the time of MBBA I, the Summer Tanager was "not known to nest in Michigan" (Adams 1991). This was still the case at the start of MBBA II (Chartier and Ziarno 2004). In 2006 and 2007, a pair of Summer Tanagers was present at Warren Dunes State Park in Berrien County. In 2007 nesting was confirmed there with many observing the successful nesting (Dombroski 2008). In other areas at the latitude of Michigan, this species is also essentially unknown as a breeder. In Ontario, the Summer Tanager was thought to be "likely a rare, occasional or sporadic breeder ... although definitive evidence has not been found." It was located in only three squares in the first Ontario atlas and two in the second, with all records close to Lake Erie or Lake Ontario (Reid 2007). It was similarly scarce or absent during atlasing in New York and Wisconsin (Cutright et al. 2006, McGowan and Corwin 2008). In Ohio and Indiana, this tanager starts to appear widely about 50 to 100 miles north of the Ohio River. North of there, it is found in only about 1% of the blocks within 100 miles of Michigan in those states (Castrale et al. 1998, Peterjohn and Rice 1991). Breeding Bird Survey data shows it reaching its greatest density of occurrence south of the Ohio River (Sauer et al. 2008).

In MBBA I, the Summer Tanager was found in eight blocks in seven counties. Five of these seven counties were in the extreme southern tier; breeding status of probable was reported only from Hillsdale County, the remaining being reported as possible. In MBBA II, only three counties reported this species – Berrien, Kalamazoo and Washtenaw – with nesting confirmed in Berrien County and a status of possible in the other counties.

Between the two atlas periods, another incidence of probable nesting occurred in the state two years before the start of MBBA II. In Hillsdale County, one-half mile north of the point where the St. Joseph River crosses the Ohio state line, a pair of Summer Tanagers was discovered in early June of 2000 (Byrne 2001). These individuals were seen into July but no additional evidence of nesting was observed by any of the numerous birders visiting the area. On 10 May 2001, a male reappeared at this location and remained into June (Reinoehl 2001, Byrne 2002), but no female was detected (pers. obs.). This was the same location where in 1987 the only observation of probable status was recorded from MBBA I.

Breeding Biology

In its primary status in Michigan as a spring vagrant, Summer Tanagers appear throughout May with some sightings in late April. In Ohio, the few known egg dates are in June (Peterjohn and Rice 1991). At Warren Dunes State Park, Berrien County, a female was observed carrying food on 23 July 2007 (C. Barragar, pers. comm.).

Abundance and Population Trends

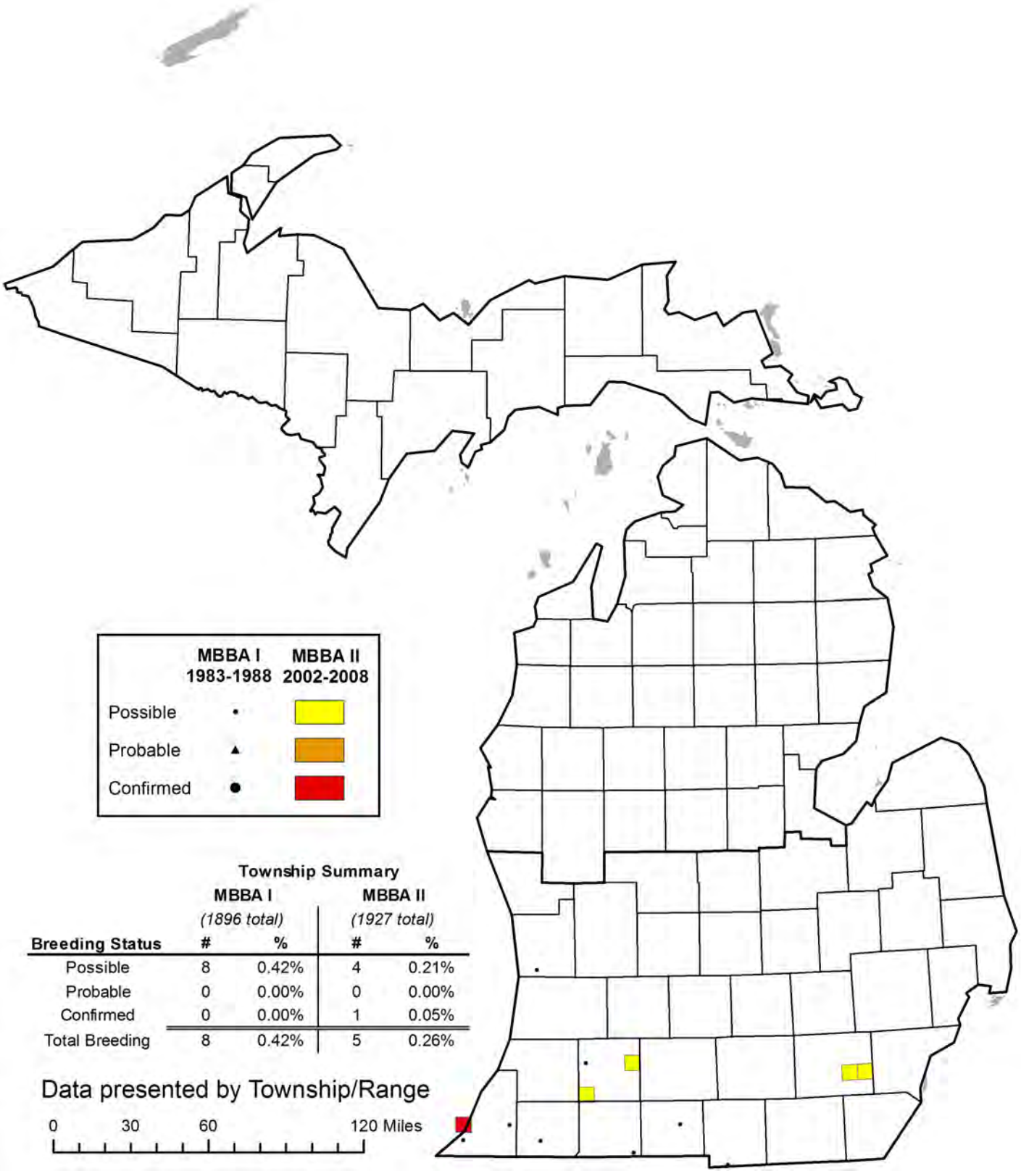
Populations of the Summer Tanager are stable or increasing over most of its range according to Breeding Bird Survey data (Sauer et al. 2008). Good rates of increase in population in some areas where this species is numerous have resulted in a positive trend continent-wide.

In Michigan, the Summer Tanager is most likely to be seen in spring as a migrant that has wandered north of its usual range. It has recently been the most numerous of those passerine species that overshoot their destinations in spring migration, though its numbers vary substantially from one year to the next. It has been quite numerous in some recent spring seasons; Summer Tanagers were located in 11 counties in the spring of 2008, including a surprising six in the Upper Peninsula (Reinoehl 2008). With two pairs having been found in the state in the last decade, and significant numbers visiting the state regularly in the spring, it seems possible that this tanager could establish a small nesting population in Michigan in the coming years.

Conservation Needs

No conservation needs are evident range-wide, as Breeding Bird Survey trends vary by region (Sauer et al. 2008), and Partners in Flight estimates the North American population at 3.3 million (PIF 2007). Declines are evident only in riparian habitats of the southwestern U.S. (Robinson 1996).

Summer Tanager *(Piranga rubra)* ***Jack Reinoehl***



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	8	0.42%	4	0.21%
Probable	0	0.00%	0	0.00%
Confirmed	0	0.00%	1	0.05%
Total Breeding	8	0.42%	5	0.26%

Data presented by Township/Range

0 30 60 120 Miles

Scarlet Tanager *(Piranga olivacea)*

Ben C. Pinkowski



Doug Leffler ©

Species sponsored in memory of: Jean Talbot

Although the brilliant red male Scarlet Tanager is a common breeder in deciduous woodlands throughout Michigan, this species is a tree-top resident with a broken plumage outline that is difficult to discern by predators and humans alike. Moreover, the tanager's arrival in spring is late and fall departure to its Neotropical wintering grounds is early, resulting in a somewhat abbreviated presence in the state. Nevertheless, its hoarse song and abrupt call are distinctive and these, together with its colorful plumage, make breeding males a regularly observed summer resident in the high forest canopy. Scarlet Tanagers winter in tall primary and second-growth forests from Panama to Ecuador, Peru, and Bolivia (Mowbray 1999).

Distribution

The Scarlet Tanager is broadly distributed throughout Michigan, and there has apparently been little change in the species' distribution in the state since MBBA I. In MBBA II, the Scarlet Tanager was reported from all 83 counties in the state, as was the case in MBBA I. Breeding Bird Survey data from USFWS Region 3 indicate only a slight and non-significant increase in birds recorded per route since MBBA I (Sauer et al. 2008).

Male Scarlet Tanagers arrive in Michigan from late April through early to mid-May, typically a week or so earlier than the drab colored females. During the breeding season, the Scarlet Tanager prefers mature deciduous forest and shows a marked dependency on size of forest tract; estimated minimum forest area needed to sustain a viable population appears to be about 10-12 hectares. In forest tracts of sufficient size, nesting birds prefer deciduous trees of considerable height. An examination of 28 habitat variables in areas inhabited by breeding Scarlet Tanagers found several variables reflecting large tree size positively correlated with abundance (Anderson and Shugart 1974). In New Jersey, 68% of all nests recorded in one study occurred in trees with a diameter at breast height (dbh) of >22.4 cm (Prescott 1965). Recent discriminant function analysis of habitat features in Michigan by Porter (1996) indicated a probability >94% of occurrence of this species in forested areas with a moderate density of large trees and a low density of small trees.

In Illinois, brood parasitism and nest predation in fragmented forests have had a depressing effect on breeding success (Mobray 1999). Scarlet Tanagers completely disappeared from small forests less than five hectares in size; forest area and openness of canopy plus density of shrub layer account for 77% of variation in abundance (Ambuel and Temple 1983). A study in the Midwest states by the Cornell Laboratory of Ornithology on improving habitat for Scarlet Tanagers concluded that forest tracts at least 7,500 acres in size should be preserved and landscapes that remain at least 70% forested tend to minimize the adverse effect of intrusion by Brown-headed Cowbirds (Rosenberg et al. 1999).

Breeding Biology

Scarlet Tanagers are monogamous and begin courtship within days after their arrival in Michigan during May. Nest-building activity begins immediately after courtship, usually by mid-May, within a week after females arrive (Prescott 1965). Males are vigorous in defense of their territories, but the drab females often go unnoticed after egg-laying and incubation are underway.

Territories are large and well-spaced, accounting for the species' sparse occurrence. The typical nest contains three or four eggs and is located in a branch fork away from the main trunk. Usually only a single brood is raised per year, and no second brood attempts were noted in south central Michigan by Prescott (1965). It is not clear if birds whose first nests are disturbed attempt to renest, though renesting is strongly suspected but not often documented.

Abundance and Population Trends

The distribution of Scarlet Tanagers is remarkably uniform throughout Michigan's three regions, with differences of no more than 3-4% noted between the percentage of townships in which scarlet tanager was recorded in MBBA I vs. MBBA II for UP, NLP, and SLP. In nearby Ontario, little change was noted in overall distribution of the Scarlet Tanager between their atlases although BBS data suggest a 3.1% annual decrease Canada-wide since 1968 (Cadman et al. 2007).

From 1966 to 1996, the Scarlet Tanager experienced statistically significant increases in breeding populations in Indiana (2.1%), Kentucky (4.4%), and Tennessee (2.2%) as well as Michigan (2.2%). During the same period, populations declined significantly in Maryland (1.1%), in the Upper Coastal Plain (1.3%), Allegheny Plateau (0.8%), Northern New England (1.1%), and Northern Spruce-Hardwoods (1.6%) physiographic regions (Mowbray 1999).

Scarlet Tanagers prefer larger forest tracts and are known to avoid edges and smaller woodlands that are used by its close relative, the Summer Tanager. Presently, Partners in Flight

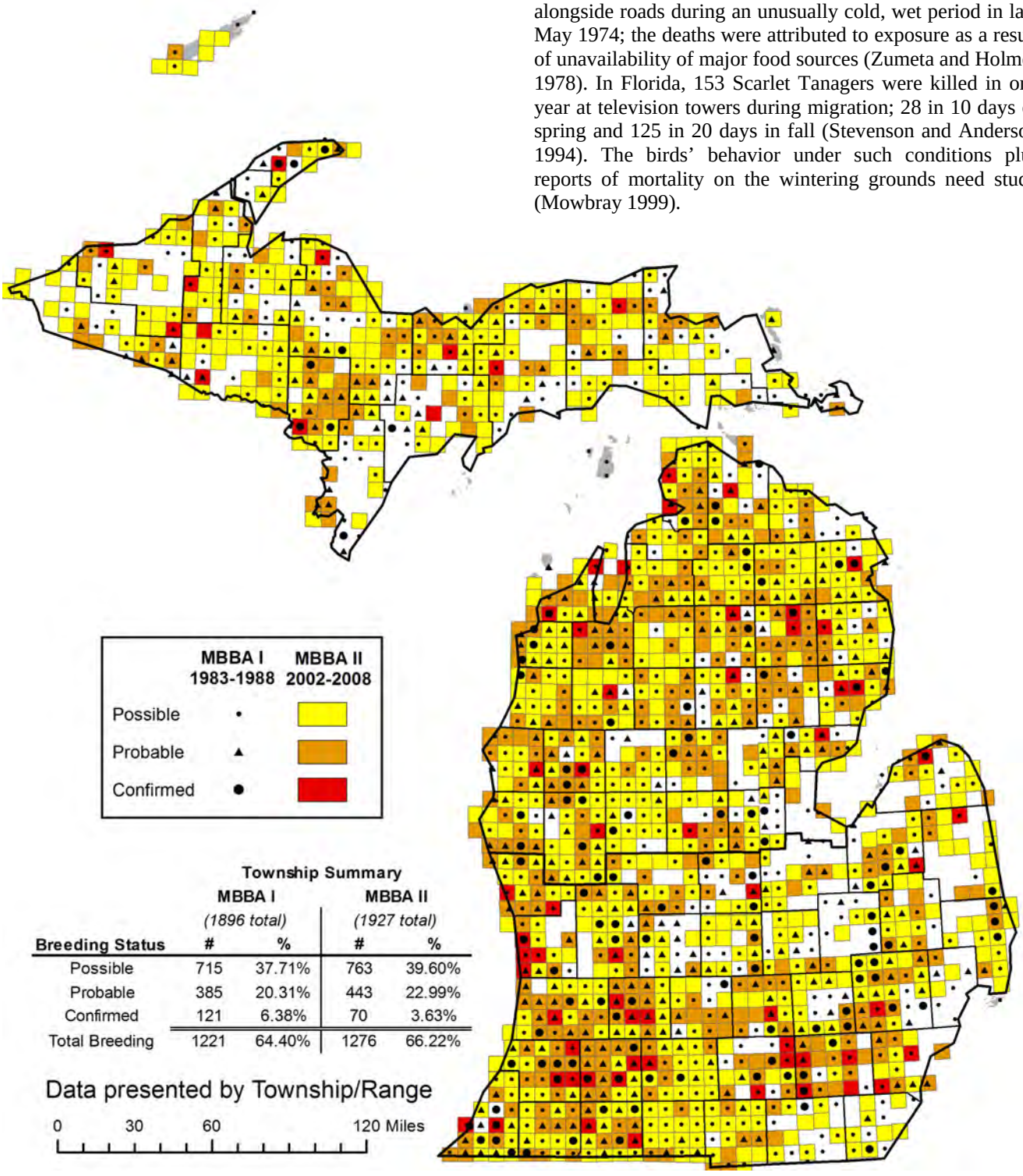
Scarlet Tanager *(Piranga olivacea)*

Ben C. Pinkowski

estimates a continental population of Scarlet Tanagers at about half that of the less restricted Summer Tanager, a southerly species that occasionally wanders into Michigan (PIF 2007). Extensive clear-cutting for farming may benefit edge species, but it is the major cause of Scarlet Tanager habitat loss. For this reason, the Scarlet Tanager is nearly twice as abundant in the wooded southern regions of Indiana and Ohio than in the heavily farmed northern regions of those states (Castrale et al. 1998, Peterjohn and Rice 1991).

Conservation Needs

Although MBBA II numbers for Scarlet Tanager throughout Michigan are stable**,** clearing of mature oak and maple woodlands for agriculture remains a potential threat to the species. Forested tracts are best if they are large and contiguous, not fragmented. Early arrival onto northern breeding areas can be perilous to Scarlet Tanagers, especially under sub-optimum conditions. For example, in New Hampshire, 71 Scarlet Tanagers were reported dead alongside roads during an unusually cold, wet period in late May 1974; the deaths were attributed to exposure as a result of unavailability of major food sources (Zumeta and Holmes 1978). In Florida, 153 Scarlet Tanagers were killed in one year at television towers during migration; 28 in 10 days of spring and 125 in 20 days in fall (Stevenson and Anderson 1994). The birds' behavior under such conditions plus reports of mortality on the wintering grounds need study (Mowbray 1999).



Northern Cardinal *(Cardinalis cardinalis)* ***Gail McPeek***



Jerry Jourdan ©

Species sponsored in memory of: Herb Harrington

Few birds add such beauty to our neighborhoods as the Northern Cardinal. A brilliant red male singing from a green treetop against a sky-blue backdrop is a picture perfect moment. This year-round resident also adds a cheery splash of red during Michigan's long, snowy winters. The cardinal ranks among our most popular birds. Its image adorns mail boxes, home décor, clothing and sports apparel, and it is the official bird of seven states. The cardinal eats a variety of insects, fruits and seeds. Its conical bill is a powerful seed crusher, a skill easily observed at feeders with sunflower seeds. During fall molt, both males and females consume fruits and insects high in carotenoid pigments. These are essential for maintaining plumage color, even the tints of red on the otherwise grayish-tan female.

Today, the Northern Cardinal can be found throughout most of the eastern and central United States, from central Minnesota, southern Canada and Maine, south across Texas, Arizona and into portions of Mexico and Central America. This is an expanded range compared to historic accounts, and is attributed to human influence on the landscape, the warming climate, and enhanced winter food supply provided by bird feeders (Halkin and Linville 1999).

Distribution

Michigan's avian checklists chronicle the dramatic change in status and distribution for the cardinal. In just 150 years, this species went from accidental visitor (Gibbs 1879); to rare and mainly confined to the southern LP (Barrows 1912); to common in southern Michigan and spreading northwards (Wood 1951); to the present distribution mapped by both Atlases. Now the Northern Cardinal is common across much of the LP, and is rare but well established in parts of the UP.

MBBA II results clearly show that the cardinal continued its northward advance during the last 25 years. Comparing the two atlases, townships with breeding evidence increased from 340 to 416 in the NLP, and from 19 to 68 in the UP. The map shows only small sections in the NLP not yet occupied by this songbird: areas having more contiguous forest and fewer people. In the UP, cardinals are concentrated along the Wisconsin border, with other records scattered about in the vicinity of human habitation.

The cardinal is a bird of second-growth habitats, including shrubby fields, forest and marsh edges, and the multitude of hedgerows and plantings found in towns, suburbs, parks and other human landscapes. A good breeding territory includes a few large trees or other conspicuous song perches, and dense woody vegetation for nesting.

Breeding Biology

Color difference of the sexes makes it easy to recognize a breeding pair. Territorial singing begins in early spring, and not just by the male. The female cardinal is an accomplished singer and song exchanges with her mate are important for coordinating behavior during the breeding season (Stokes and Stokes 1983, Kroodsma 2005). The female also sings from the nest, a signal to the male for food delivery (Halkin 1997). In fact, listening for such song and observing a male enter and leave the same spot, can help you locate the nest. Commonly chosen nest sites include hawthorn, honeysuckle, multiflora rose, and dense conifers.

Recorded egg dates for Michigan range from 10 April to 9 September (Kalamazoo Nature Center 2004). An early start to breeding allows for two or three broods per season. Clutch size is usually three eggs, which hatch in about 12 days. Nestlings are fed a nourishing diet of insects and fledge in about 10 days. Fledglings resemble the female, but with a tiny crest and stubby tail. As juveniles, a dark-colored beak distinguishes them from adult females.

Abundance and Population Trends

Within the state, Northern Cardinals are most abundant in the SLP. The second-growth habitats and climate of this region are more suited to this species. The large human population with its plantings and bird feeders are an added bonus. Atlas, Breeding Bird Survey, Christmas Bird Count (CBC) and other databases all show this pattern of abundance. On the 2006-07 CBC, for example, the number of cardinals counted totaled 7,140 in the SLP, 714 in the NLP, and 51 in the UP (Palmgren 2007).

The BBS is our best source for relative abundance of breeding birds. Data for the period of 1966-2007 identified highest densities (20+ cardinals per route) in the counties of Macomb, Oakland, Livingston, and Washtenaw in the southeast plus all of the counties in the southwest from Ionia, Eaton, and Calhoun to Berrien (Sauer et al. 2008). It is also fairly abundant in the Thumb, with several routes averaging 15-20 cardinals. Counties along the SLP-NLP transition line tend to average between 5-10 cardinals per route. Farther north in the LP, numbers are considerably lower (1-2 per route) with the exception of the Traverse City area, where one route has an average of eight cardinals. This concentration was evident in MBBA I and attributed to the

Northern Cardinal *(Cardinalis cardinalis)*

Gail McPeek

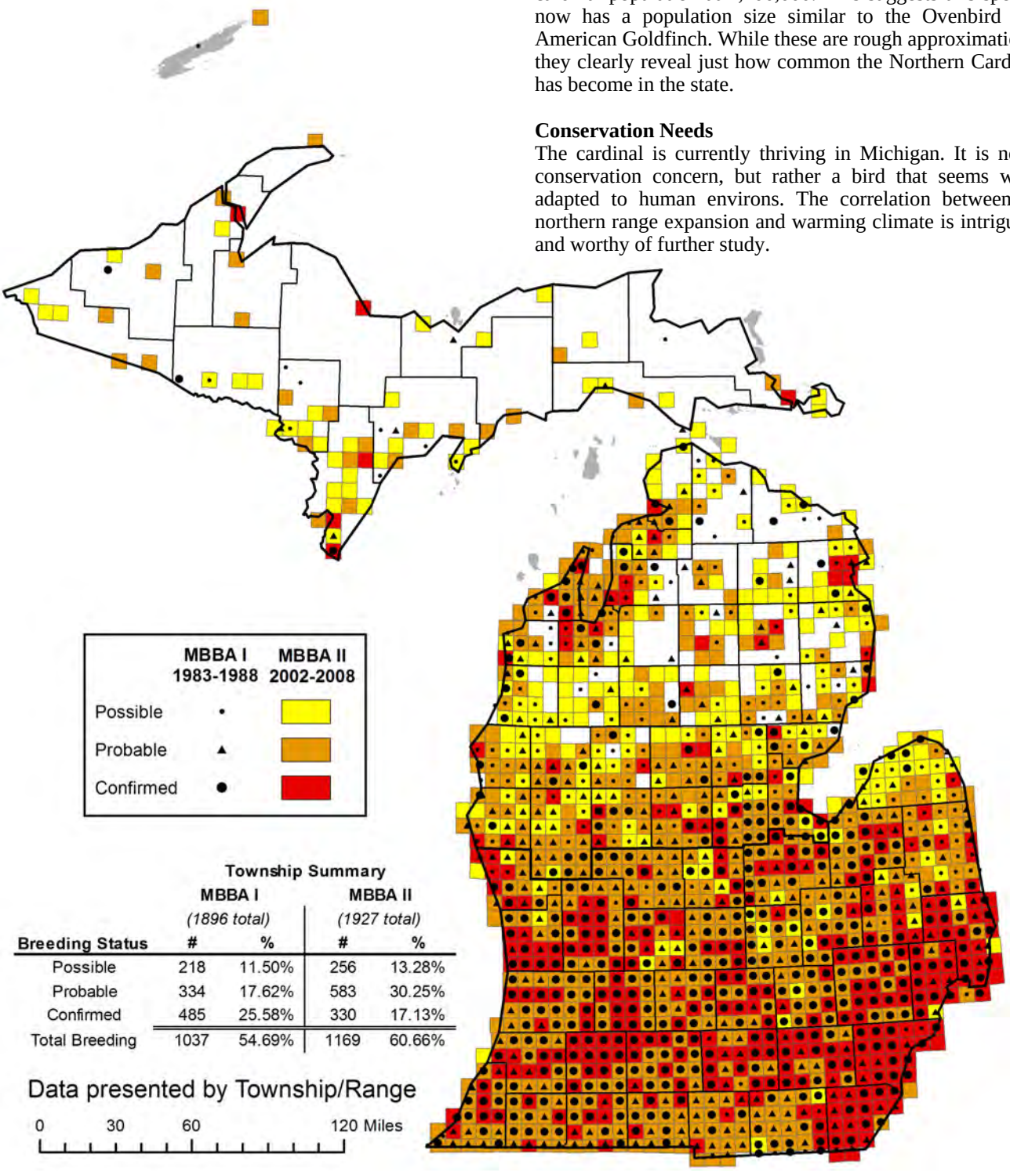
abundance of orchard and residential habitats in the area (Durst 1991).

Since 1966, BBS data for the state show a steady and significant increase of 1.4% per year (Sauer et al. 2008). After being reported on an average of 30 routes during the 1966-79 period, this species showed a large increase, and was observed on an average of 60 routes in 1980-2007. This trend has manifested itself across the northern part of its range. Our neighbors to the west and east in Wisconsin (Temple 2006) and Ontario (McLaren 2007) have also documented continued increases during the 1990s. Likewise, McGowan (2008) reported an increase in New York State since the first atlas 20 years ago.

During the development of its Landbird Population Conservation Plan, PIF (2004) estimated Michigan's cardinal population at 1,100,000. This suggests this species now has a population size similar to the Ovenbird and American Goldfinch. While these are rough approximations, they clearly reveal just how common the Northern Cardinal has become in the state.

Conservation Needs

The cardinal is currently thriving in Michigan. It is not a conservation concern, but rather a bird that seems well-adapted to human environs. The correlation between its northern range expansion and warming climate is intriguing and worthy of further study.



Rose-breasted Grosbeak *(Pheucticus ludovicianus)* ***Amber Roth***



Jerry Jourdan ©

Species sponsored by: James & Carolyn Henning

The Rose-breasted Grosbeak is one of the most recognizable Neotropical migrants due to the male's striking plumage and the species' propensity to visit bird feeders on migration and early in the breeding season. The melodious song is described as sounding like a robin with voice lessons. By following this song, on occasion, you may be led to the male singing in the nest. Michigan is at the core of the breeding range which includes the Appalachians, the northeastern U.S., the Midwestern U.S., and southeastern and central Canada. Based on banding records and recoveries, most Midwestern individuals are suspected to migrate to western Central America (Mexico to Honduras) for the winter (Wyatt and Francis 2002).

Distribution

This common songbird is found throughout Michigan, and breeding evidence in MBBA II was documented in 43% of blocks and 82% of townships. The Upper Peninsula had a notably lower ratio with only 31% of blocks and 67% of townships reporting breeding evidence. In a comparison of breeding documentation between the two atlases, there was little difference in the percentage of townships reporting breeding evidence though there was a difference at the block level. The percentage of blocks reporting breeding evidence declined by 17% for the SLP and 15% for the NLP but increased by 11% in the UP which may reflect a change in survey coverage between atlases. Compared to MBBA I, there was a notable drop (41% decline for blocks and 33% decline for townships) in the proportion of confirmed to possible and probable breeding records, especially in the LP, which may not reflect a true change in breeding activity but rather a difference between atlases in observer effort or a tendency for observers in MBBA II to be satisfied with less evidence to establish breeding activity.

Atlas projects in neighboring states reported similar distribution findings with forested states having a higher percentage of blocks reporting breeding evidence than was found in the more agricultural-grassland states. New York (88% and 82% of blocks for first and second atlases, respectively) and Wisconsin (89% of quads) reported similar results and represent two states with a mix of agriculture and large, forested landscapes (Andrle and Carroll 1988, Cutright et al. 2006, McGowan and Corwin 2008). Illinois (56% of blocks) and Ohio (55% of priority blocks) had similar results for their northern regions (Peterjohn and Rice 1991, Kleen et al. 2004).

Breeding Biology

Rose-breasted Grosbeaks are an early to mid-successional forest generalist and inhabit a wide range of deciduous and mixed forest uplands and lowlands including shrubby ecotones, second growth forest, and well vegetated residential areas such as parks, gardens, and orchards (Wyatt and Francis 2002). They are rarely found in dry woodlands and conifer dominated forests. In aspen forests in Michigan and Minnesota, grosbeaks reached their highest densities in stands with tree heights ranging from 1.9 to 4.0 meters and were absent in stands shorter than 1.9 meters and taller than 8.0 meters (Probst et al. 1992). In Wisconsin, Rose-breasted Grosbeak abundance was highest in 11 year old aspen stands and was present in stands five to 45 years following clearcutting (Steffen 1985). Given that the mean nest height for this species is six meters, the density of the upper shrub layer is likely an important microhabitat characteristic (Wyatt and Francis 2002).

Rose-breasted Grosbeaks typically build their loose, cup shaped nest 1.2-6.0 meters above ground in a forking tree branch and construct it of twigs, coarse grasses, weed stems, and decayed leaves lined with fine twigs, rootlets, and hair (Baicich and Harrison 1997). During MBBA II, nesting or brood rearing activity was observed from April 30 to August 23 with a peak from mid-May to mid-July. A majority of observations (64%) involved feeding young and ranged from May 7 to August 23. Quantitative studies across the region suggest a low rate of Brown-headed Cowbird parasitism relative to other open cup nesting species (10% of nests or less depending on the study area), and grosbeaks are generally successful in rearing their own young despite the cowbird young (Wyatt and Francis 2002).

Abundance and Population Trends

Partners in Flight estimates the population for Michigan at 240,000 individuals, an estimated 5.2% of the global population, and identifies the Rose-breasted Grosbeak as a Regional Stewardship Species in Michigan (PIF 2007). The long term Breeding Bird Survey (1966-2007) results and the trend between the two Michigan atlas projects indicate a stable population in Michigan despite significant long-term declines in Ontario, northeastern states, and survey-wide (Sauer et al. 2008). The higher number of individual birds observed per route in Michigan as compared to the region further highlights the importance of Michigan's contribution to supporting the regional and global population.

Conservation Needs

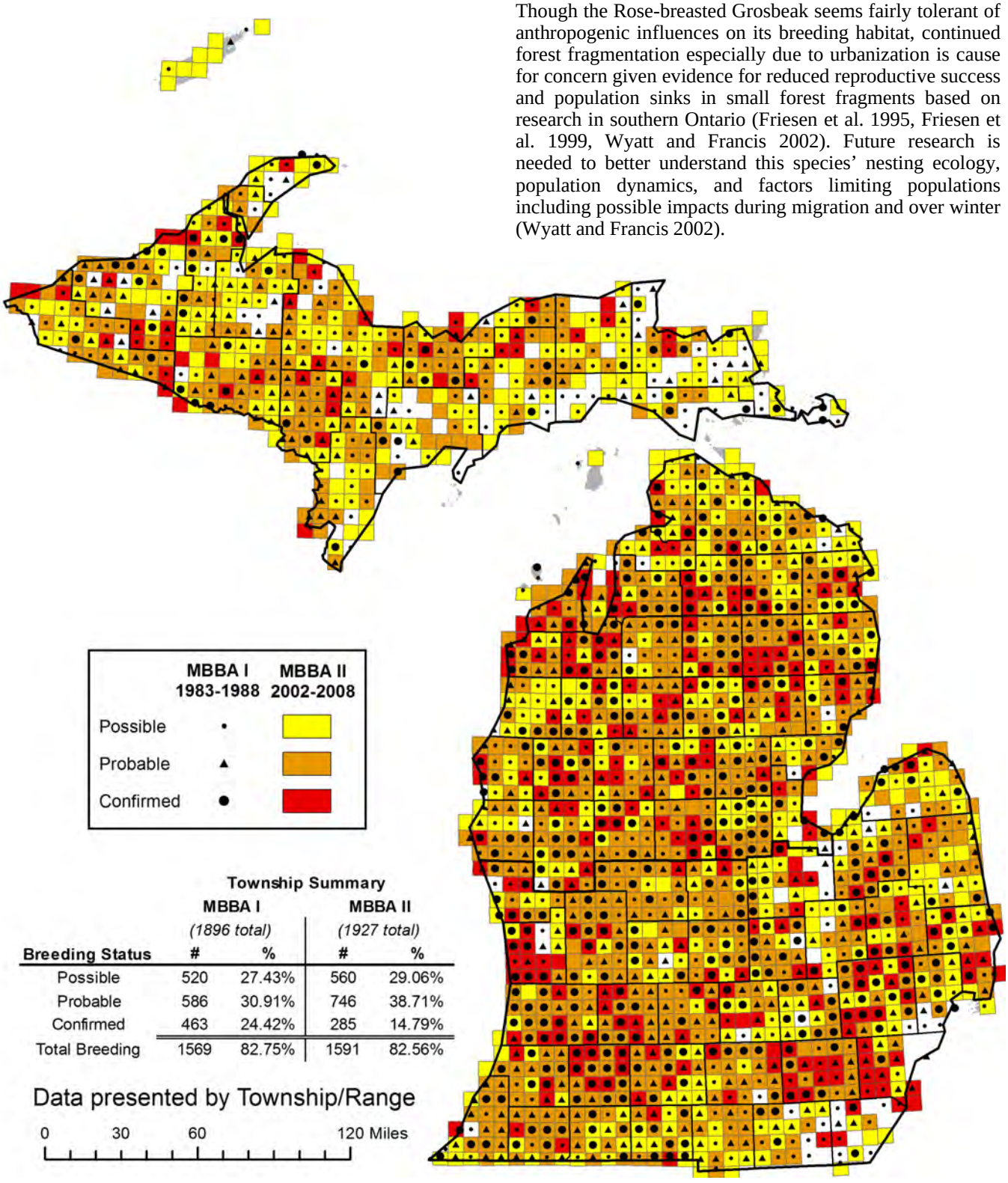
Given that the Rose-breasted Grosbeak is a PIF Stewardship Species, the residents of Michigan have great stewardship responsibility for the long term sustainability of this species' global population. Conservation actions should target habitat management practices that will benefit the suite of species commonly associated with the Rose-breasted Grosbeak (Blancher et al. 2007). Forest maturation may reduce nesting opportunities and can be countered with

Rose-breasted Grosbeak *(Pheucticus ludovicianus)*

Amber Roth

forest management such as clearcutting or burning to create and maintain early successional breeding habitat (Wyatt and Francis 2002). In Minnesota, grosbeak abundance did not differ between clearcut and burned aspen forests (Schulte and Niemi 1998). Grosbeaks were more abundant in the residual patches of canopy trees retained in aspen clearcuts than clearcuts without residual patches (Merrill et al. 1998). Strip-cutting forest can either increase or decrease grosbeak abundance, and differences in response may depend on context (e.g. stand age at time of cutting or surrounding forest structure) and the characteristics of the strip cutting (Christian et al. 1996, Doyon et al. 2005).

Though the Rose-breasted Grosbeak seems fairly tolerant of anthropogenic influences on its breeding habitat, continued forest fragmentation especially due to urbanization is cause for concern given evidence for reduced reproductive success and population sinks in small forest fragments based on research in southern Ontario (Friesen et al. 1995, Friesen et al. 1999, Wyatt and Francis 2002). Future research is needed to better understand this species' nesting ecology, population dynamics, and factors limiting populations including possible impacts during migration and over winter (Wyatt and Francis 2002).



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	520	27.43%	560	29.06%
Probable	586	30.91%	746	38.71%
Confirmed	463	24.42%	285	14.79%
Total Breeding	1569	82.75%	1591	82.56%

Data presented by Township/Range

0 30 60 120 Miles

Blue Grosbeak *(Passerina caerulea)*

Alan T. Chartier

Status: *Casual (MBRC)*



John Van Orman ©

The beautiful rich warbling song of the Blue Grosbeak, similar to an Orchard Oriole or House Finch, is rarely heard in Michigan, as it is mainly a casual spring overshoot migrant with only twelve accepted state records since the first in May 1991 in Berrien County (MBRC 2009). Early-arriving male Indigo Buntings with winter brown feathers mixed in with summer blue plumage are sometimes mistaken for the male Blue Grosbeak, though there is a notable size difference and Blue Grosbeaks show a chestnut, not brown, shoulder patch. Females are more difficult to distinguish from female Indigo Buntings, and have only been confirmed twice in Michigan.

The Blue Grosbeak is typically considered to be a southern species, occurring across the U.S. from central California and southern Utah in the west, and from southern Illinois to New Jersey in the east, south into Mexico and Central America and with a northward extension of its range in the Great Plains to southern North Dakota (Ingold 1993).

Distribution

Ohio recorded breeding Blue Grosbeaks from 27 blocks, primarily from southernmost and unglaciated portions of the state, which represents a range expansion that may have begun before 1987 (Peterjohn and Rice 1991). Additionally, though not recorded during the Ohio atlas period, occasional summering individuals are found in the northwestern corner of the state at the Oak Openings Park in Lucas County (Peterjohn and Rice 1991).

There was no evidence of breeding in MBBA I. Remarkably, a pair of Blue Grosbeaks was confirmed nesting in northwestern Constantine Township, St. Joseph County, in 2004 by Ray Adams, the first ever for the state. A male and female were seen carrying food to a probable nest site, located on private property, between 19-26 July 2004. The nest was not located but was suspected to be in a small clump of trees on the edge of a pasture (R. Adams, pers. comm.). The territory of this pair apparently also included the adjacent block in southwestern Fabius Township. In addition, male Blue Grosbeaks were detected during the breeding season in appropriate habitat in single blocks in Berlin Township, Monroe County on 20 June 2007 and in Manchester Township, Washtenaw County on 25 June 2007, but with no higher breeding evidence than possible.

Breeding Biology

The breeding habitat of the Blue Grosbeak includes forest edge, old fields with hedgerows, transmission line corridors, or other places with dense, low vegetation and medium-sized trees (Ingold 1993). Such habitats are very common throughout southern Michigan and were it not for the Blue Grosbeak's southerly distribution, it would likely find many suitable areas to breed in the state.

Nesting in this species is not well studied, even though nests are apparently easy to find, usually low (15 cm to 7.8 m above ground) in a small tree or shrub near open areas and consisting of a compact open cup similar to that of the Indigo Bunting. Usually 3-5 eggs are laid and some females are double brooded. Dates of first egg laying in Indiana occurred in June and in May farther south. Incubation lasts 11-12 days and young fledge at 9-10 days old (Ingold 1993).

Abundance and Population Trends

Evidence of a northward expansion of the breeding range of the Blue Grosbeak since the 1960s was noted in the Ohio, Indiana, and Illinois breeding bird atlases (Peterjohn and Rice 1991, Castrale et al. 1998, Kleen et al. 2004). Wisconsin recorded singing males in appropriate breeding habitat in two blocks (Cutright et al. 2006). A total of 47 records of Blue Grosbeak, representing 52% of all records from the province, were recorded from the well-known migration hotspot, Point Pelee National Park, Ontario, between 1957 and 2002, with a clear pattern of increasing records in more recent years. Most were reported from early to mid-May, with extreme dates of 22 April to 1 June (Wormington 2003). Breeding has not been recorded in Ontario.

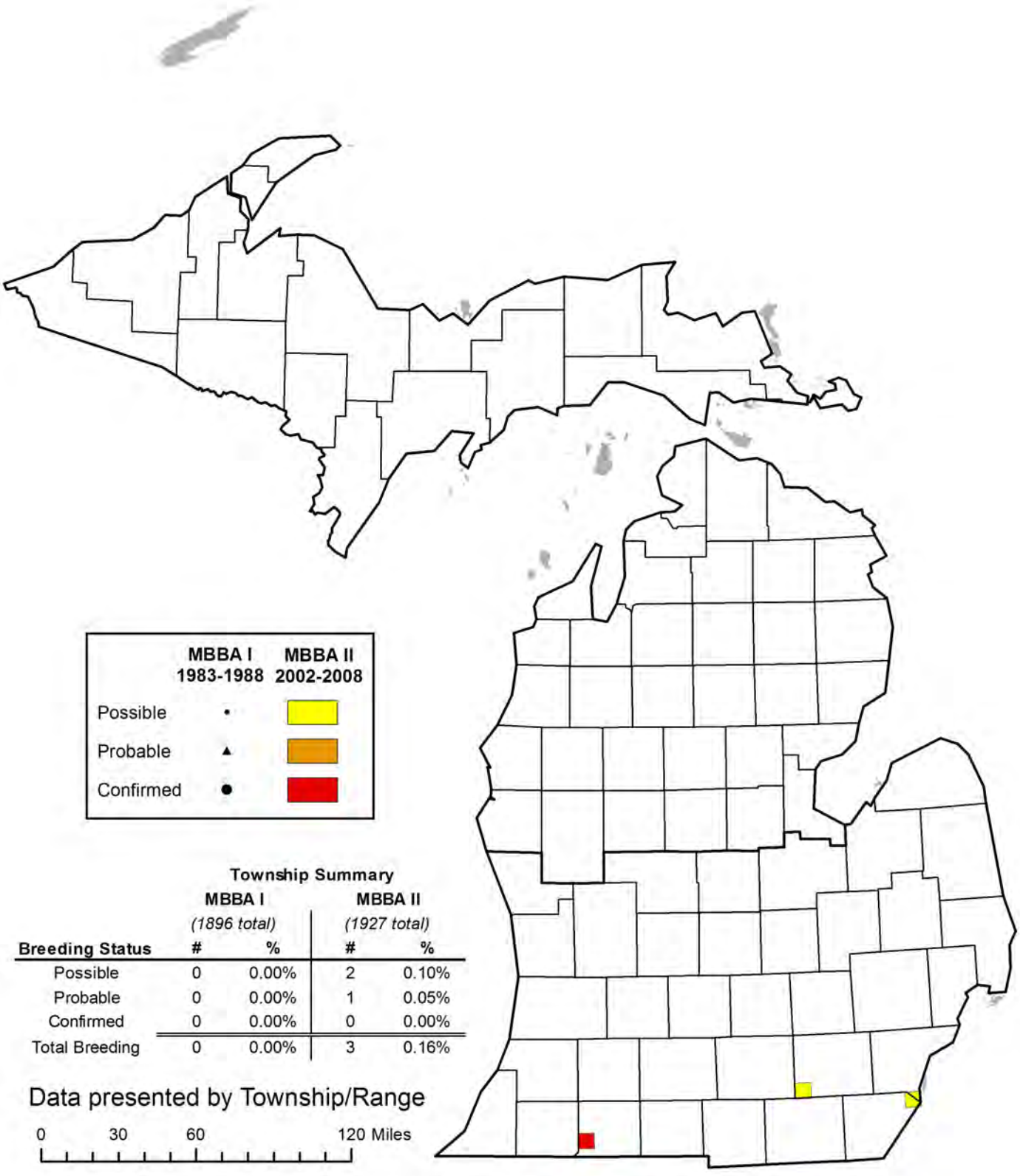
Conservation Needs

Abandonment of agricultural land may benefit this species, but urbanization will not (Ingold 1993).

Blue Grosbeak *(Passerina caerulea)*

Alan T. Chartier

Status: *Casual (MBRC)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	0	0.00%	2	0.10%
Probable	0	0.00%	1	0.05%
Confirmed	0	0.00%	0	0.00%
Total Breeding	0	0.00%	3	0.16%

Data presented by Township/Range

Indigo Bunting *(Passerina cyanea)*

Robert B. Payne



Jim Ridley ©

In late spring and through the summer, the songs of Indigo Buntings are heard throughout Michigan. The bright blue males are conspicuous as they sing high on their perch in trees. The brown females remain out of sight in the bushes and weeds where they nest. The buntings migrate in spring across the Gulf of Mexico and along the Caribbean lowlands of Mexico, and in autumn and winter they return to Mexico, Central America and the West Indies. During the breeding season in Michigan they eat mainly insects and they also take seeds, buds and berries (Payne 2006).

Distribution

Indigo Buntings are widespread throughout Michigan. They live in shrubby habitats and often choose a site where blackberries and dogwood provide a place to nest. They also nest in rank forbs with branched stems that support a nest, and where several vertical stems are bound together to support the nest, as in goldenrods. Their distribution remained stable from MBBA I through MBBA II in most townships in the state, with an 11% increase in occurrence in townships in the UP. The decrease in distribution in survey blocks in the NLP and SLP appears to be a matter of scale; the survey blocks are more fine-grained than townships. Perhaps the more local changes in habitat in survey blocks account for this decrease in birds in these survey areas.

Breeding Biology

Males sing and set up breeding territories in Michigan when they return from their wintering area from early May to June. They breed shortly after their arrival and continue to breed through early summer and into late July and August in the more humid habitats (Payne 2006). Females build the nests within a day or two of their arrival in spring, or they wait a couple of weeks after their arrival (Carey 1982). The latest seasonal reports of breeding in Michigan are fledglings in parental care into early September (Payne 2006). In the northern part of their range, buntings may have time to nest only once in a season (Binford 2006). Territory size is 0.3 to eight hectares and is larger in swampy habitats. Although the birds live in pairs in the breeding season, females often mate outside the pair bond, as both genetic markers and morphology show about 30% of nestlings had a genetic father who was not their mother's social mate (Westneat 1987, 1988, 1990; Payne and Payne 1989). Females rear their brood until the young fledge; some older males help the female care for the young after they leave the nest. About 15% of the males attract more than one female to nest on their territory in a season. A female nests repeatedly in a season either with the same male or with a change of male and territory. Occasionally even a first year female succeeds in raising three broods (Payne 1989, 2006).

Most buntings do not return to the nest site where they were born, they usually settle at least several kilometers from that site. Nevertheless, many buntings return to breed in their natal area, within 2-4 kilometers of the nest site where they were born (Payne 1991). These first-year males sing songs unlike their fathers' songs, and they learn their songs from an adult male on the territory next to their own first breeding territory. Females usually mate with a male whose song is unlike their father's song, although a few mate with their father; only about 1% mate with a close family relative. Older returning males usually settle on their territory of the previous year, while females often settle on a new territory rather than re-pairing with their old mate even when he returns to his old territory (Payne and Payne 1993, 1996). In the first half of the breeding season about a third of bunting nests are brood-parasitized by Brown-headed Cowbirds; their later nests are free of cowbird parasitism (Payne and Payne 1998). Overall, about half the nests fledge at least one bunting, most other nests are lost to a predator (Payne 1989, 2006). Although they avoid predation of their eggs and young by concealing their nests, females themselves may flush from a nest more quickly when their nests are less well concealed and they see a predator approaching the nest (Burhans and Thompson 2001). Adult survival is 55% for males and 40% for females; the oldest known male was banded as a one-year bird and returned to the same territory for the next ten years (Payne and Payne 1989, 1990, 1996).

Abundance and Population Trends

Indigo Buntings have been widespread and common in Michigan for many years. Barrows (1912) noted them in nearly every part of the state except Isle Royale. Breeding density in southern Michigan has been estimated at as many as 35 breeding pairs per 100 hectares in Cass County and 15 breeding pairs per hectare in Livingston County (Payne 2006). During MBBA I they were found in 94% of the surveyed townships in the SLP, 91% in the NLP and 67% in the UP. During MBBA II they were recorded in 94%, 92% and 77% of surveyed townships respectively, suggesting an increase in the UP. Breeding Bird Survey (BBS) routes show higher densities (more than 20 birds per route) in the northwestern LP from Kalkaska and Crawford north to Charlevoix and Cheboygan Counties and in the southwestern LP from Allegan, Barry and Calhoun to Cass and St. Joseph Counties. In this region the deciduous woodlands and shrubby vegetation are mixed with small farms and provide nesting areas along roadsides. Densities are lower (fewer than 10 birds per BBS route) in the more wooded NLP and the boreal coniferous forests of the UP. In neighboring Wisconsin the proportion of survey blocks (88.8%) with Indigo Buntings (Cutright et al. 2006) is similar to that in Michigan (88.1%). Densities in Ontario,

Indigo Bunting *(Passerina cyanea)*

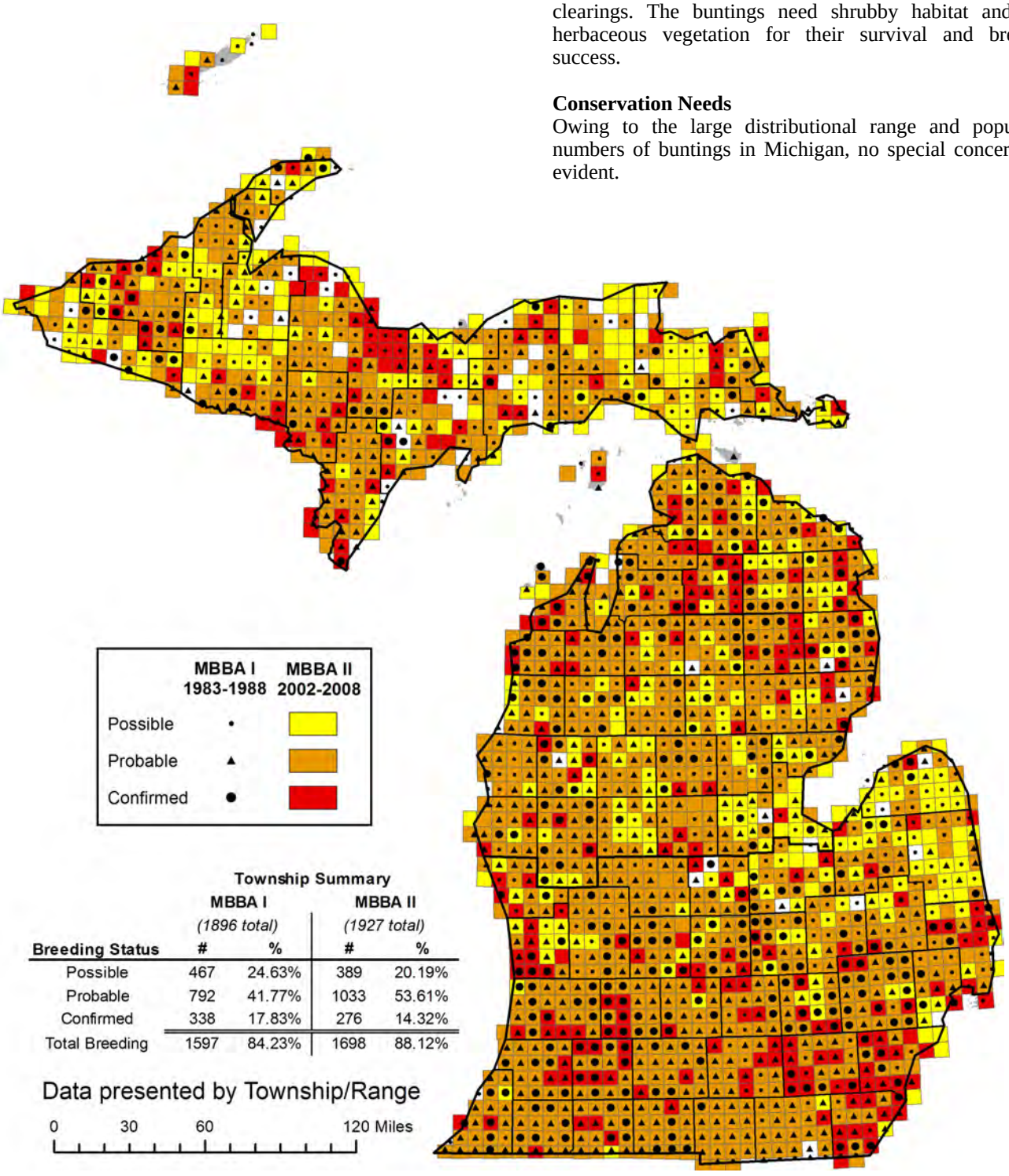
Robert B. Payne

like those in Michigan, decrease with latitude, with 7.2 buntings per route in the southern Carolinian Region, 4.6 in the Lake Simcoe-Rideau Region and 0.1 in the Southern Shield Region (Cadman et al. 2007). In Michigan, no significant changes in numbers were detected in BBS routes from 1966 through 2006; while throughout the bunting's range a small but significant decrease of 0.6% was noted from 12.4 birds per route in 1966 to 11 birds in 2004 (Sauer et al. 2008).

Indigo Buntings are scarce or absent in urban areas, in intensively cultivated lands, and in heavily forested habitats. They settle in abandoned farm fields and roadside edge within a few years after the land is abandoned by humans. Where swamps and abandoned fields remain as shrubby habitat due to browsing by white-tailed deer, the buntings may appear over more than 60 years (Sutton 1959, Payne 2006). They disappear where areas are turned into cities and residential development, where farms are worked intensively, and where forests grow and replace earlier clearings. The buntings need shrubby habitat and rank herbaceous vegetation for their survival and breeding success.

Conservation Needs

Owing to the large distributional range and population numbers of buntings in Michigan, no special concerns are evident.



Dickcissel *(Spiza americana)*

Julie Gibson

Status: *Special Concern (MNFI)*



Willie McHale ©

The Dickcissel is primarily a seed-eating bird that is at the edge of its range in Michigan with numbers varying greatly from year to year. In average years the species is rare and, when present, is primarily confined to the southwest corner of the state. Its erratic breeding distribution is believed to be in response to drought conditions in its core breeding range in the prairie grassland region of the central and south-central United States. The Dickcissel is generally associated with medium and tall grasslands: prairie, savanna, hayfields, lightly grazed pastures, weedy roadsides, and old fields with few shrubs. Birds do not appear to be particularly area sensitive and are found in grasslands of less than 10 ha. Dickcissels migrate in large flocks to their wintering grounds in southern Mexico, Central America, and northern South America (primarily Venezuela). Very few individuals overwinter in the United States.

Distribution

Temple (2002) maps the peripheral breeding distribution of the Dickcissel in Michigan as including the southern tip of the UP south through Michigan's LP **(**not including the southeastern LP**).** Distribution from the Thumb south to the Ohio border is considered sporadic. The distribution map based on both Michigan atlas periods shows birds were detected statewide. Looking specifically at the UP, it is interesting to note that during MBBA I, birds were fairly localized in the southern tip of the UP, while MBBA II data show birds more widely scattered across the western and central UP. This extended push to the north and east coincides with spring droughts in the Great Plains in 2006 and 2007, which may have resulted in birds moving further into the margins in search of more favorable breeding habitat. Well known 20th century Great Plains droughts occurred in the 1930s and 1950s, which correspond to increased Dickcissel populations in Michigan (McPeek and Adams 1994). In addition, Temple (2002) refers to droughts affecting Dickcissel in 1964, 1973, and 1988.

Dickcissel abundance and distribution vary dramatically in the surrounding states and provinces. In Ontario it is a very rare breeder occurring, but still uncommon, during years of severe spring drought in the core range (Cadman et. al 2007). In Wisconsin, it is a somewhat common summer resident in the south and west, with occasional irruptions reaching all but the northern third of the state (Cutright et. al 2006). Birds are generally found in the formerly glaciated western half of Ohio, with very few birds detected to the east (Peterjohn and Rice 1991) as far as western New York (Andrle and Carroll 1988). The highest densities are found to our south in Illinois where it is a widespread and common summer resident (Kleen et. al 2004) and to a lesser degree in Indiana where the species is widespread but more abundant in the western portion of the state (Castrale et. al 1998).

Breeding Biology

Migrants arrive relatively late in spring. Preferred habitat consists of mid-height grassland containing a strong forb component, a medium litter layer, areas of patchy bare ground, and a moderate amount of residual standing dead vegetation (Sample and Mossman 1997). The female constructs the nest and incubates three to five pale blue eggs for 12-13 days. During MBBA II, a nest with young was found 11 July in Muskegon County (B. Johnson, pers. comm.). The earliest fledged young were observed 9 June in Wayne County and the latest on 2 July in Monroe County. Shortly following the nesting season, Dickcissels may form large premigratory flocks in the southern U.S. where they forage before their mostly nocturnal migration to wintering grounds (Temple 2002).

Abundance and Population Trends

Although Michigan BBS trend results for the period 1966 to 2007 show a decline of about 9%, these results could be misleading because they are based on fewer than ten survey routes (Sauer et. al 2008). BBS trend data from 1983 to 2007 show an annual increase of 3.7% (n=6) in Michigan and a significant annual decrease of 1.4% (n=379) for FWS Region 3. Because of the erratic nature of this species, it is also difficult to make comparisons of abundance and distribution between each atlas period. However, when assessing data at the block level, detections across the UP and the SLP were similar over each atlas period while recent declines were most notable in the NLP.

Seasonal observations increased dramatically, coinciding with a severe drought in the Great Plains in 1988. To a lesser degree this cycle was repeated during 2006 and 2007. Abundance peaked in 2007 with raw atlas data documenting over 400 pairs statewide. In 2008, numbers again dropped precipitously. The SLP supported the highest densities in 2007, specifically in Kalamazoo, Monroe, Allegan, and Berrien counties. Across the UP and the NLP, observations peaked in 2006. While birds were generally widespread and scattered across the UP and the NLP, they were also somewhat concentrated within Isabella County in the southern NLP. Although there appears to be a preference for the southwestern LP, it is difficult to assess population viability due to the erratic presence and few breeding confirmations of Dickcissel in the state. Another complicating factor to consider when drawing conclusions was the unequal survey effort within the state during each atlas period.

Dickcissel *(Spiza americana)*

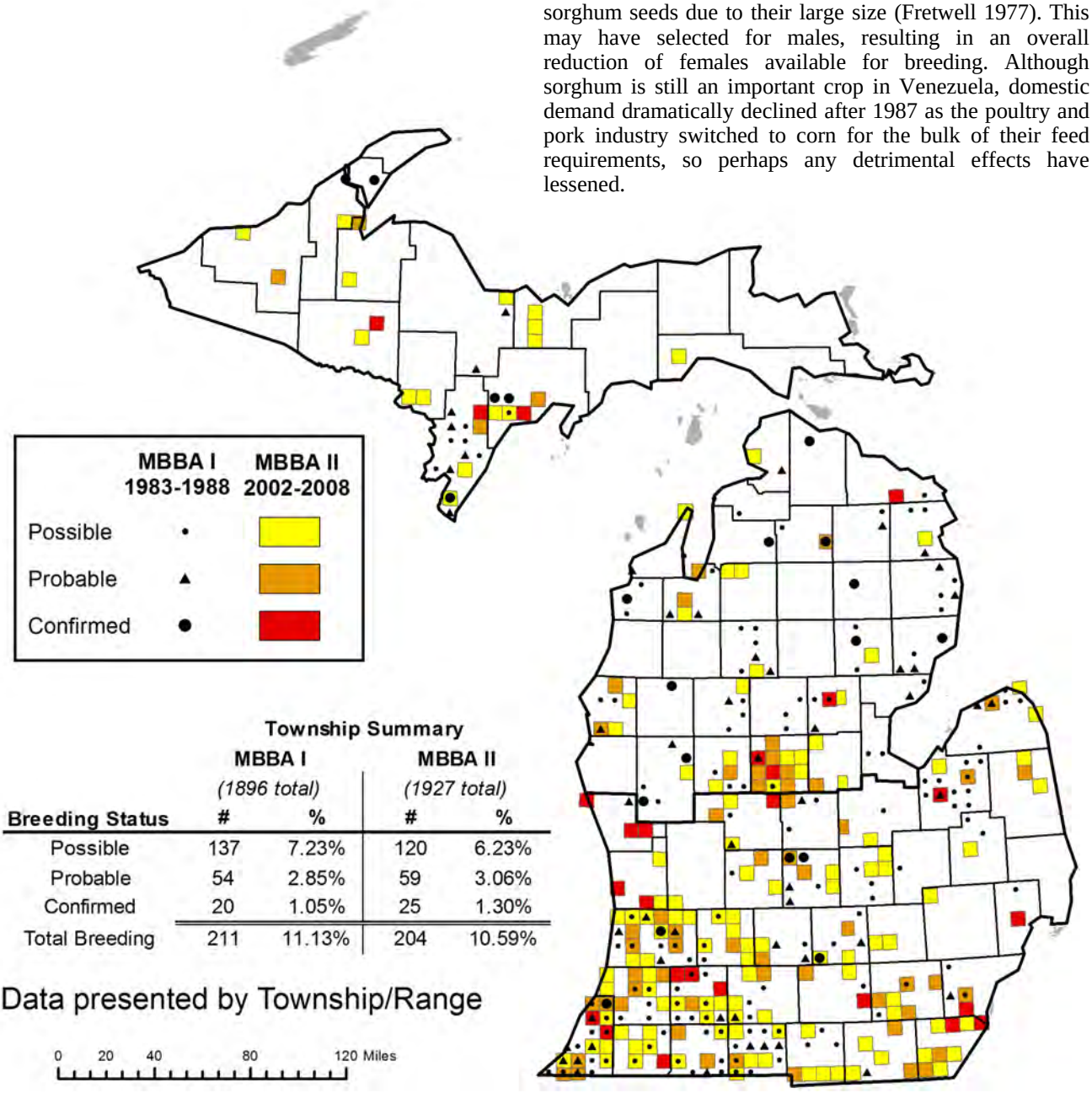
Julie Gibson

Status: *Special Concern (MNFI)*

Conservation Needs

Although the Dickcissel is well adapted to ephemeral habitat, global populations continue to face challenges on both the breeding and wintering grounds. The early and frequent mowing of hay and alfalfa fields is a significant threat to breeding Dickcissels, sometimes leading to the loss of nests, eggs, and chicks. Predation by small mammals and snakes, as well as nest parasitism by cowbirds, is also a significant factor affecting productivity. Large tracts of medium to tall vegetation, including a forb component, will benefit this and other grassland species, especially when management is conducted after the breeding season.

On the wintering grounds, the Dickcissel is considered an agricultural pest; much of the global population gathers on the llanos of Venezuela, feeding on rice and sorghum (Temple 2002). As sorghum production increased dramatically in the mid-1980s, farmers suffered large economic losses from crop damage. Subsequent poisoning of roosting birds impacted the global population and was eventually widely publicized. Both governmental and non-governmental organizations (NGOs) have worked with local farmers, enacting conservation measures aimed at reducing lethal control of wintering Dickcissels. Management efforts may include chemical repellents that are applied to the food source, rendering it unappetizing to the target species (Avery et. al 2001). As described in MBBA I, research speculated that smaller females could not take advantage of sorghum seeds due to their large size (Fretwell 1977). This may have selected for males, resulting in an overall reduction of females available for breeding. Although sorghum is still an important crop in Venezuela, domestic demand dramatically declined after 1987 as the poultry and pork industry switched to corn for the bulk of their feed requirements, so perhaps any detrimental effects have lessened.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	137	7.23%	120	6.23%
Probable	54	2.85%	59	3.06%
Confirmed	20	1.05%	25	1.30%
Total Breeding	211	11.13%	204	10.59%

Data presented by Township/Range

0 20 40 80 120 Miles

Bobolink *(Dolichonyx oryzivorus)*

Raymond J. Adams, Jr. & Torrey Wenger



Willie McHale ©
Species sponsored by: Audubon Society of Kalamazoo
And also in memory of: Dee LaBatt

As spring turned into summer, Michigan's grasslands came alive with the bubbly flight songs and aerial antics of male Bobolinks as they vied for territories or sang to the attentive females perched in the grass or on the fence lines below. For many of Michigan's older residents, these memories from childhood are forever etched in their minds. This scene is less familiar today. Not only has the Bobolink declined, but fewer young people explore the woods and fields as earlier generations did (Louv 2006). While the Bobolink continues to breed statewide, more of the birds are concentrated in rural counties with extensive hayfields. The Bobolink's breeding range is confined to North America from southern Canada south into the northern United States. During the breeding season, they are sexually dimorphic with the male a striking black below contrasting with a rich buff hind neck, white scapulars and rump interspersed with black above. The more subtle female is overall yellow-buff with dark streaks on the back, head and sides. This species has an incredible migration, flying to South America south of the equator and east of the Andes primarily to Brazil, Paraguay and northern Argentina (Martin and Gavin 1995). During the fall and winter the male and female are quite similar in appearance, much like the breeding female but typically richer buff below.

Distribution

The Bobolink was first recorded in Michigan by Dr. Abram Sager (1839). It certainly would have been regular and fairly common in the prairies in the southern part of the state at the time of European settlement. Dr. Morris Gibbs called it "a very common summer resident" in his list of Michigan's birds in 1879 and A. J. Cook described it as very common in southern Michigan in 1893. It appears that while the Bobolink was present in southern Michigan in numbers from the time of settlement, undoubtedly the species moved northward in the state as logging progressed northward. Barrows (1912) considered it an "infrequent resident" in the UP, more common below the 44th parallel in the LP. Throughout most of the 20th century, this blackbird appears to have been common in the southern half of the state and uncommon and local farther north (Van Tyne 1938, Wood 1951, Zimmerman and Van Tyne 1959). By the start of the MBBA I, Payne (1983) considered it "common but local."

MBBA I confirmed the localized distribution in the UP with birds concentrated in the eastern third, south central and the northwest corner. The species was absent from the heavily forested sections of the UP. In the southern LP the species was widespread but restricted. The Bobolink was common in rural counties with larger areas of hayfield, pasture, old field and some open wetland (McPeek 1991). It was also absent from heavily forested areas of the central and western northern LP, as well as areas of intensive row crops and urban and suburban landscapes throughout the state.

MBBA II indicates a reduction in the number of townships in which the Bobolink occurred. During MBBA II, it was found in about 50% of the townships statewide compared to 62.6% in MBBA I, with the percentage of townships down in all three regions. The difference is more noticeable in the southeastern and southwestern LP as well as the north central and western LP. Bobolinks were found in approximately 2% of the townships in which they were unrecorded during MBBA I. Because its range reduction is widespread and not confined to a specific area, it is likely that the change in distribution is related to loss of suitable habitat for nesting.

Breeding Biology

The Bobolink returns to southern Michigan from South America by the end of April or the first week of May. Birds return to the northern LP and the UP over the next two to three weeks. Nesting can commence in late May lasting into mid-July farther north (McPeek 1991) when re-nesting after nest failure is attempted. Successful second broods have been recorded. Clutch size ranges from three to seven eggs (average of five) in Wisconsin (Martin and Gavin 1995). After the breeding season the birds flock to protected sites with plentiful food and cover including open wetlands. Fall migration occurs in August and September with some birds lingering into early October.

Abundance and Population Trends

The population estimate for the Bobolink in Michigan is about 400,000 birds (PIF 2004). This estimate yields around 200,000 pairs or an average of 2,400 pairs per county. Unfortunately, based on personal observation, this could be a substantial overestimate. During MBBA II, staff and volunteers counted only about 8,000 pairs, roughly about 4% of the total estimate.

Based on BBS results (Sauer et al. 2008), the Bobolink's national population has declined 0.8% per year from 1966 through 2007, with the steepest decline occurring through 1979. Michigan's component of the population also has

Bobolink *(Dolichonyx oryzivorus)*

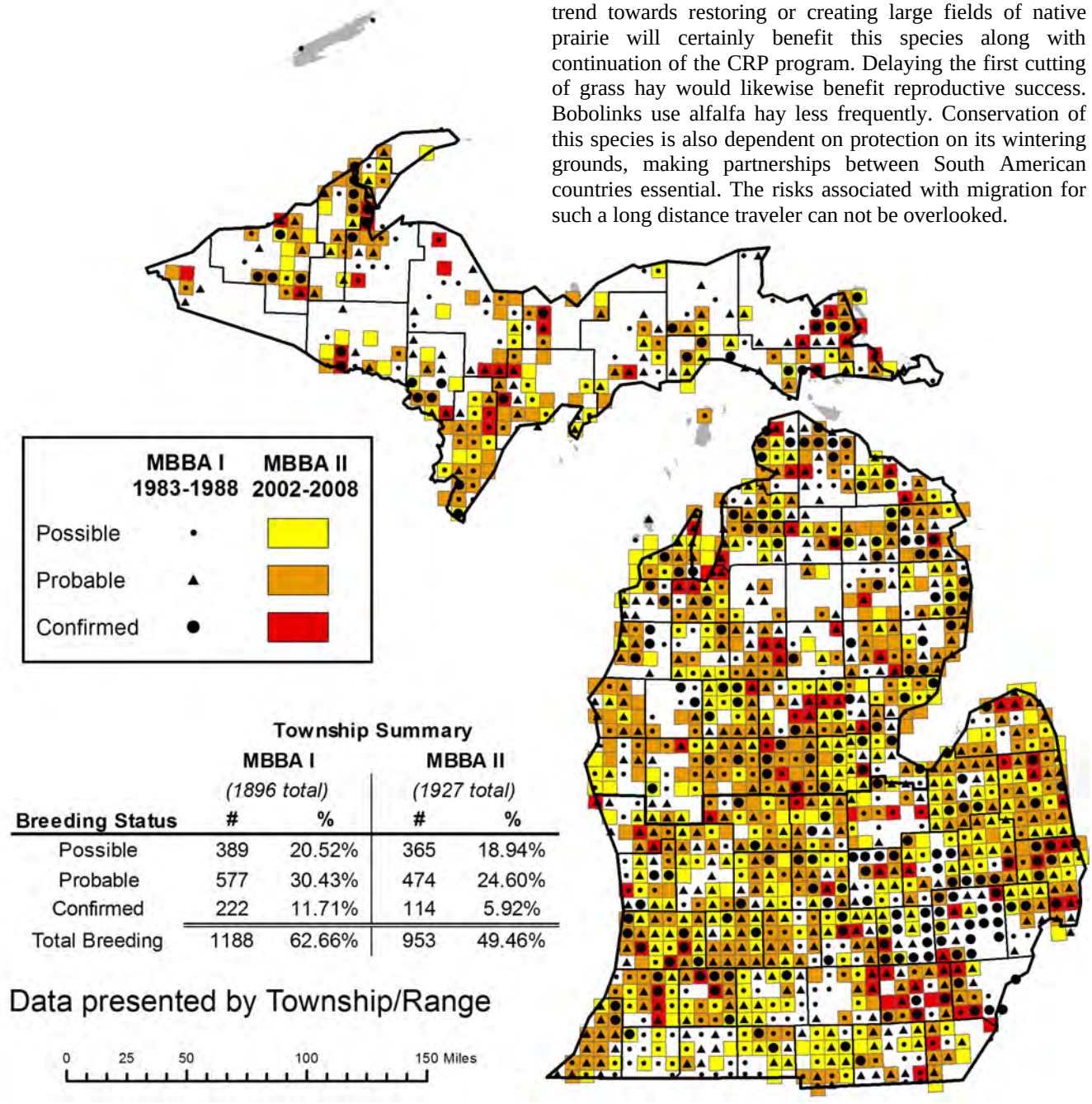
Raymond J. Adams, Jr. & Torrey Wenger

declined 4.5% per year from 1983 through 2007, with a decline in USFWS Region 3 of 2.18% from 1983 through 2007. These trends may be slightly misleading in that Kalamazoo County data show the Bobolink population peaking during the period from 1973 through 1983 and declining rapidly into the early 1990s. It appears that the CRP program, which began in 1992, slowed the decline at least locally.

Martin and Gavin (1995) suggest that predation and nest exposure, along with flooding, are likely the most important mortality factors. Furthermore, land-use changes are suggested as important in affecting overall abundance at the regional and continental scales. Between loss of reproduction as a result of predation, early harvest of breeding sites and adult mortality due to factors during the long migration and on the wintering ground, it is no wonder that the Bobolink population is declining.

Conservation Needs

The Bobolink is very habitat specific and depends on large undisturbed grasslands for prime breeding sites. The recent trend towards restoring or creating large fields of native prairie will certainly benefit this species along with continuation of the CRP program. Delaying the first cutting of grass hay would likewise benefit reproductive success. Bobolinks use alfalfa hay less frequently. Conservation of this species is also dependent on protection on its wintering grounds, making partnerships between South American countries essential. The risks associated with migration for such a long distance traveler can not be overlooked.



Red-winged Blackbird *(Agelaius phoeniceus)*

Max A. Henschell



Darlene Friedman ©

Species sponsored in honor of: Palmer F. Craven

The Red-winged Blackbird is one bird that almost everyone has seen, no matter where they live in the state. From marshes to freeway medians and anywhere else cattails might grow, the male's *"Konk-le-REE"* song can be heard ringing out from the vegetation. Venturing into such an area will yield views of a blackbird swaying from the top of a cattail, flashing his striking red-and-yellow "epaulets" and flaring his wings. Upon closer approach, the male is likely to take to the air, hovering above and diving at any intruder, no matter what size. At least one drab streaky female, which may be mistaken for a large sparrow, is usually close by, helping to drive away any threat to their young. The Red-winged Blackbird is one of the most common birds in North America (Yasukawa and Searcy 1995). It is found from central Canada, through the entire continental United States and into Mexico and Central America. Most frequently associated with marshes, the Red-winged Blackbird is also found in agricultural lands, roadside marshes and even suburban and urban environs (Yasukawa and Searcy 1995).

Distribution

Red-winged Blackbirds are common breeders throughout the Great Lakes region. They were found in nearly every survey block in Ohio (Peterjohn and Rice 1991), Illinois (Kleen 2004), Indiana (Webster 2006), and Wisconsin (Yasukawa 2006). In Ontario, Red-winged Blackbirds are common breeders in the Great Lakes drainage, but are less common north to Hudson Bay (Zimmerling 2007).

During MBBA II, Red-winged Blackbirds were recorded in nearly 96% of the townships in the southern Lower Peninsula, 92% in the northern Lower Peninsula and 65% in the Upper Peninsula. During MBBA I, Red-winged Blackbirds were found in 98%, 93% and 72% of townships, respectively. This decline is consistent with Breeding Bird Survey data from Michigan (Sauer et al. 2008).

Breeding Biology

The breeding biology of Red-winged Blackbirds has been extensively studied for decades. This species is typically a colonial nester, with many males defending territories within suitable habitat, such as marshes or fallow fields. Males are polygynous, with as many as 15 females within a single male's territory. This polygynous mating is primarily driven by the quality of the habitat the male defends. In less suitable habitats, such as suburban and urban areas, Red-winged Blackbirds may nest monogamously and in much lower density (Yasukawa and Searcy 1995).

The female builds the nest in late April, which is woven from plant fibers around several vertical plant stalks. The outer cup is lined with decayed plant matter, particularly leaves and wood. The cup is further lined with mud and, typically, fine grasses (Yasukawa and Searcy 1995).

The female begins laying eggs several days after the nest is completed and lays a clutch of around three eggs. Incubation lasts approximately 12 days and the young fledge within two weeks of hatching. A second brood is occasionally raised (Yasukawa and Searcy 1995).

Abundance and Population Trends

Partners in Flight data indicate that the Red-winged Blackbird is one of the most abundant birds in the state, with an estimated 3.6 million birds (PIF 2007). BBS data show a statistically significant annual decrease of approximately 1% of observations per route for this species between the beginning of MBBA I and the end of MBBA II (Sauer et al. 2008). The Red-winged Blackbird has also experienced a similar statistically significant decrease in FWS Region 3, which includes Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin (Sauer et al. 2008). Other areas of the country have experienced much greater declines in Red-winged Blackbird numbers. Surveys of the Dakotas from 1965-1981 have shown a decrease of nearly 42% (Yasukawa and Searcy 1995).

Conservation Needs

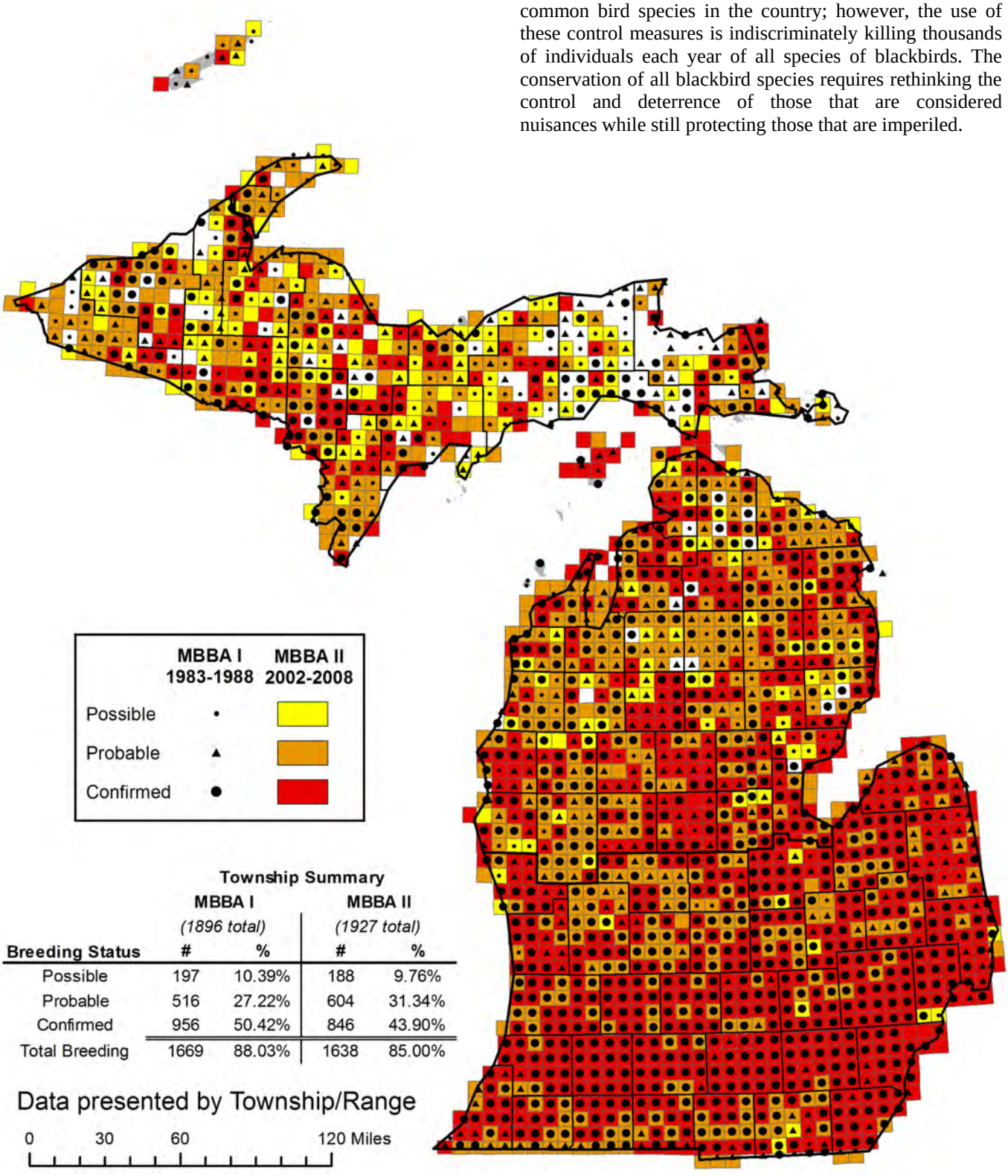
The Red-winged Blackbird is often considered an agricultural pest because of its propensity to gather in enormous flocks in grain fields to feed on crops such as sunflowers, corn, rice and other grains as well as insect pests. Winter roosts are considered a nuisance in the southeastern U.S. Blackbird roosts can harbor the fungus *Histoplasma capsulatum*, which can cause histoplasmosis, a disease fatal in humans. Because of these issues, Red-winged Blackbirds can be legally killed under the law, "Depredation order for blackbirds, cowbirds, grackles, crows and magpies." (Depredation…2008). Under this law, farmers are allowed to kill blackbirds that threaten crops. In some states, large roosts of blackbirds are sprayed with surfactants that break down the waterproofing of feathers, causing birds to die from exposure. Millions of blackbirds have been killed in this way in numerous control campaigns (Yasukawa and Searcy 1995).

Red-winged Blackbird *(Agelaius phoeniceus)*

Max A. Henschell

While millions of Red-winged Blackbirds have succumbed to the control measures above, perhaps the biggest threat to this species is the conversion of marshes and other lowlands to tilled farmland. This landscape change is one of the key factors that drove the massive declines in the Dakotas and has also been used as a method to control populations (Yasukawa and Searcy 1995).

Red-winged Blackbirds continue to be perhaps the most common bird species in the country; however, the use of these control measures is indiscriminately killing thousands of individuals each year of all species of blackbirds. The conservation of all blackbird species requires rethinking the control and deterrence of those that are considered nuisances while still protecting those that are imperiled.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	197	10.39%	188	9.76%
Probable	516	27.22%	604	31.34%
Confirmed	956	50.42%	846	43.90%
Total Breeding	1669	88.03%	1638	85.00%

Eastern Meadowlark *(Sturnella magna)* ***Julie Gibson***



Jerry Jourdan ©
Species sponsored by: James Hewitt

After witnessing a meadowlark collide with a car, I spent two stressful weeks collecting insects for this voracious eater and driving across the state twice to transport the bird to a suitable wildlife rehabilitator. I can vouch for the strength and tenacity of this species. The male Eastern Meadowlark can also perform up to 100 different songs in his repertoire. Eastern Meadowlarks grace us with their presence throughout the state where suitable habitat exists. The species ranges over eastern North America from the northern Great Lakes states and southern Canada, south to the Gulf Coast, and from Mexico south into South America. Higher densities occur in tall-grass prairie regions of the Great Plains (Lanyon 1995). In Michigan it is an uncommon migrant where grasslands are present and is rare in winter, with a few confirmed records in most years. While most are permanent residents throughout much of their range, birds at the northern end of their range generally move southward for the winter.

Distribution

Overall distribution is similar to that described in the first atlas (Brewer et al. 1991). The species continues to be a common breeder throughout much of the LP, except in forested areas. Most observations from the UP were concentrated to the south, central, and east. In MBBA II, breeding occurred in 79% of townships in the SLP, 60% in the NLP, and 20% in the UP. During MBBA I, Eastern Meadowlarks were noted in 92% of the SLP townships, 74% of the NLP and 26% of the UP townships. The cause of this decrease is not clear, but it may include diminished reproductive success, natural fluctuations in population numbers, and regional changes in land use on breeding or wintering grounds**.**

Eastern Meadowlark is a grassland obligate species known to use short-grass, mixed-grass and tall-grass prairie. Its preferred habitat consists of mid-height grassland with a moderate amount of forbs, a thick litter layer, few shrubs, areas of patchy bare ground, and some residual standing dead vegetation (Sample and Mossman 1997). The extensive hayfields and other grasslands throughout much of the SLP provide habitat for many of Michigan's Eastern Meadowlarks.

All the surrounding states and provinces support Eastern Meadowlarks. In Ontario, it occurs throughout the southern portion of the province, while largely absent from the Northern Shield and the Hudson Bay lowlands (Cadman et al. 2007). It is widespread in Wisconsin except in forested regions to the north (Cutright et al. 2006). Atlas accounts describe Eastern Meadowlark as common and widespread to our south throughout Indiana, Illinois, and Ohio, with detections in 97%, 100%, and 97% of priority blocks respectively (Castrale et al. 1998, Kleen et al. 2004, Peterjohn and Rice 1991).

Breeding Biology

Saunders observed that the first males to arrive on breeding grounds were young short-distance migrants that preceded older birds coming from further south (Bent 1958). Females generally follow males by roughly two weeks. The female constructs a well-concealed ground nest in dense grass, sometimes in a shallow depression, and incubates the eggs. Breeding phenology data from Michigan are scarce. Nest building has been observed as early as 20 April. A nest with eggs was reported 11 June in Barry County and one on 21 June in Muskegon County. Atlas workers reported a nest with young on 21 May in Muskegon County and on 02 August in Alpena County. Young remain in the nest for 10-12 days and are tended by the female, after which time parents provide post-fledgling care for about two weeks. Females may have two broods, and polygamous relations, possibly involving older males, are not uncommon. The Eastern Meadowlark is host to Brown-headed Cowbirds throughout much of its breeding range (Lanyon 1995).

Abundance and Population Trends

While this beloved summer resident can be heard throughout Michigan's prairies, hayfields, pastures, and fallow lands, BBS data indicate a declining population trend east of the Mississippi over the period 1966-2006. Michigan BBS trend estimates for the period 1990 to 1999 show a significant decline of 5.4% with an average of 5.7 birds per route. The period 2000 to 2007 indicates continuing declines with an average of 3.2 birds per route. Atlas data also support this trend, with the minimum number of pairs detected dropping from 7,802 to 5,810 (MBBA I and II, respectively). Moreover, species detections declined statewide from 1,232 townships to 1,045 (a 15% decrease), while finer detailed data are more disturbing. Examined by quarter-township, or "block", Eastern Meadowlark occupancy dropped from 2,814 to 1,850, a decrease of nearly 45%. The species may be losing habitat faster than the range is contracting.

Compared to MBBA I, fewer birds were detected during MBBA II in Oakland, Livingston, and Wayne counties, and around Saginaw Bay, in addition to other scattered locations throughout the state. Based on comparisons of the minimum number of pairs mapped by township during MBBA I and II, declines in abundance are most notable in Calhoun, Kalamazoo, St. Joseph, and Van Buren counties. There was also an obvious shift in concentration from Mecosta County to neighboring Isabella County. While abundance has

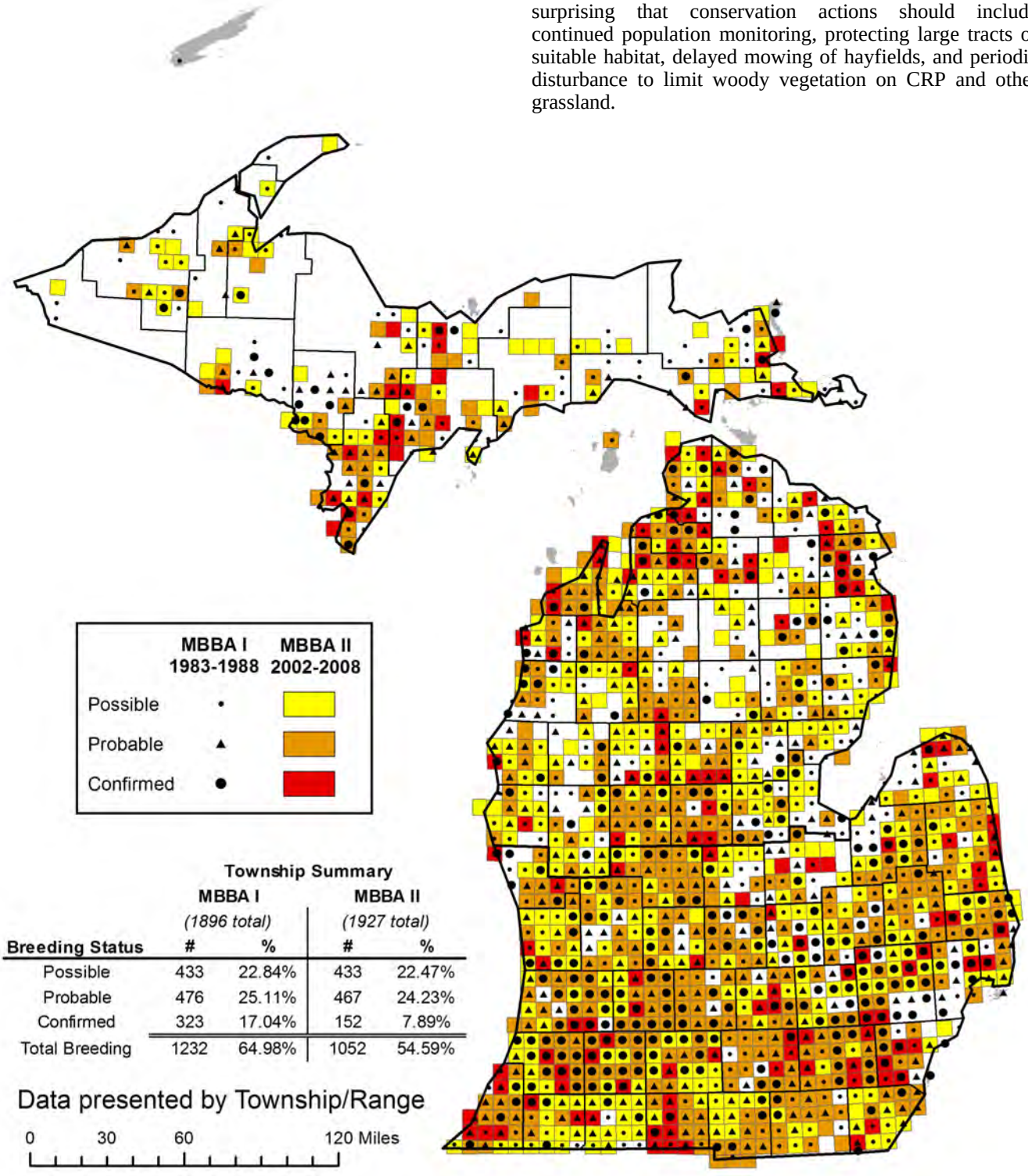
Eastern Meadowlark *(Sturnella magna)*

Julie Gibson

decreased by about 5%, distribution across the UP has not changed much over the past 20+ years.

Conservation Needs

Pointing to declines of roughly 70% over the past 40 years, the National Audubon Society deemed Eastern Meadowlark one of the top ten common birds in decline. It is also a focal species for Partners in Flight and the Upper Mississippi River and Great Lakes Region Joint Venture for prioritized conservation actions. This species is moderately sensitive to habitat fragmentation. Ongoing regional declines are generally attributed to changes in land use; conversion of grasslands and hayfields to cultivated crops, succession of old fields, and suburban sprawl. Severe winter weather can also reduce populations, in addition to drought, which may lead to reduced productivity. Breeding birds show a preference for hayfields. Early and frequent mowing of hayfields can destroy vulnerable nests and young. It is not surprising that conservation actions should include continued population monitoring, protecting large tracts of suitable habitat, delayed mowing of hayfields, and periodic disturbance to limit woody vegetation on CRP and other grassland.



Western Meadowlark *(Sturnella neglecta)* ***Sarah Coury***



Caleb Putnam ©

Throughout prairies, farmland, and on roadsides across much of America, the arrival of spring is announced by the rich flute-like song of the Western Meadowlark. First documented in 1805 in the journal of Meriwether Lewis as his expedition made its way across Montana, this longtime avian symbol of the frontier has since been steadily expanding eastward. Its current range extends from the Pacific Ocean to northwestern New York, and from central Alberta and Saskatchewan to the northern half of Mexico. Though plentiful in many of these areas, the Western Meadowlark is listed as a species of special concern in Michigan.

Distribution

First confirmed in Michigan's UP in 1894 (Wood 1951), the Western Meadowlark is a comparatively new summer resident in the Great Lakes region. During the 1930s through the 1950s, this species flourished throughout the Midwest and breeding pairs were documented consistently in most counties of the state (Lanyon 1956). From the 1960s to the time of MBBA I, however, Michigan's Western Meadowlark populations were found to be in steady decline. Similar rates, between 4-9%, were recorded in Indiana, Illinois, Wisconsin, Ohio and Ontario (Lanyon 1994).

Although the species seems to have modestly expanded its range in the UP since MBBA I, the distribution of Western Meadowlarks in Michigan's LP has continued to contract. The SLP showed 18 counties recently void of Western Meadowlarks, probably due to increasing habitat fragmentation and changes in agricultural land use. The trend is most apparent in the NLP, where the number of counties reporting the species was reduced by half. Whereas all nine NLP counties along Lake Michigan found Western Meadowlarks during MBBA I, only Oceana reported a possible sighting during MBBA II.

Granlund (1991) stated that the high concentration of MBBA I observations in the northwestern NLP was perhaps due to the many expansive hayfields remaining in the region at that time. In recent years, however, the area has experienced a 1-2% forest cover increase annually due to old field succession, and continuing parcelization of private land has resulted in ever shrinking agricultural lots (K. Kintigh, MDNR, pers. comm.). As Western Meadowlarks in the Midwest require a minimum of 2-15 hectares (5-37 acres) of open grassy habitat for nesting (Dechant et al. 2003), these factors may explain contractions in the region.

Breeding Biology

In the upper Midwest, male Western Meadowlarks arrive and begin defending territories throughout March and early April, with females following within two to four weeks (Leckie 2007, Niemuth 2006). Females begin nest construction about one week later. Two broods of young may be raised, with final fledge dates in early August. Males often have two concurrent mates, with females alone building nests, incubating, and assuming a much greater role in care and feeding of nestlings (Lanyon 1994).

Abundance and Population Trends

Breeding Bird Survey estimates for the Western Meadowlark in Michigan from 1990 to 2007 indicate a population trend of -7.3% per year. Due to the small sample size of Michigan BBS recordings for the species, however, this decline is not considered significant. During MBBA II, Western Meadowlarks were found in 64 atlas blocks (0.89%), down from 140 (1.98%) during MBBA I. Of the 64 observations, 52 were possible, nine were probable, and three – from Muskegon County in the LP and Menominee and Ontonagon Counties in the UP – were breeding confirmations. Western Meadowlark nests are well concealed, and the difficulty of finding them often results in a low number of breeding confirmations for the species. From MBBA I to MBBA II, observations went up from 19 to 28 in the UP, and down from 61 to 25 in the SLP. The greatest declines were seen in the NLP, where observations dropped from 60 to 11. In addition to actual declines, reduced effort in the NLP may account for the drop in observations.

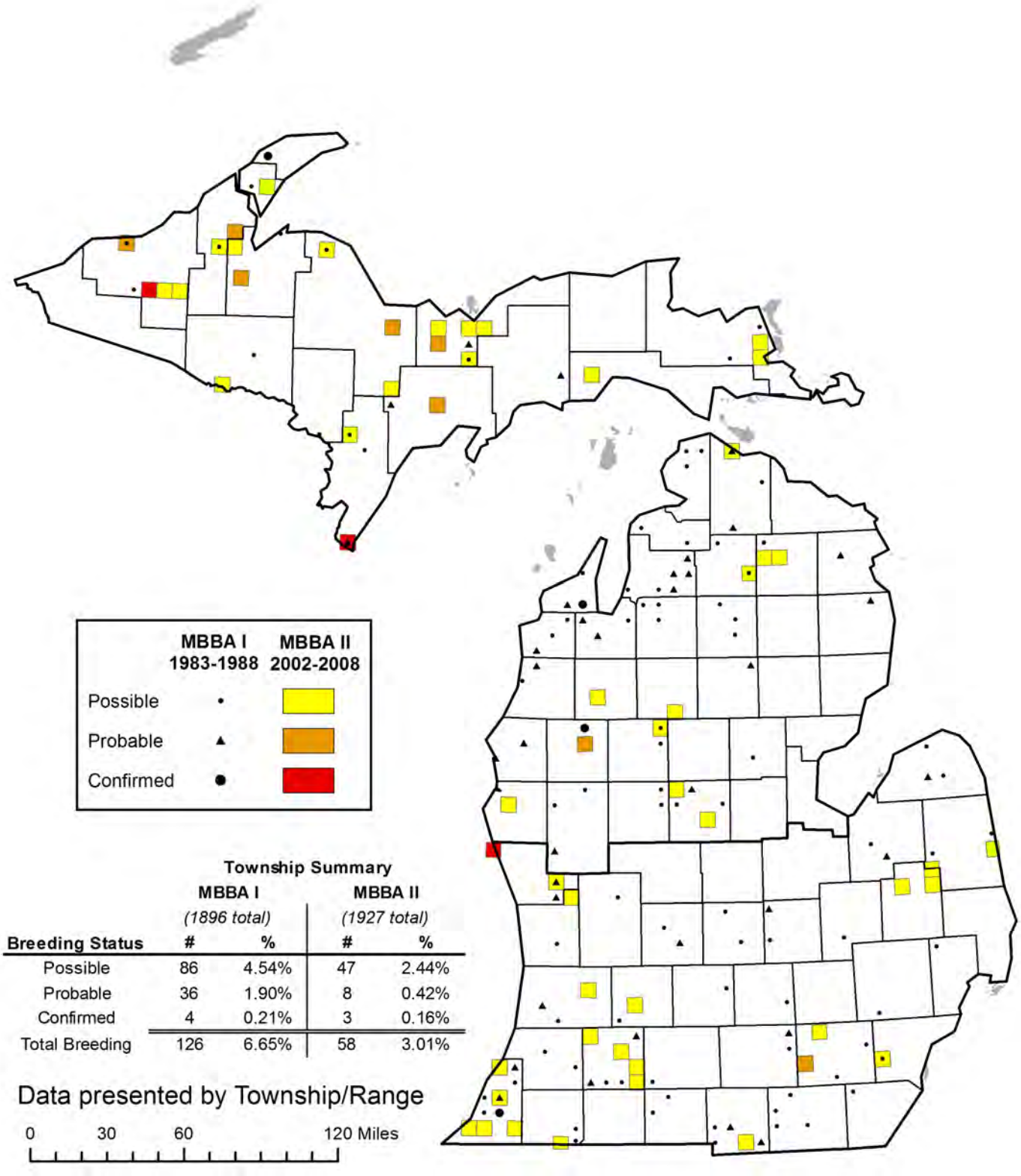
Conservation Needs

The Michigan DNR estimates that out of the 420,000 acres of prairie once found in the state, less than 2,000 remain, and farmland is being developed for other uses at a rate of about ten acres per hour (Sargent and Carter 1999). Land management for Western Meadowlarks and all grassland species in Michigan must include the preservation of these open landscapes. Changing use of agricultural acreage, such as conversion of pastures and hayfields to corn and soybeans is another factor reducing suitable habitat throughout the Midwest (Askins 2000). Additional threats to these ground-nesting birds include the mowing of hayfields during the nesting season, application of pesticides, trampling by livestock, predation by domestic cats, and Brown-headed Cowbird parasitism. Western Meadowlarks are known to be extremely sensitive to human disturbance of breeding territories, which often results in the abandonment of nests with eggs (Lanyon 1994).

Western Meadowlark *(Sturnella neglecta)*

Sarah Coury

Prairie restoration initiatives as well as efforts to educate private landowners on wildlife management techniques have increased dramatically throughout the Great Lakes region in recent years, which is a vital step toward ensuring the continuing occurrence, and perhaps future abundance, of Western Meadowlarks in Michigan.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	86	4.54%	47	2.44%
Probable	36	1.90%	8	0.42%
Confirmed	4	0.21%	3	0.16%
Total Breeding	126	6.65%	58	3.01%

Data presented by Township/Range

0 30 60 120 Miles

Yellow-headed Blackbird *(Xanthocephalus xanthocephalus)* ***Kathleen Grady***

Status: *Special Concern (MNFI)*



John Van Orman ©

In its favored marshy habitat, the Yellow-headed Blackbird is easily recognized by its vibrant plumage and un-musical calls. Its repetitive scientific name also refers to the males' fantastic yellow head. These birds breed most abundantly in prairie wetlands in the western United States with Michigan constituting the extreme eastern edge of their range. This polygynous species nests in group territories with males keeping harems of up to six females (Twedt and Crawford 1995).

Distribution

Historically, the breeding range of the Yellow-headed Blackbird was centered on the Prairie Pothole region of the northern Great Plains (Twedt and Crawford 1995), but other small breeding populations occur in the Great Lakes region and are dependent on the presence of suitable nesting habitat. The Yellow-headed Blackbird is a relatively recent addition to Michigan's birdlife, with the first state record occurring in 1890 and the first breeding record in the 1950s (Reinoehl 1994).

These historic breeding records and the presence of breeding birds in the first Atlas may have been representative of an eastward expansion of the breeding range of the Yellow-headed Blackbird, a range that now seems to be contracting. MBBA I showed confirmed breeding populations in four townships in the UP, three in the NLP and six in the SLP with six other townships in Michigan reporting probable breeding records. In contrast, MBBA II has only one township in the NLP with a confirmed breeding record. There are no longer any townships reporting breeding Yellow-headed Blackbirds in the UP, and the SLP has only one township with probable breeding records. The overall population of these blackbirds is low in Michigan. The largest count during MBBA II was 30 at the only confirmed breeding site in Bay County. The highest number of recorded sightings during MBBA II was also from the wetland habitats along Saginaw Bay in Bay County. Their presence was noted in Cheboygan and Manistee Counties in the NLP, as well as Tuscola, Saginaw and Berrien Counties in the SLP, but only Bay and Saginaw Counties contained probable nesting birds.

These blackbirds have been found to exist at densities in direct correlation to the size of cattail stands (Safratowich et al. 2008), the type of emergent vegetation in which they prefer to nest. At the Saginaw Bay wetlands they are found mainly in coastal cattail (Whitt et al. 1999). These plants provide the proper habitat structure on which the Yellow-headed Blackbird depends.

Breeding Biology

The arrival date of this Neotropical migrant in Michigan is similar to that of Wisconsin, with males arriving first to set up territories between 11 and 23 April, and the females following between 4 and 7 May (Monfils 2004). Breeding activity is usually greatest between late April and late June (Monfils 2004). Records from Saginaw Bay confirm this, putting the arrival date of Michigan's Yellow-headed Blackbirds in mid-April, with the earliest sighting there on 2 April (Reinoehl 1994). Egg-laying occurs in late May and early June, with the young fledging three to four weeks later (Reinoehl 1994). Most of the birds are gone by the end of October, but a few have been reported as late as December during Christmas Bird Counts (Reinoehl 1994).

Abundance and Population Trends

Although MBBA I indicated that the Yellow-headed Blackbird was increasing its range, MBBA II actually shows fewer confirmed breeding birds in Michigan. Breeding Bird Survey data from USFWS Region 3, which includes Michigan, show a significant decline in the presence of breeding Yellow-headed Blackbirds since 1983. This trend also appears in the breeding bird atlases of the other states on the edges of the blackbirds' eastward expansion. The Yellow-headed Blackbird is listed as threatened in Indiana and endangered in Illinois and was found in less than 1% of the survey blocks in the most recent Indiana Breeding Bird Atlas (Keller and Keller 1998, Kleen et al. 2004). Ohio was unable to confirm any breeding Yellow-headed Blackbirds in their most recent Atlas which states that the breeding population in Ohio is known to be very small with generally fewer than five pairs (Peterjohn and Rice 1991). In the Upper Midwest, Wisconsin reports little change in the population of these birds. They are always a sporadic presence in the wetlands there (Volkert 2006). Ontario also indicates no important changes in the Yellow-headed Blackbird population, but the overall numbers are relatively low considering that in the heart of its range colonies can consist of many hundreds of pairs (Dunn 2007).

Conservation Needs

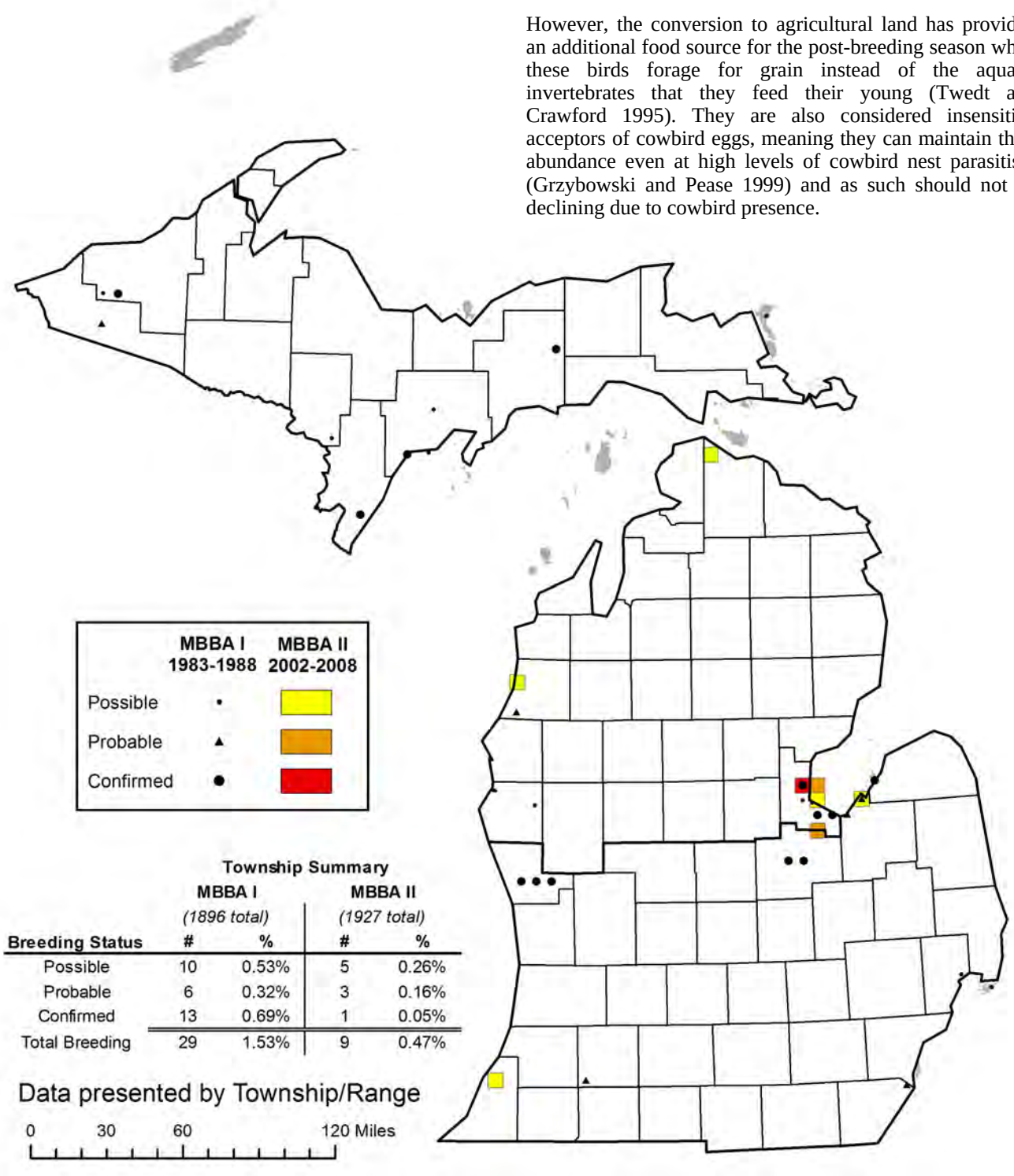
Because of the significant decline in Yellow-headed Blackbirds in Michigan, they have been listed as a state species of special concern by the Michigan Natural Features Inventory (MNFI), and may be vulnerable to state extirpation. However they are considered secure globally and according to the USFWS Breeding Bird Survey show no significant trend of increase or decline on a national scale (Sauer et al. 2008).

Yellow-headed Blackbird *(Xanthocephalus xanthocephalus)* ***Kathleen Grady***

Status: *Special Concern (MNFI)*

As breeders restricted to wetland habitats, the Yellow-headed Blackbird could be vulnerable to continued habitat loss due to land conversion for agricultural and commercial reasons. Also the population at Saginaw Bay has been found to be subject to storm surges along the coast that change the water levels. A change in the water level can destroy nests or make them more vulnerable to predation or change the habitat structure and vegetation composition creating unsuitable nesting habitat (Monfils 2004). Twedt and Crawford (1995) also indicate that this species' colonial breeding habits may make them vulnerable to localized extirpation with peripheral breeding populations, like those in Michigan, being especially at risk.

However, the conversion to agricultural land has provided an additional food source for the post-breeding season when these birds forage for grain instead of the aquatic invertebrates that they feed their young (Twedt and Crawford 1995). They are also considered insensitive acceptors of cowbird eggs, meaning they can maintain their abundance even at high levels of cowbird nest parasitism (Grzybowski and Pease 1999) and as such should not be declining due to cowbird presence.



Rusty Blackbird *(Euphagus carolinus)* ***Allen T. Chartier***



Darlene Friedman ©

The rusty-gate song, and rusty fall plumage combine to give this bird a very appropriate name. With its broad rusty fringes on the crown, nape, back, and tertials, it is distinctive in winter plumage. But the breeding plumage of males is very similar to the Brewer's Blackbird, with which it often occurs in winter and in migration, and the iridescent green head of the male Rusty Blackbird may not be easily distinguished from the iridescent purplish head of the male Brewer's. Females are more easily distinguished as Brewer's Blackbirds have dark eyes and are grayish-brown not dark gray. This similarity warrants caution and careful observation when attempting to document breeding Rusty Blackbirds in Michigan, especially in marginal habitats or during late May.

The Rusty Blackbird is primarily an early spring and late fall migrant in Michigan, with small numbers in winter and very few breeding season records. In spring, they generally arrive in March in the southern Lower Peninsula and linger into late May in the UP. Recent Michigan Bird Survey results, published annually in *Michigan Birds and Natural History* (MAS 1994-2007), listed the latest spring migrant Rusty Blackbirds between 22-31 May, often from Whitefish Point but occasionally from the northern LP and once from Shiawassee NWR in Saginaw County and one from Belle Isle on 19 May 2005 (pers. obs.). One record from 3 June 2000 is the latest spring migrant recorded in recent years (Byrne 2001). In fall, Rusty Blackbirds usually arrive in mid-September in the UP and linger into early December in the southern LP, and sometimes in small numbers over winter (Reinoehl 1994, Chartier and Ziarno 2004). In migration throughout Michigan, the Rusty Blackbird prefers wooded wetlands, often feeding by flipping over wet leaves on the ground, sometimes in the company of Common Grackles and Red-winged Blackbirds (Avery 1995).

Distribution

The Rusty Blackbird breeds in openings in forested wetlands, especially bogs, in the boreal forest biome from Alaska across Canada east to Newfoundland and generally south in the eastern portion of its range to the north shore of Lake Superior and northern New England (Avery 1995). In winter, it favors forested wetlands from eastern Nebraska to Ohio and southern New York south to east Texas, the Gulf Coast, and east to central peninsular Florida, with greatest numbers concentrated in Bird Conservation Region 26, the Mississippi Alluvial Valley (Avery 1995, Niven et al. 2004).

Nesting has been confirmed in Wisconsin only four times since 1861, with the most recent being an observation of adults foraging with young in Ashland County in the far northern part of the state (Harriman 2006). In Ontario, breeding was widespread throughout the boreal forest of the Hudson Bay Lowlands, while the southernmost breeding areas were along the northern shore of Lake Huron and in Algonquin Provincial Park (Francis 2007).

Only one actual nest has ever been discovered in Michigan, in willows along the Paint River in Iron County on 4 June 1943 (Parmelee 1960). During MBBA I, breeding evidence was obtained from four blocks in Luce, Delta, and Marquette counties in the UP with two confirmations, and from one block in Mason County in the LP. MBBA I erroneously indicated records from four UP counties instead of three (Granlund 1991). In Luce County, nesting was confirmed based on an observation of adults carrying food in a spruce bog near Betsy Lake (T49N, R8W, block 4) on 15 June 1988, with a previous observation from the same locale in the summer of 1985. Possible breeding was noted based on birds observed in appropriate habitat near Sleeper Lake (T48N, R10W, block 3) in 1985. In northeastern Delta County (T42N, R18W, block 1) breeding was confirmed based on an observation of an adult apparently attending young in a beech-maple woodland on 23-25 July 1988. In northwestern Marquette County, possible breeding was noted based on birds present in suitable habitat near Little Dishno Lake or Dishno Creek, several miles north of Champion (T49N, R29W, block 3), in 1986. In Mason County, at the northeast end of Bass Lake (T17N, R18W, block 4, section 25) a pair (indicating probable breeding) was described from marginal breeding habitat, "tamarack trees, alder bushes, lining a 10-15 ft. wide creek…surrounded by climax deciduous forest" on 7 July 1988 providing the only LP record.

During MBBA II, breeding evidence was obtained from only two UP counties. Breeding was confirmed from western Gogebic County near Thomaston (T48N, R45W, section 30) based on an observation of a group of 15-20 birds that included adults feeding fledged young on 20 June 2006. The habitat at this site was a recently abandoned and partially drained beaver pond with hemlock and black ash woodland at the north end and mesic northern hardwood uplands at the southern end and numerous dead snags. The area was not occupied by Rusty Blackbirds in 2007 or 2008 (B. Bogaczyk pers. comm.). Possible breeding was noted

from Seney NWR in eastern Schoolcraft County (T44N, R13W, block 2) based on an individual detected on a BBS point count in appropriate breeding habitat on 2 June 2006, though this could also have been a late migrant on this date. As with MBBA I, several LP and UP reports in late May were listed as Observed as they likely pertained to late migrants.

Breeding Biology

Avery (1995) provides the most complete description of the breeding biology of the Rusty Blackbird. The female builds a bulky nest of twigs, grasses, mosses, and lichens in dense vegetation of small trees or shrubs near, or sometimes over water. Openings in boreal forest including bogs, fens, and edges of beaver ponds within forested wetlands, most often coniferous in nature, are favored as nesting locales. Single pairs or small colonies may nest together. Clutch size ranges from three to five and egg laying can begin in mid-May to early June depending on latitude. The incubation period, undertaken only by the female, is not well known but has been reported as 14 days. Likewise, the fledging period has not been well documented, but the altricial young have been known to leave the nest at about 13 days of age. Adults of both sexes feed the nestlings, and have been seen tending young up to four weeks after they had fledged. Rusty Blackbirds are most likely single-brooded, but will renest following a nest failure.

Abundance and Population Trends

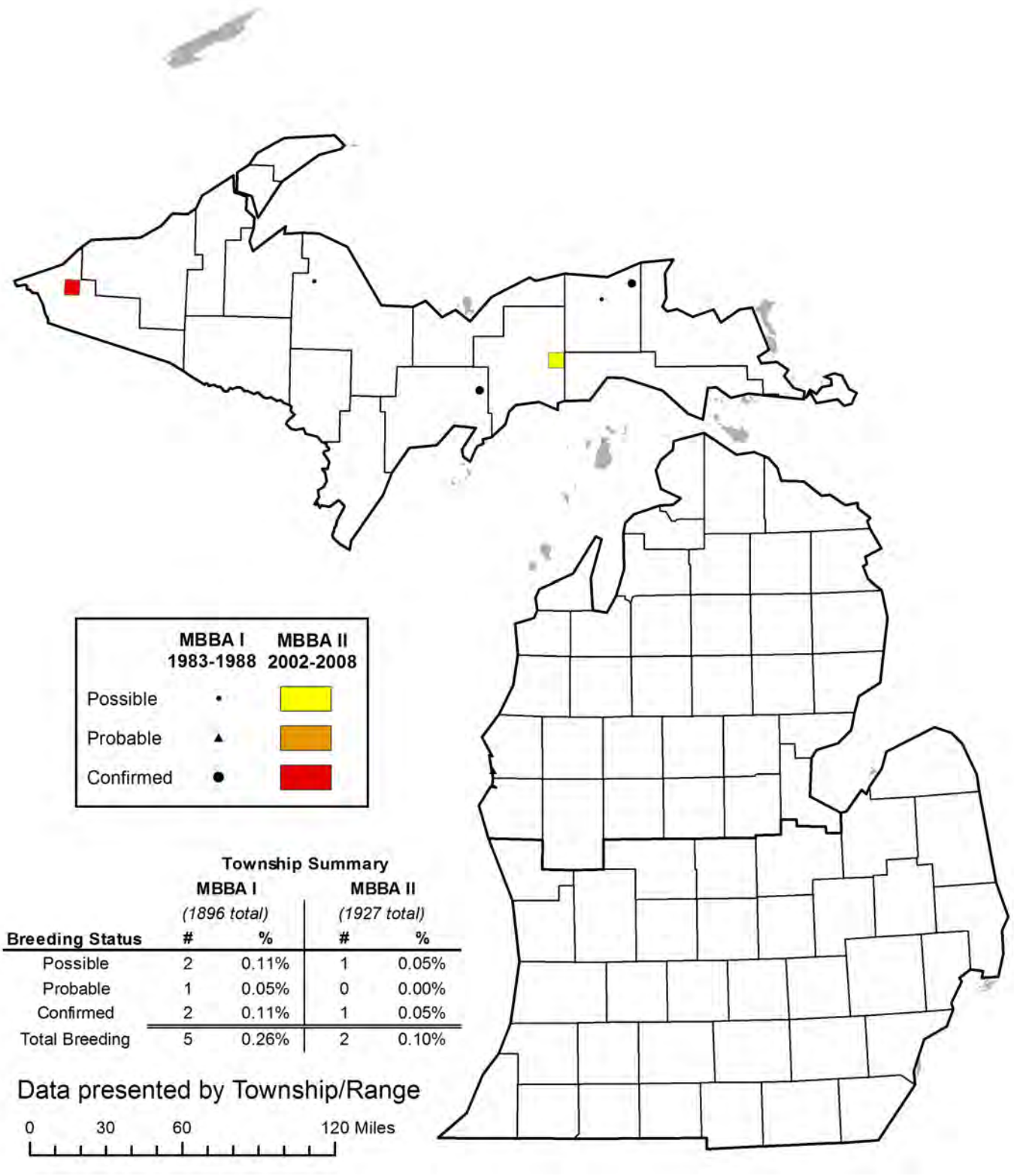
The Rusty Blackbird is a difficult species to census as the bulk of the breeding population nests north of the area covered by the North American Breeding Bird Survey. In winter, it mixes with other species, including other blackbirds, and the forested wetlands it favors can be difficult to survey.

Partners in Flight estimates the current North American population at 2 million (PIF 2007), based largely on BBS route data which does not adequately survey the boreal forest habitat where the Rusty Blackbird breeds (Sauer et al. 2008). The PIF population estimate for Ontario, which may be the principal source of migrants though Michigan, is 190,000 (PIF 2007). Greenberg and Droege (1999) described historical declines of Rusty Blackbird based on published accounts in the ornithological literature, and steep declines since about 1980. Niven et al. (2004) extrapolated an estimated North American population, pre-1965, of about 13.3 million, and described a steep decline on Christmas Bird Counts over the past 30 years. The second Ontario Breeding Bird Atlas (Francis 2007) documented population declines in southernmost breeding areas of about 30% since their first atlas 20 years ago, but noted increases of 37% in northern breeding areas in the Hudson Bay Lowlands which may indicate a northward shift in breeding, or may be an effect of increased surveying effort in those regions in the second atlas. In New York, the disjunct breeding population in the Adirondack Mountains was detected in 23% fewer blocks in their second atlas than in their first (Peterson 2008).

Conservation Needs

More study of this species is urgently needed as the reasons for the significant population declines are not well understood. Some suggested reasons for declines on the breeding grounds have included habitat loss and degradation, including effects due to global climate change, acid rain, and mercury accumulations, especially in the eastern portions of its range where it may have been historically most abundant. On the wintering grounds, significant loss of forested wetlands in the southeastern U.S., pesticides in agricultural lands where Rusty Blackbirds also feed, accidental mortality during blackbird control efforts, and competition with other blackbird species have been cited as potential factors causing declines (Avery 1995, Smithsonian Institution 2009).

Rusty Blackbird *(Euphagus carolinus)* ***Allen T. Chartier***



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	2	0.11%	1	0.05%
Probable	1	0.05%	0	0.00%
Confirmed	2	0.11%	1	0.05%
Total Breeding	5	0.26%	2	0.10%

Data presented by Township/Range

0 30 60 120 Miles

Brewer's Blackbird *(Euphagus cyanocephalus)* ***Brian Johnson***



Caleb Putnam ©

Although closely resembling the Rusty Blackbird in appearance and proportions, the Brewer's Blackbird differs decidedly from that species in distribution and habitat. Quite common west of the Great Plains, it occupies a niche similar to the Common Grackle, a more eastern and less closely related species. Over a span of six decades, Brewer's Blackbirds extended their breeding range several hundred miles eastward across the northern United States and southern Canada. In Michigan and other regions where they overlap, competition with grackles has narrowed habitat selection for both species. The blackbird has claimed grassy and brushy areas, while the grackle dominates marshy and suburban ecosystems (Stepney 1979). In Michigan, Brewer's Blackbirds often breed as solitary pairs, but more frequently they aggregate in small, loose colonies (generally numbering less than 10 pairs). Unusual for grassland passerines, adults aggressively defend nests and young, and in colonial situations, an entire flock may insistently mob an intruder.

In western North America, Brewer's Blackbirds breed from central British Columbia, Alberta, Saskatchewan, and Manitoba, south to northern Baja California, central Arizona, northern New Mexico, and southeast Colorado. The highest concentrations occur in California, where it is abundant (Sauer et al. 2008). At the beginning of the early 20th century, they were only sparingly distributed east of western Minnesota (Walkinshaw and Zimmerman 1961, Stepney and Power 1973). Following the rampant clearing of forestlands in the upper Midwest, the species extended the northern part of its breeding range eastward to eastern Ontario at an average rate of approximately 11 miles per year (Stepney and Power 1973).

Distribution

The first Michigan specimen of Brewer's Blackbird was collected in Gogebic County on 26 July 1932 (Wood 1951). As indicated by a steady rise in reports, the species radiated eastward across the UP, and had reached the Sault Ste. Marie area by 1953. Between 1953 and 1956 Walkinshaw and Zimmerman (1961) had documented nesting from eight of the 15 UP counties, and by the late 1950s, they considered Brewer's Blackbirds "fairly common" in the peninsula. Meanwhile, the species was discovered in the Lower Peninsula on 16 May 1947 near Kalamazoo, and a nest was found on 12 June (Fleugel 1948). Additional records from the southwest part of the state followed in rapid succession, and in 1953, Walkinshaw and others confirmed breeding in eight LP counties, all in western Michigan (Walkinshaw and Zimmerman 1961). Sightings spread eastward across the Lower Peninsula, with breeding documented in Jackson County in 1955 (Walkinshaw 1961) and in Bay County in 1960 (Wolf and Grefe 1960). The expansion continued into eastern Ontario thru the 1960s (Stepney and Power 1973), but by the mid-1970s, Brewer's Blackbirds had effectively reached their eastern terminus.

No similar range extension occurred across the more southerly states, and even in Michigan, Brewer's Blackbirds are strongly preferential to more northern latitudes. Despite its fairly rapid colonization of Michigan, the species has remained only locally common at best. Atlas records generally reveal a fairly thin distribution in most of the northern counties, although tighter concentrations are apparent in the central UP and the central NLP. The species becomes increasingly scarce toward the southeastern SLP.

Brewer's Blackbirds were found in 15 UP, 25 NLP, and 11 SLP counties during MBBA I, while MBBA II showed a general reduction to 13 UP, 23 NLP, and 12 SLP counties. There were only 67 (40, 22, 5) townships with birds seen during both Atlases. The limited number of SLP records from MBBA I seemed to show that the initial surge during the colonization phase had waned (Granlund 1991), and anecdotal observations supported this conclusion (Powell 1982). Results from MBBA II have indicated that SLP populations have remained sparse (though stable) over the last 25 years. However, in northern Michigan there has been a reduction in the number of townships hosting this species, and this decrease has been especially significant in the UP, despite greater coverage there during MBBA II. Likewise, much of Ontario generally showed minor population changes, but the region with the most birds exhibited a significant decline in observations (Dunn and Gordon 2007).

Breeding Biology

In the western United States, breeding Brewer's Blackbirds utilize a wide range of open or semi-open settings, usually in human-modified areas. Typical habitats include farm and grazing lands, natural grasslands, wetlands, riparian areas, clearcuts, parks, and residential areas (Martin 2002). In Michigan, the species is more restrictive in its choice of habitat, gravitating to more rustic areas, but it still shows considerable variability. Nesting habitats in Michigan include grasslands, lake edges, dry marshes, bogs, and muck lands farmed for row crops – the latter being a favored haunt

Brewer's Blackbird *(Euphagus cyanocephalus)* ***Brian Johnson***

during the colonization phase in southern Michigan (Walkinshaw 1957). Acceptable grasslands may be moist to moderately dry and may be extensive, small, or merely marginal to other habitats. Such areas may also have considerable woody vegetation and weeds, but sites dominated by tall, dense grass are avoided. As its distribution in the north central LP and parts of the UP attest, Brewer's Blackbirds especially favor well-drained areas of regenerating jack pines, and in such environments they are one of the most common inhabitants. The closest habitat associates in Michigan seem to be Upland Sandpiper and Clay-colored Sparrow (which has also exhibited a similar eastward range expansion).

Although some males can be sporadically found during the winter in Michigan (primarily in the SLP), the earliest migrants appear in late February or early March, and most territorial birds return during the first half of April in both peninsulas. The nest site, chosen by the female, may be in a small deciduous or coniferous tree, shrub, or on the ground. In Michigan and elsewhere in the eastern part of its range, ground nests seem to be most prevalent. Of the several UP and LP nest sites described by Walkinshaw, all were situated on or very close to the ground. Such nests are often located among changes in local relief such as shallow slopes or banks (Stepney 1971). Ditches and fencerows are also prime nesting sites, and two nests found at Munuscong WMA, Chippewa County, were located in ditches (B. Johnson, unpub. data). A nest found in Newaygo County in 1998 was in an area of several hundred acres of pasture along a busy rural connector road (Ross 1999). Compared to other grassland species, nests tend to be poorly hidden.

Females construct a bowl-type nest variably incorporating twigs, grass, weed stems, and pine needles, and often mixed with mud or manure, then lined with fine grass, rootlets, and hair. Clutches usually consist of four to six eggs, generally pale with dark markings, but highly variable in color and patterning (Martin 2002). The female incubates for 12 to 13 days. Only the female broods, but both parents feed the young, which normally leave the nest in 13 to 14 days. Food carrying adults, which tend to be rather conspicuous, were the most common source of breeding confirmations in Michigan. Few nests were found during MBBA II. Eggs from two nests at Munuscong WMA hatched at the end of May and in early June (B. Johnson, unpub. data). Dates provided for 24 nests found by various observers in Michigan from 1953 to 1956 range from 26 May to 21 July, but most were discovered during the second half of June (Walkinshaw 1957). In Crawford County, from 1970 to 1976, 16 nests with eggs or young were discovered between 26 May and 1 July (Walkinshaw 1985). Over most of the species' range, they normally raise one brood each season (Martin 2002).

As Brewer's Blackbirds disperse from their breeding sites in July, they coalesce into flocks, often with other blackbird species. Some of these assemblages can be very large relative to the total Michigan breeding population. A flock of 407 Brewer's Blackbirds was counted at Munuscong WMA on 25 July 2007 (B. Johnson, unpub. data), and 500 were estimated in Oceana County on 1 October 1998 (Chartier 1999). Although sightings diminish during the fall, small numbers remain into November.

Abundance and Population Trends

Since the inception of the BBS in 1966, the Brewer's Blackbird has exhibited an annual decline of 1.31% across its breeding range (Sauer et al. 2008). From 1983 to 2007, the decrease has been 1.78% annually. In Michigan, the species is too sparsely distributed to provide meaningful trends from BBS data. Since 1983, it has only been recorded on 22 Michigan routes and then averaging just 1.2 birds per route. A non-significant increase of 1.12% from 1966 to 2007, partially offset by 1.48 decrease from 1983 to 2007, suggests that the state population is not dramatically changing (Sauer et al. 2008).

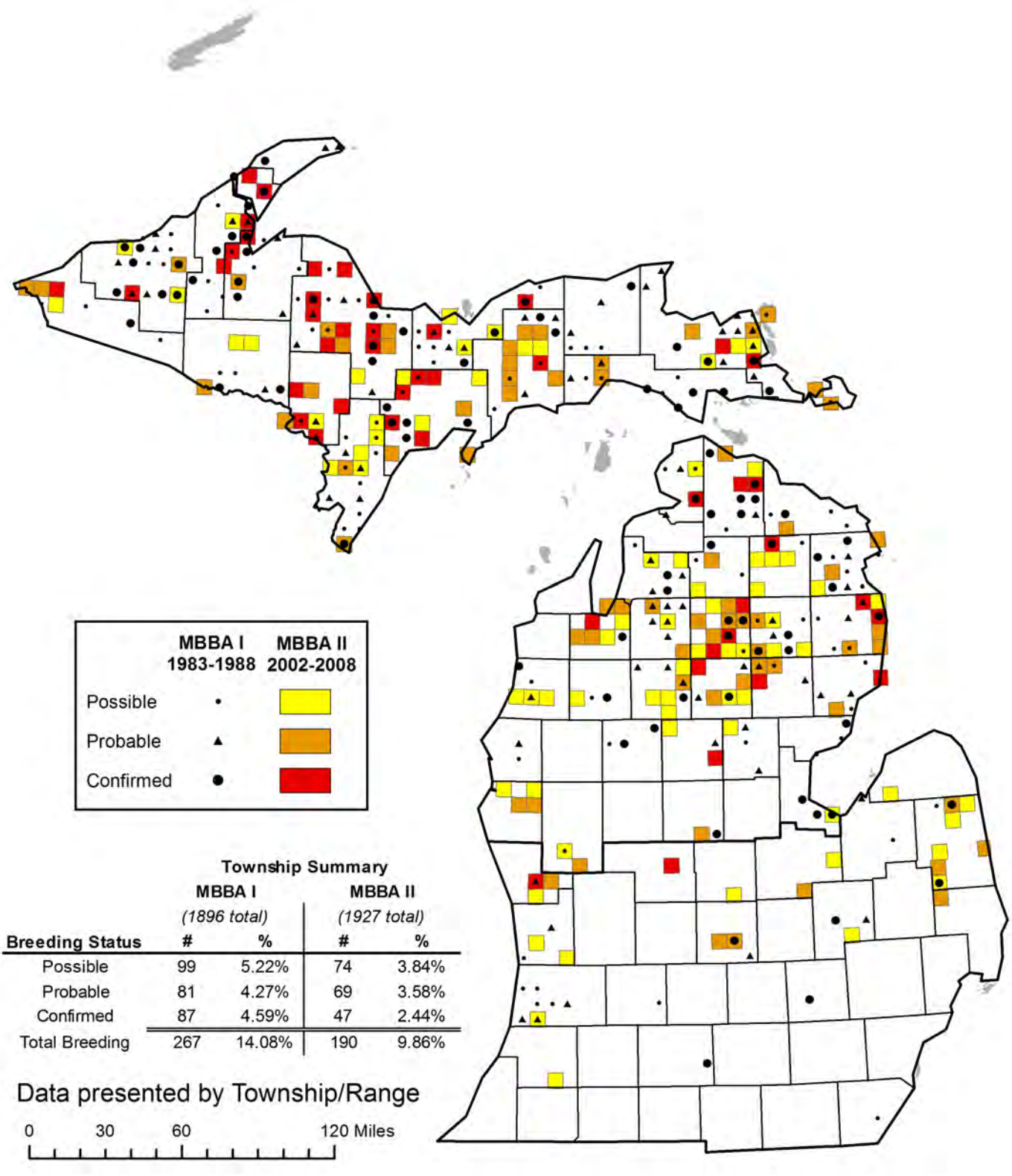
Conservation Needs

Various natural and semi-natural mechanisms work to limit Brewer's Blackbird numbers. The exposed nests are vulnerable to predation and inclement weather. Those located in ditches are prone to loss from flooding. Brown-headed Cowbirds regularly parasitize nests in the western United States, but the impacts are less severe in much of northern Michigan due to lower cowbird numbers.

Consequently, the primary threat faced by Brewer's Blackbirds, as with dozens of other Michigan species, is the deterioration and destruction of open habitats. Whereas the opening of the landscape had promoted colonization into Michigan, woody succession and encroachment has reduced available grassland habitat. In the LP and the eastern UP, the loss of cultivated land to development has further restricted blackbird distribution. Policies and programs that encourage both agriculture and grasslands are needed to maintain the Brewer's Blackbird at a reasonable threshold. Prudent farming practices are normally conducive to Brewer's Blackbirds, as the species usually nests in the fallow edges and mostly utilizes croplands to gather insects. For those in hayfields, harvesting normally occurs too late in the season to jeopardize most nests and chicks, though young juveniles may still be vulnerable.

Since Brewer's Blackbirds eschew closed-canopy shrublands and woodlands, commercial timber harvest in public and private forests and the periodic removal of brush in managed grasslands proffer suitable breeding sites. This species is one of the first to colonize cutover pine lands, so responsible silvicultural practices, such as those used by land managers for Kirtland's Warblers, benefit Brewer's Blackbirds as well. Prescribed burns followed by natural or patchy regeneration would probably enhance the allure of the new habitat and retain blackbird colonies for longer periods.

Brewer's Blackbird *(Euphagus cyanocephalus)* ***Brian Johnson***



Common Grackle *(Quiscalus quiscula)*

Max A. Henschell



Jerry Jourdan ©

The return of the shimmering purple and bronze plumage, striking yellow eye and keeled tail of the Common Grackle is a sure sign that spring is on its way throughout much of Michigan. A harbinger of the end of summer, large flocks of Common Grackles form in the farmlands throughout Michigan for migration south. The Common Grackle was probably much less common in the state prior to European settlement, but land cleared for agriculture was rapidly inhabited by the species. Though now common throughout eastern North America, Common Grackle populations are on the decline due to undetermined causes (Peer and Bollinger 1997).

Common Grackles are widespread throughout the United States east of the Rocky Mountains, as far north as northern Alberta, south through most of Texas and east through the Gulf States to the coast up to Newfoundland (Peer and Bollinger 1997). It can be found in low numbers through the southernmost tier of Michigan counties during winter, north to Port Huron. It nests throughout the state.

Distribution

Peer and Bollinger (1997) define the habitat as "open to partially open situations with scattered trees." Common Grackles often nest along edges of both coniferous and deciduous forests and are common breeders around human-altered habitats such as parks and urban areas, particularly in shrubs and hedges close to water. Affinity for human-altered habitat is evident in the MBBA II map, with many confirmations coming from urban areas such as Detroit, Lansing, Clare, Gaylord, Sault Ste. Marie, Iron Mountain, Houghton/Hancock and Copper Harbor. Peer and Bollinger (2007) also note that Common Grackles are rarely found nesting in dense forests. Areas of extensive forests such as the Porcupine Mountains and the Ottawa and Hiawatha National Forests, have fewer confirmations. Outside of urban settings, Common Grackles in Michigan breed in partially open swamps, such as ash woodlots and beaver ponds, as well as near farmland (S. Haas, pers. comm.).

Common Grackles were recorded breeding in nearly 95% of the townships in the southern LP, nearly 88% in the northern LP and 63% in the UP during MBBA II. During MBBA I, Common Grackles were found in 98%, 91% and 70% of townships, respectively. This decline is consistent with Breeding Bird Survey data (Sauer et al. 2008), but may also be a result of lower observer effort in MBBA II.

Common Grackles are widespread and abundant in all states neighboring Michigan. It was found in 87% of townships during the Wisconsin atlas (Harriman 2006) and in 100% of sample townships in both the Ohio (Peterjohn and Rice 1991) and Illinois atlases (Kleen et al 2007). Ontario recorded Common Grackles in approximately 47% of its townships (Zimmerman 2007). This low occurrence is most likely due to large amounts of dense boreal forest in the northern two-thirds of the province, which corresponds with the northern limit of the breeding range documented during their atlas project (Zimmerman 2007).

Breeding Biology

The Common Grackle is found throughout Michigan during the breeding season. Birds arrive on the breeding grounds starting in mid-March for the northern LP (Chartier and Ziarno 2004) and reach the northern limits of their breeding range in the state in early April (Binford 2006). Pair-bonding begins as soon as females arrive on the breeding grounds, typically late March into April; birds in the northern reaches of their range may not pair-bond until May. Nesting occurs from mid-April to early June, with fledging of young completed by early July. Common Grackles are semicolonial breeders, and aggregate into groups of up to 30 pairs (McPeek et al 1994). Nests are often built with a mud base and lined with soft materials such as hair and grass; nests are typically found in coniferous trees or occasionally in dense brush (McPeek et al, 1994).

Abundance and Population Trends

Partners in Flight data indicate that the Common Grackle is one of the most abundant birds in the state, with an estimated 1.6 million birds (PIF 2007). BBS data show a decrease of approximately 2.5% of observations per route for this species from the beginning of MBBA I to the end of MBBA II. The decrease in Michigan is in contrast with a slight increase of 0.42% in FWS Region 3 during the same time period. The Central and Eastern BBS Regions combined, covering most of the breeding range of Common Grackle, shows a decrease of 0.7% (Sauer et al 2008).

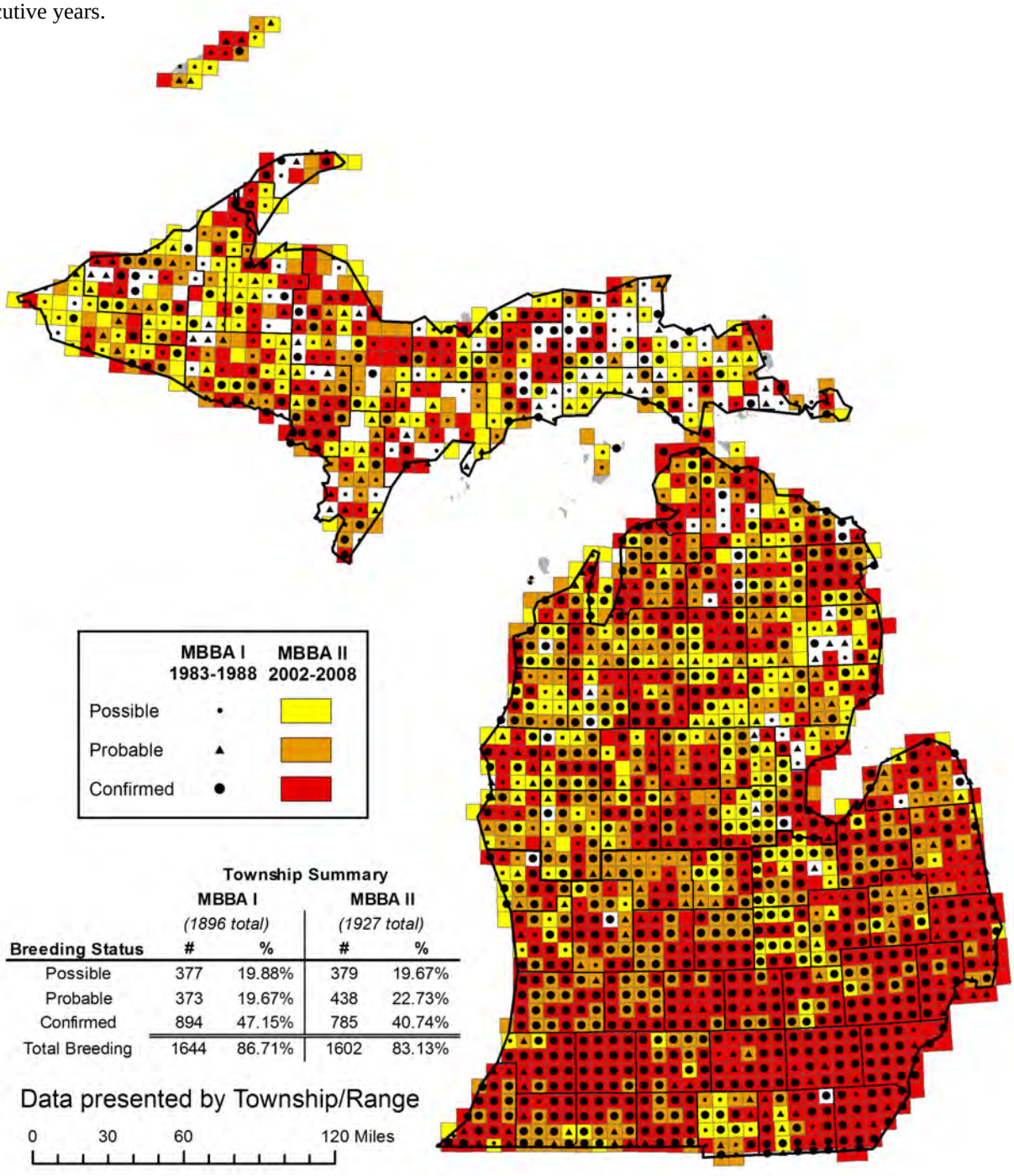
Conservation Needs

Land clearing practices throughout Michigan in the late 1800s into the 1900s dramatically increased the amount of habitat for Common Grackle. Common Grackles are often considered an agricultural pest because of their large aggregations around food sources such as corn, soybeans and cherries. For this reason, the Common Grackle joins other birds considered agricultural pests in the federal

Common Grackle *(Quiscalus quiscula)*

Max A. Henschell

regulation, "Depredation order for blackbirds, cowbirds, grackles, crows and magpies" (Depredation, 2008) This order allows the control of Common Grackles in agricultural situations "when found committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance". Human health hazard is caused by large aggregations of Common Grackle which can harbor the fungus *Histoplasma capsulatum*, which can cause histoplasmosis, a disease fatal in humans. The fungus typically only occurs in roost sites used for several consecutive years.



Brown-headed Cowbird *(Molothrus ater)* ***Doug Powless***



John Van Orman ©

Brown-headed Cowbirds likely flourished alongside the Pleistocene megafauna that once roamed North America (Rothstein and Peer 2005). In modern times, flocks of cowbirds followed the great herds of bison across the grasslands of the continent, feeding on insects kicked up, and depositing their eggs in other birds' nests along the way. An obligate brood parasite, the Brown-headed Cowbird is documented leaving eggs in the nests of hundreds of species (Friedmann and Kiff 1985, Lowther 1993). The evolution of this breeding strategy is one of the most fascinating aspects of North American ornithology (Lanyon 1992, Winfree 1999, Rothstein et al. 2002), but the cowbird has long drawn disdain. Chapman (1927) called it "...a thoroughly contemptible creature, lacking in every moral and maternal instinct...". Martin et al. (1961) wrote: "Apparently this social parasite is either too lazy or too smart to take care of its own domestic duties." Although ornithologists today are concerned about the effects of cowbirds on other birds (Robinson et al. 1995, Rosenberg et al. 1999), current views are not so scornful, and some consider cowbirds "a fascinating study in behavior" and "marvelous to watch" (Stokes and Stokes 1983).

Distribution

Brown-headed Cowbirds breed in grassland, prairie, and agricultural habitats across southern Canada to Florida, the Gulf of Mexico, and south into central Mexico (Lowther 1993). The center of concentration and highest abundance of the cowbird during summer occurs in the Great Plains and Midwestern prairie states where herds of wild bison and other ungulates once roamed (Lowther 1993, Chace et al. 2005).

Flocks of cowbirds likely also inhabited the prairies and woodland openings of southern Michigan prior to the 1800s (Walkinshaw 1991). Brewer (1991) points out that cowbirds were on Sager's Michigan bird list of 1839. In contrast, cowbirds were not noted in Ontario until the 1870s (Falk 2007).

Cowbirds likely did not spread farther north in Michigan until after logging and subsequent wildfires of the late 1800s (Mayfield 1961a). Wood and Frothingham (1905) found cowbirds in Oscoda and Crawford Counties during their 1903 quest for birds along the Au Sable River, but did not comment on them. Cowbirds were recorded in the NWLP around Douglas Lake by 1910 (Pettingill 1974). Wood (1918) also found cowbirds in the early 1900s as far north as northwestern Alger Co. in the UP, but he only noted their presence, an indication that he was not surprised to find cowbirds that far north by then.

Today, the cowbird is a common summer resident throughout Michigan. There was no apparent change in distribution of the cowbird since the first atlas. A few areas of Michigan had no cowbirds during either atlas surveys, particularly heavily forested portions of the UP. Overall there were 27% fewer townships reporting cowbirds in the UP, with breeding evidence from 40% of UP townships. Most cowbirds migrate to the south each autumn, but some can be found in southern Michigan through the winter.

Breeding Biology

The Brown-headed Cowbird is an obligate brood parasite—with no ability to build a nest, the female must lay her eggs in the nests of other birds, particularly species that nest low in shrubby, young forest, forest edge, and open habitats (Lowther 1993). A female cowbird can lay no more than one egg per day, usually at dawn, but can lay several dozen over a breeding season, and sometimes takes hosts' eggs and young from the nest (Mayfield 1961a, 1961b, Payne 1965, Lowther 1993, Elliott 1999). The mating system might vary from monogamy, to polygyny, to promiscuity depending on habitat, sparsity of host nests, and sex ratios (Teather and Robertson 1986).

Abundance and Population Trends

Survey data show Brown-headed Cowbird population declines at all landscape scales. Michigan BBS routes show a statistically significant decline of 1.95% from 1983-2007 (Sauer et al. 2008). Regionally, the BBS data also show a slight, but steady and significant annual decline of 0.55% during the same period. It also declined across North America 1% per year on BBS routes from 1966-1996 (Sauer et al. 2008). These declines appear corroborated by atlas data: breeding was confirmed in fewer townships during MBBA II. However, the number of townships with cowbirds in the SLP was 677 up from 676 in MBBA I, over 95% of all townships in both atlas periods. The number of townships with cowbirds decreased within the UP and NLP from MBBA I to MBBA II. This decrease in the UP and NLP seems especially indicative of a reduction in cowbird habitat in the north since observer effort in those regions was greater during MBBA II. Cowbirds also declined in Ontario between atlas periods (early 1980s to early 2000s) along Ontario BBS routes (Falk 2007). These declines might be due to regrowth of forests in the north.

Conservation Needs

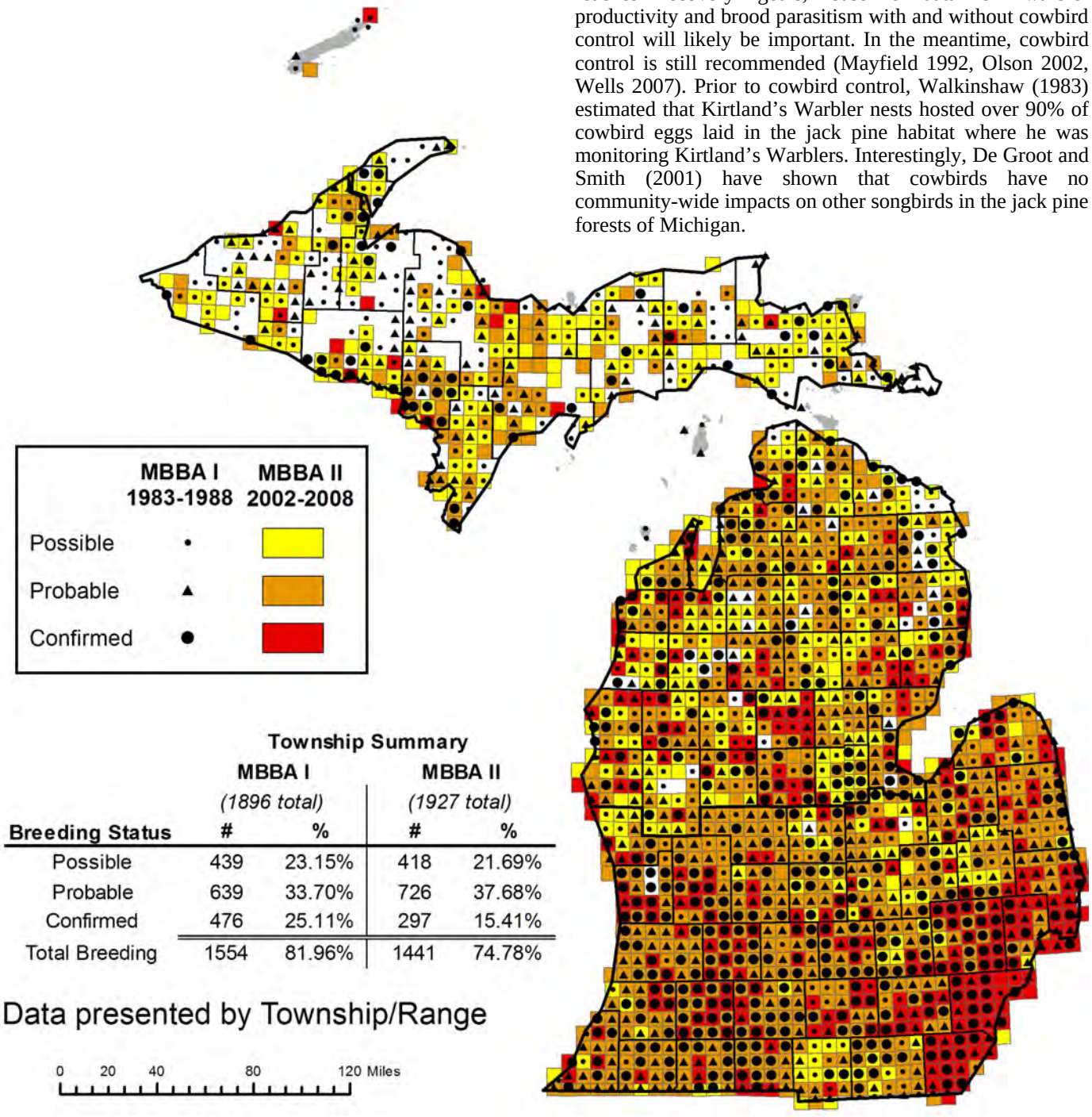
Brown-headed Cowbirds have been found to lay eggs in nests of over 220 species (Lowther 1993) including some of the rarest warblers in our region, such as Prairie (Nolan 1978), Kirtland's (Mayfield 1961a, 1992), Golden-winged (Coker and Confer 1990), Hooded (Ogden and Stutchbury 1994), and, to a lesser degree, Cerulean (Rogers 2006). However, a recent review of brood parasitism by the

Brown-headed Cowbird *(Molothrus ater)*

Doug Powless

National Audubon Society reports that cowbirds do not appear responsible for rangewide declines of various songbirds, with the exception of some rare species (Muehter 2002). Since MBBA I, ornithologists have published extensively on the effects of landscape factors on songbird productivity and brood parasitism (Askins 2000). Several studies indicate that the songbirds most vulnerable to cowbirds build open cup nests in open and edge habitats, but forest nesting species can also be very vulnerable in agricultural landscapes where forests are fragmented (Robinson et al. 1995, Trine 1998, Fauth 2000, Ford et al. 2001, Fauth 2001, Knutson et al. 2004)

In Michigan, the cowbird is infamous as one of the main threats to the Kirtland's Warbler (Mayfield 1960, 1963, 1977, 1992, Radtke and Byelich 1963, Ryel 1981, Walkinshaw 1983, 1991, USFWS 2008). The severe effect of brood parasitism on Kirtland's Warbler necessitated the nation's first cowbird control program in 1972. Some argue that warbler population growth was limited solely by amount of suitable habitat (Rothstein and Peer 2005); but most contend that a combination of intensive habitat management along with cowbird control saved the Kirtland's Warbler (Kelly and De Capita 1982, Walkinshaw 1983, Mayfield 1993, USFWS 2008). As the warbler reaches recovery goals, baseline data on warbler productivity and brood parasitism with and without cowbird control will likely be important. In the meantime, cowbird control is still recommended (Mayfield 1992, Olson 2002, Wells 2007). Prior to cowbird control, Walkinshaw (1983) estimated that Kirtland's Warbler nests hosted over 90% of cowbird eggs laid in the jack pine habitat where he was monitoring Kirtland's Warblers. Interestingly, De Groot and Smith (2001) have shown that cowbirds have no community-wide impacts on other songbirds in the jack pine forests of Michigan.



Township Summary

	MBBA I (1896 total)		MBBA II (1927 total)	
Breeding Status	**#**	**%**	**#**	**%**
Possible	439	23.15%	418	21.69%
Probable	639	33.70%	726	37.68%
Confirmed	476	25.11%	297	15.41%
Total Breeding	1554	81.96%	1441	74.78%

Orchard Oriole *(Icterus spurius)*

William C. Scharf



Willie McHale ©

Its smaller size compared to the Baltimore Oriole and its appealing musical warbled song coupled with a chestnut colored body, black back and hood makes identification of an adult male Orchard Oriole easy. Yearling males have the yellow-green coloration of females and juveniles, but with a recognizable black bib on the breast. Delayed plumage maturation is due to age-specific differences in foraging and food availability as well as age differences in gene expression (Enstrom 1992). Yearling males are often successful breeders (pers. obs.).

Distribution

Orchard Orioles are common breeders in the southern LP with a few scattered records from the northern LP and only two from the UP. They are limited to areas where sparse deciduous trees and shrubs form the dominant vegetation, although a photo from the Ontario Atlas (Cadman et al. 2007) shows a nest of this species in a pine tree, and one nest has been recorded in a white pine in Michigan (J. Craves pers. comm.).

Orchard Orioles reach their greatest numbers in Michigan's southern two tiers of counties. In MBBA II five townships in southwestern Michigan and one township in southeastern Michigan had breeding populations of 9-10 Orchard Orioles, while 25 townships had 4-8 Orchard Orioles with confirmed nesting. There has been an increase of 83% in the number of townships in the SLP with nesting Orchard Orioles reported (possible, probable and confirmed) from MBBA I to MBBA II.

Breeding Biology

Except for a few early records in April, Orchard Orioles usually arrive in Michigan between early May and early June. They start nesting in late May through mid-June, and the young have fledged by mid-July to early August. They nest semi-colonially in prime habitat (Clawson 1980, Scharf and Kren 2010). There is a preference for nesting in cottonwoods and willows (Clawson 1980). Additionally in Michigan, nesting occurs in aspens and mulberries (R.J. Adams pers. comm.) and in an elm (J. Craves pers. comm.). Orchard Orioles are usually single brooded, and renesting can occur if the initial nest fails (Scharf and Kren 2010). However Ligi and Omland (2007) found as many as 33% of nests were double brooded in Maryland. The species is a classic Neotropical migrant, spending only three months or less in our latitude before beginning its passage south to Mexico, Central and South America for the winter. It is one of the earliest species to depart Michigan in late summer.

The cup-shaped nest is composed of long strands of tightly woven grass, with a lining of downy plant material suspended between forked branches. Nests in deciduous trees are obvious in leafless seasons, and can be visually separated from co-nesters, Eastern Kingbirds and Baltimore Orioles (pers. obs.).

Orchard Orioles are primarily arthropod eaters around flowering shrubs and trees until the ripening of fruits such as chokecherry, black cherry, pin cherry, and mulberry. When fruits are available, they switch diets to become mainly frugivores in mid-summer (Scharf and Kren 1997). In their winter residence they become nectar feeders (Morton 1979).

Abundance and Population Trends

Population estimates of Orchard Orioles for Michigan put the number at 5,000 birds (PIF 2007), about 0.1% of the estimated 3.7 million birds in the North American population (Sauer et al. 2008). Orchard Orioles are widespread and locally common in the eastern U.S. Increases in numbers and range expansion in areas near Michigan have been suggested in Pennsylvania (Brauning 1992) with the newest Pennsylvania Atlas (Cornell Laboratory of Ornithology 2009) showing an extensive increase in range. Range expansions have been documented in Indiana, Ohio and Ontario (Peterjohn and Rice 1991, Castrale et al. 1998, Cadman et al. 2007). Populations are stable and higher than Michigan in southern Illinois and Missouri due to their location nearer to the center of the species' range (Kleen et al. 2004, Robbins and Easterlea 1992). Wisconsin tallied a 9.7% increase over a 36 year period ending in 2002 (Cutright et al. 2006). Even though the Orchard Oriole population is relatively small compared to other North American species, and 87% of the population nests within the U.S. and Canada, Rich et al. (2004) confer no special status on the species.

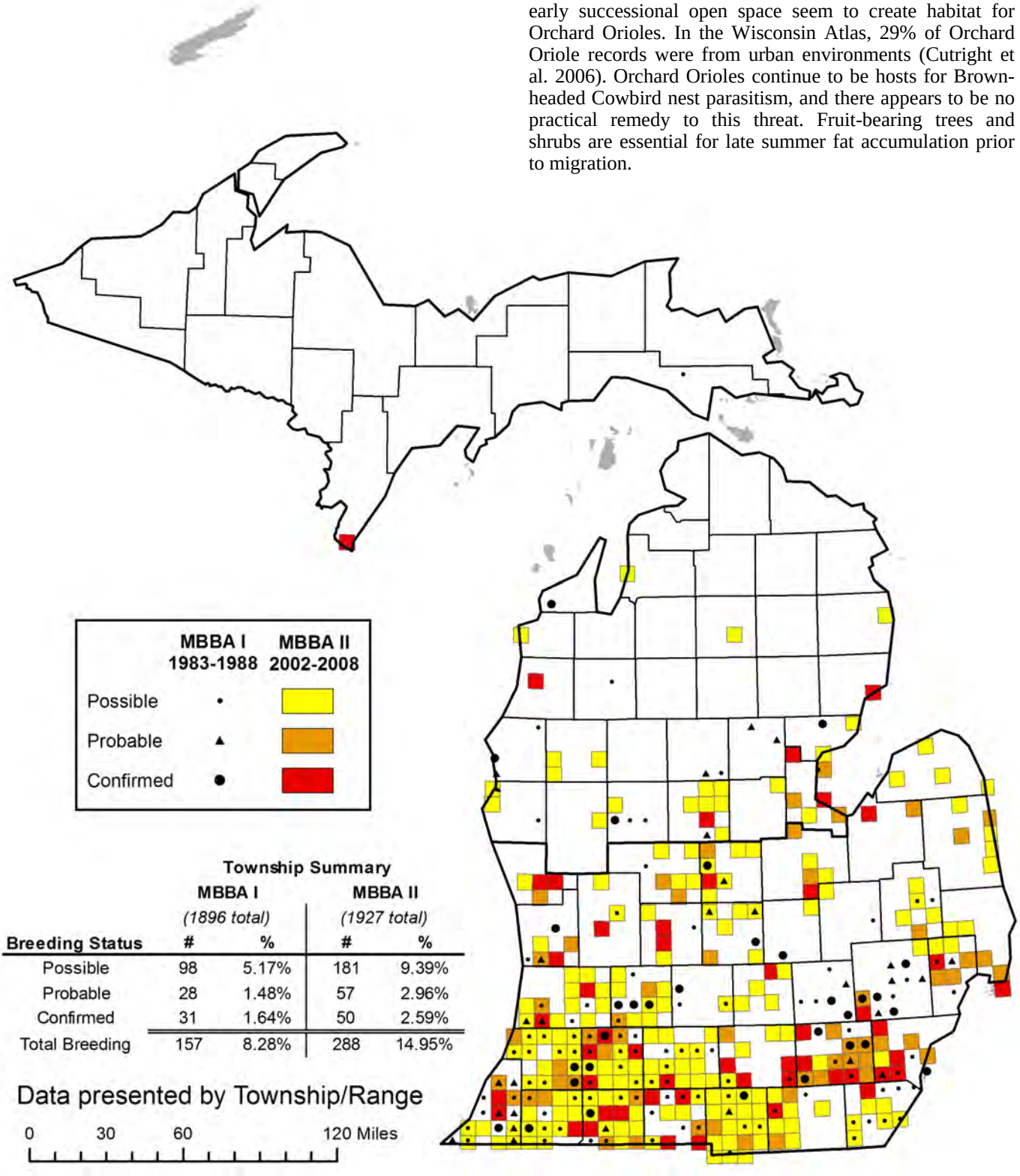
Orchard Orioles have increased their presence from 39 counties in MBBA I to 50 of Michigan's 83 counties in MBBA II. Only four counties that had nesting in MBBA I reported no Orchard Orioles in MBBA II. The species' increase is shown by the number of townships with nesting occurrences reported by MBBA II observers. There were 36% of townships with Orchard Orioles in the SLP in MBBA II (vs. 20% in MBBA I), but only 4.7% of NLP townships in MBBA II (vs. 2.7% in MBBA I), and less than 1% of UP townships in both MBBA I and MBBA II.

Orchard Oriole *(Icterus spurius)*

William C. Scharf

Conservation Needs

Early successional habitats ranging from shrub-invaded grasslands to sparse shade-intolerant deciduous trees are vital for continued nesting of this species. These habitats can be created in a variety of ways: abandoned agricultural land, increased deciduous parklands, unsprayed orchards, cemeteries, prescribed burning, or riverine floodplains that are flooded or scoured frequently to provide the open deciduous environment. Succession toward a closed forest canopy and the planting and culture of conifers negatively affects the habitat of this species. Ironically, from a conservation standpoint, housing development and rural homes with adequate deciduous plantings and dedicated early successional open space seem to create habitat for Orchard Orioles. In the Wisconsin Atlas, 29% of Orchard Oriole records were from urban environments (Cutright et al. 2006). Orchard Orioles continue to be hosts for Brown-headed Cowbird nest parasitism, and there appears to be no practical remedy to this threat. Fruit-bearing trees and shrubs are essential for late summer fat accumulation prior to migration.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	98	5.17%	181	9.39%
Probable	28	1.48%	57	2.96%
Confirmed	31	1.64%	50	2.59%
Total Breeding	157	8.28%	288	14.95%

Baltimore Oriole *(Icterus galbula)*

Gail McPeek



John Van Orman ©

Species is sponsored in memory of: Val Noble

Bird names have many different origins, and for this species inspiration came from the coat of arms of Lord Baltimore, Maryland's colonial governor. The male Baltimore Oriole is well known because of its brilliant orange and black plumage, but don't overlook the yellowish-orange female, who is colorful in her own right. Together the two are a regal pair. There was a brief period when this species and the similar Bullock's Oriole were lumped together under the name Northern Oriole, because of frequent hybridization in the Great Plains area. Upon further research, the two were again separated into distinct biological species (Monroe et al. 1995), a decision popular with many birders and non-birders fond of the original name.

The Baltimore Oriole is one of two oriole species breeding in Michigan. It is the more common of the two and more widely distributed, being found in association with deciduous woodlands across the state. Its North American breeding range extends from the Rockies east to the Atlantic coast, south to the Gulf States and north to southern and central Canada. Considered a Neotropical migrant, most Baltimore Orioles winter from Mexico to northern South America. For the past several decades however, larger numbers have wintered in Florida and other southern coastal states (Root 1988, Rising and Flood 1998).

Distribution

The Baltimore Oriole is a common summer resident across most of Michigan. It becomes more locally distributed or absent in portions of the UP, where conifer forests dominate. Results from both MBBA I and II, clearly show that this species has become more widely distributed over the past 100 years. Barrows (1912) wrote that it was apparently absent altogether from most of the UP. A few decades later, Wood (1951) deemed it common in the southern half of the state, uncommon and local north, and while there were no nesting records in the UP, he suspected it probably bred there. Not long afterwards, Zimmerman and Van Tyne (1959) recorded the first UP nesting record in Ontonagon County. They also noted an increase in observations in the Douglas Lake area of Cheboygan County since 1930.

By the 1980s, the Baltimore Oriole was common across the entire LP. During MBBA I it was recorded in 95% of SLP townships and 90% of NLP townships. Even more remarkable was the change in status in the UP since the 1950s, with observations in 36% of townships including 50 breeding confirmations. This UP distribution corresponds to deciduous woodland habitats and residential areas (McPeek 1991).

MBBA II results show an overall similar distribution to MBBA I, particularly in the LP. Township totals were down slightly in this region, but overall effort in the LP was less in MBBA II. UP reports of Baltimore Orioles, on the other hand, were down considerably (25% vs. 36%) even though UP effort in MBBA II was greater by nearly 10%. A similar pattern of decline was reported in neighboring Ontario by Cadman (2007) where significantly fewer orioles were observed in the northern regions during their second atlas. He indicated that forest growth and reduction in open woodlands may account for this change, and the same may be true in the UP. Further maturation of forests may have rendered habitat less suitable for this species which favors more open woodlands with tall trees.

Breeding Biology

Baltimore Orioles return to Michigan in early to mid-May, and occasionally in late April in the southern counties. Males precede females by several days and are easy to detect as they sing their cheery song from prominent perches. When females arrive, they too will sing and pairs communicate with short song phrases.

The trademark, saggy pouch nest is built solely by the female. It is an amazing structure woven from plant fibers and typically suspended from droopy branches high in the canopy. The nest is incredibly durable and can often be found after autumn leaf fall. The female incubates the four to five eggs, and both parents help in the feeding of the young. Recorded egg dates for Michigan are 15 May to 13 June, with fledglings from 15 June to 14 July. Only one brood is raised per season, and fall migration occurs in August and September.

Abundance and Population Trends

The Baltimore Oriole is a common breeding bird in many parts of the state, but it is not a particularly abundant species. Totals from Atlas block counts and BBS route averages are considerably lower when compared to species on the Atlas Top Ten list. The PIF Landbird Population Estimate (PIF 2008) for Michigan Baltimore Orioles is 230,000. Interestingly, this is similar to estimates for other birds of open woodland habitats, such as Rose-breasted Grosbeak, Warbling Vireo, Least Flycatcher, Black-and-white Warbler, and Eastern Wood-Pewee.

Baltimore Oriole *(Icterus galbula)*

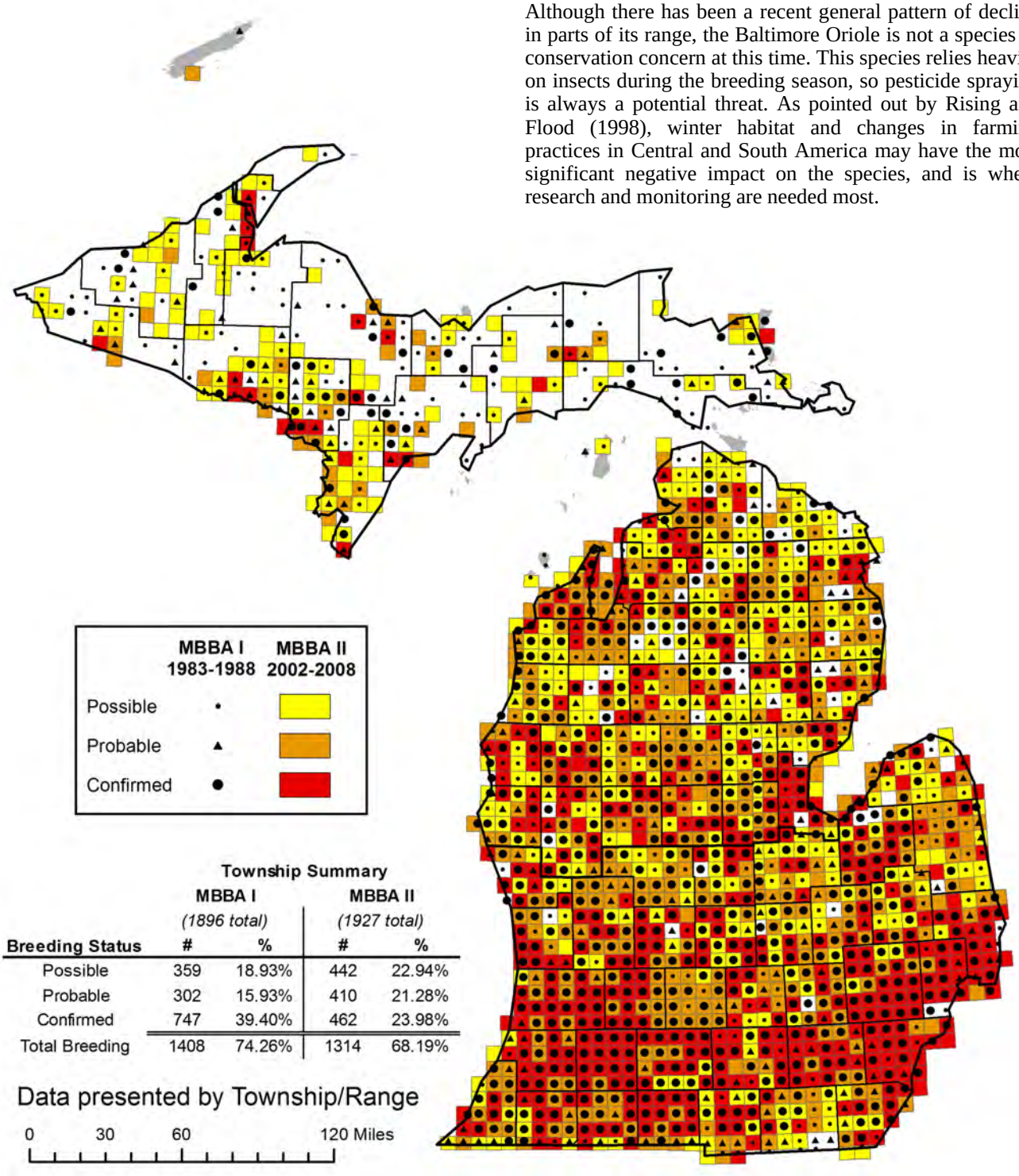
Gail McPeek

Patterns of abundance within the state have remained the same since MBBA I. Highest densities of Baltimore Orioles are generally found in southwestern Michigan. All but one of the townships with block totals in the 39-70 range were in this region. Other areas of relatively higher abundance occurred in southeastern counties including Oakland, Livingston, Washtenaw, Wayne and St Clair; central counties of Isabella and Mecosta; and in the Grand Traverse region. In the UP, there are local concentrations in Menominee, Dickinson, and Iron Counties.

Following the Baltimore Oriole's increasing population trend documented by BBS routes from 1966-85 (Adams et al. 1988), review of Michigan data indicate a decline, though not significant, from the mid-1980s to 2007 (Sauer et al. 2008). This pattern of increase and then decrease occurred across much of the North, including Wisconsin (Shultz 2006), Ontario (Cadman 2007), and New York (McGowen 2008).

Conservation Needs

Although there has been a recent general pattern of decline in parts of its range, the Baltimore Oriole is not a species of conservation concern at this time. This species relies heavily on insects during the breeding season, so pesticide spraying is always a potential threat. As pointed out by Rising and Flood (1998), winter habitat and changes in farming practices in Central and South America may have the most significant negative impact on the species, and is where research and monitoring are needed most.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	359	18.93%	442	22.94%
Probable	302	15.93%	410	21.28%
Confirmed	747	39.40%	462	23.98%
Total Breeding	1408	74.26%	1314	68.19%

Purple Finch *(Haemorhous purpureus)*

David Ewert



Willie McHale ©

The Purple Finch, similar in appearance to the House Finch, is relatively well known because it frequents bird feeders. The raspberry to pinkish colored males are often accompanied by heavily streaked brown females and young males. Purple Finches are distinguished from House Finches by their thicker streaks and, for males, by their pinkish plumage unlike the reddish plumage of House Finches. During the breeding season, their musical and varied songs enrich the morning orchestra of bird song whose other players often include the Winter Wren, White-throated Sparrow, and Rose-breasted Grosbeak. Purple Finches are common breeders in the UP and northern LP in coniferous and mixed forests. The Purple Finch breeds in coniferous and mixed forests from southeastern Yukon across boreal Canada to Newfoundland south through the Pacific coastal mountains to California, the northern Great Lakes states, northeastern Ohio, New England, and in the Appalachians to West Virginia and Virginia (Wootton 1996). It winters from southern portions of the breeding grounds south to the Gulf Coast and in lowlands of the southwestern United States and extreme northwestern Mexico (Wootton 1996). Although at least some Purple Finches migrate each year, numbers at any one site vary widely from year to year depending on food supplies.

Distribution

The breeding distribution of the Purple Finch in Michigan seems to have changed very little since Barrows (1912) described it as a "not uncommon summer resident" north of the Saginaw and Grand River Valleys, including the UP and islands in Lake Michigan, with occasional breeding in southern Michigan. Wood (1951) described a similar breeding distribution although he was skeptical of breeding reports from the Lansing and Kalamazoo areas. Purple Finches have been reported during the breeding season on the following islands: Isle Royale in Lake Superior, Beaver Island, and the Fox and Manitou Islands in Lake Michigan (Barrows 1912, Wood 1951, Bowen and Seefelt 2002), and Bois Blanc Island in Lake Huron (MBBA II). During MBBA I, Purple Finches were confirmed as breeding as far south as Ottawa, Genesee, Lapeer and St. Clair counties and probable breeding further south in Allegan and Ingham counties (Ewert 1991). It appears that the distribution of Purple Finch has been consistent for 100 years with most Purple Finches breeding in the northern 2/3 of Michigan and occasional, sporadic breeding in the southern third of the state (McPeek and Adams 1994). Results from MBBA II describe a similar breeding range south to Macomb (confirmed), Ingham (probable) and Kent counties (confirmed). Collectively, these data suggest that the distribution of breeding Purple Finches has remained stable between MBBA I and MBBA II.

Purple Finches summer in both the interior and edge of coniferous or mixed forests, especially in mesic forests (Freemark and Merriam 1986, Wootton 1996). In Michigan, Wisconsin (Gostomski 2006), and Ontario (Leckie and Cadman 2007), Purple Finches have been found to be strongly associated with conifers. In Michigan this includes such conifer habitats as moist coniferous and mixed forests, bogs, riparian areas, Great Lakes shorelines and less commonly in drier habitat (jack pine and pine plantations), or ornamental evergreen plantings in suburban settings. In jack pine barren landscapes they are found along rivers, streams, and lakes and in wetlands but rarely in jack pine forest (pers. obs.). Purple Finches commonly breed in adjacent Ontario and Wisconsin, and locally in northeastern Ohio, but none were found during the Indiana Breeding Bird Atlas (Keller and Castrale 1998). In Ontario, Purple Finches breed throughout most of the province, except most of the far north and the Carolinian region of far southern Ontario (Leckie and Cadman 2007). Purple Finches are relatively common breeders in northern Wisconsin but local and uncommon breeders in central and southern Wisconsin (Gostomski 2006). As in Ontario and Michigan, the breeding range of this species in Wisconsin has apparently changed little historically (Gostomski 2006). In Ohio, the breeding range of Purple Finches has apparently expanded since the 1950s and now includes much of northeastern Ohio where they tend to breed around tall ornamental conifers rather than natural habitats (Peterjohn and Rice 1991).

Breeding Biology

Purple Finches typically nest from mid-May to June. Nests are characteristically found toward the ends of branches in conifers from 0.8-18.3 m above ground (McPeek and Adams 1994, Wootton 1996). The mean clutch size is approximately four eggs (Wootton 1996). Males and females feed nestlings (Wootton 1996). These characteristics of nesting biology suggest that nests should be reasonably easy to locate.

Abundance and Population Trends

The Purple Finch seems to be widespread and common as a breeding species in northern Michigan (McPeek and Adams 1994), northern Wisconsin (Gostomski 2006), much of Ontario, especially eastern Ontario (Leckie and Cadman 2007) and northern New York (Young 2008). There has been a slight increase in the percent of townships occupied

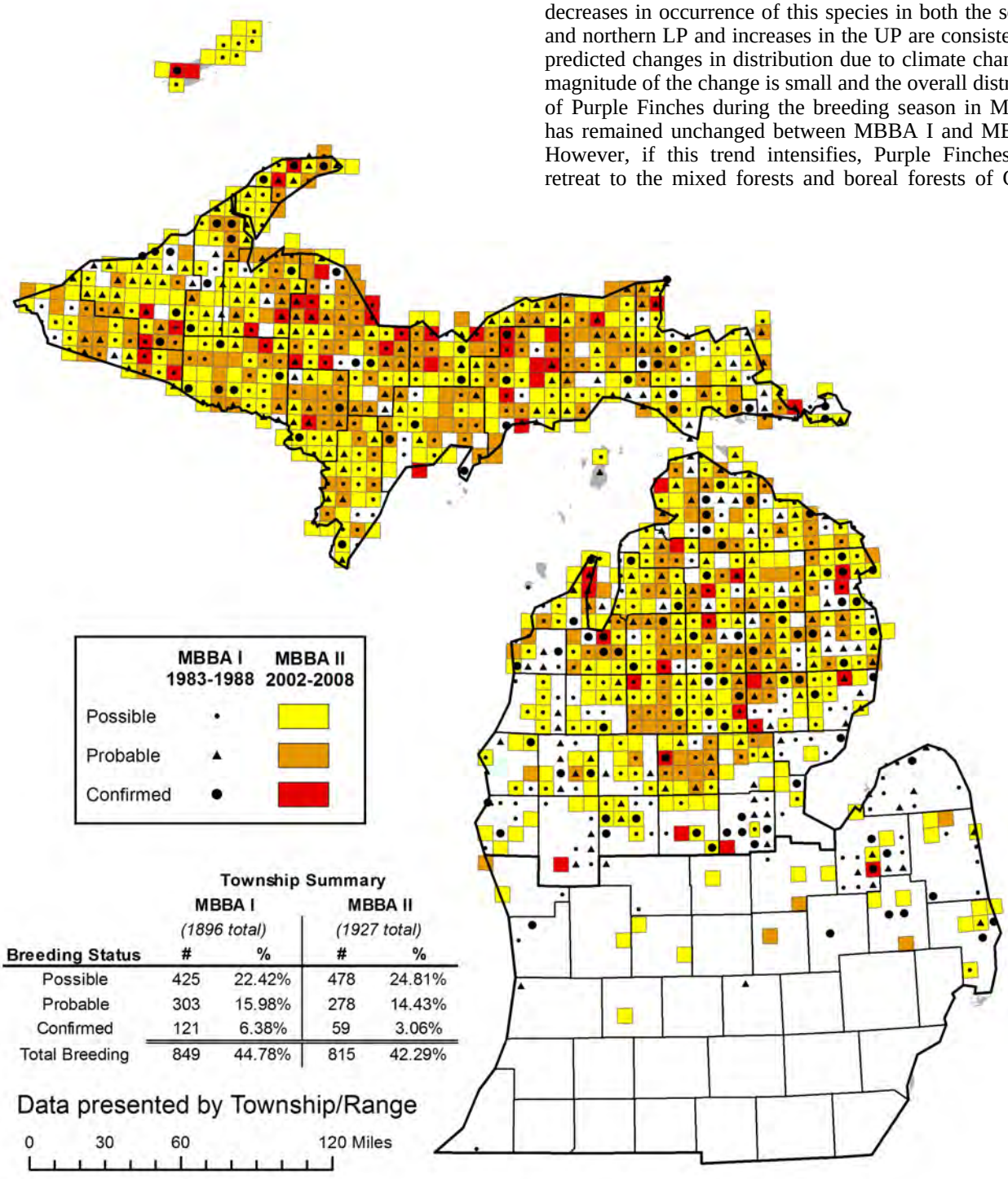
Purple Finch *(Haemorhous purpureus)*

David Ewert

by Purple Finches between MBBA I and MBBA II in the UP (68% to 73%) but slight decreases in the northern LP (65% to 54%) and the southern LP (7% to 5%). Population trends of Purple Finches, based on Breeding Bird Survey data from 1983-2007, for Minnesota, Wisconsin and Michigan indicate a slight, but insignificant increase (0.1% per year) and for Michigan alone, a slight but insignificant decrease (0.1% per year). In Ontario, there have been significant annual declines of 2.6% since 1968, possibly a result of declines in spruce budworm populations (Leckie and Cadman 2007).

Conservation Needs

At least in Michigan, because the Purple Finch is relatively common and uses habitats that will likely persist in the short term, there do not appear to be any imminent conservation concerns. However, especially at the southern edge of the breeding range, Purple Finches may be dependent upon the availability of conifer plantations (Gostomski 2006, Young 2008) and coniferous ornamental plantings (Peterjohn and Rice 1991, Young 2008). Long term, projected changes in climate may result in a reduced or eliminated breeding range of the Purple Finch in Michigan (Price 2000). Although decreases in occurrence of this species in both the southern and northern LP and increases in the UP are consistent with predicted changes in distribution due to climate change, the magnitude of the change is small and the overall distribution of Purple Finches during the breeding season in Michigan has remained unchanged between MBBA I and MBBA II. However, if this trend intensifies, Purple Finches might retreat to the mixed forests and boreal forests of Canada.



House Finch *(Haemorhous mexicanus)* ***John Brenneman***



John Van Orman ©

Bright red (sometimes orange or yellow) plumage and a cheery song make the mature male House Finch one of the most recognizable birds at a Michigan bird feeder. The female in contrast has an unremarkable brown and white striped plumage that is often confused with the female Purple Finch. The House Finch is also called "Mexican Finch" or "Hollywood Finch" because its original distribution range was mainly contained to the American west and southwest. This changed in 1940 when illegally sold caged birds were released in Long Island, New York (Elliott and Arbib 1953) which led to a rapid expansion of the House Finch, and its range now covers most of the continental United States.

Distribution

The House Finch's success and expanding population can be attributed to the increase of suburban sprawl and the transformation of large forested and open areas into the more park-like setting that the House Finch prefers. MBBA II had confirmed breeding and the highest population densities of House Finch located in the most urbanized areas with cities such as Detroit, Ann Arbor, Kalamazoo, Grand Rapids, and Traverse City. Comparing the maps from MBBA I to MBBA II, a northward expansion in Michigan is evident, with House Finches now found in 81 of the 83 counties. This figure is an increase from the 61 counties House Finches were found in during MBBA I.

This northward expansion was also found in atlases adjacent to Michigan. During the second breeding bird atlas of Ontario, House Finches were found in almost all squares in southern Ontario and also had some confirmed breeding records in northern Ontario (Leckie 2007). The Wisconsin breeding bird atlas reported 60% of their atlas quads having House Finch and extending into the more populated areas in northern Wisconsin (Cutright et al. 2006).

In Michigan the number of SLP townships reporting House Finches has almost doubled from MBBA I to nearly 92% in MBBA II, and in the NLP the number of townships reporting House Finches has increased from 11% in MBBA I to 54% in MBBA II. The UP, with its sparse human population and fewer areas of appropriate habitat, has also seen an expansion of House Finches with no birds being detected during MBBA I to 7% of townships reporting birds during MBBA II. This expansion of House Finches into the UP could be explained by a northward movement of birds coming out of northern Wisconsin into the adjacent counties of Menominee, Dickinson, Delta, Alger and Marquette. The eastern and western portions of the UP however, still lack House Finches.

Breeding Biology

House Finches can thrive in suburban settings by nesting in a wide range of locations including flower pots, lamp posts, and many of the ornamental trees and shrubs typically found in lawns and parks (Hill 1991). House Finches can also lay as many as six clutches of eggs during a breeding season, although they have not been observed fledging more than three broods with plentiful and dependable food sources available (Hill 1993). Suburban areas often provide water and food in the form of bird feeders, bird baths and fountains. Dandelion seeds, which are found in many lawns and parks, are a particularly favored seed food source that House Finches feed their young (Bergtold 1913).

Abundance and Population Trends

In the Great Lakes Region, Michigan's House Finch population is among the largest, estimated at 480,000 individuals by Partners in Flight (PIF 2007).

Since 1983, USFWS Region 3 has shown an increase of 6% per year according to BBS data (Sauer et al. 2008). In Michigan the BBS data also reflect the House Finch's population increase since 1983 with an 8% increase per year. Other states also show increases with Wisconsin at 9%, Indiana at 5%, and Ohio with a 1% increase (Sauer et al. 2008). Ontario had a 2% decrease since 1988 (Collins and Downes 2009), but this was due to the appearance of mycoplasmal conjunctivitis in 1995. During the next six years the population declined rapidly but after that has leveled off at approximately a third of its peak population (Leckie 2007).

The increase in the number of House Finches can also be seen in Christmas Bird Count Data and the Winter Feeder Count Data that have been collected by the Kalamazoo Nature Center for over 30 years. House Finch was in the top 10 of the most common feeder birds in Michigan during the 2009 winter season (KNC unpublished data). The National Audubon Society's Christmas Bird Count Data also shows a growing trend with only six of the 41 counts that took place in 1983 reporting House Finch while in 2008 this number grew significantly with House Finch reported on 57 of the 65 counts done in that year (NAS 2009).

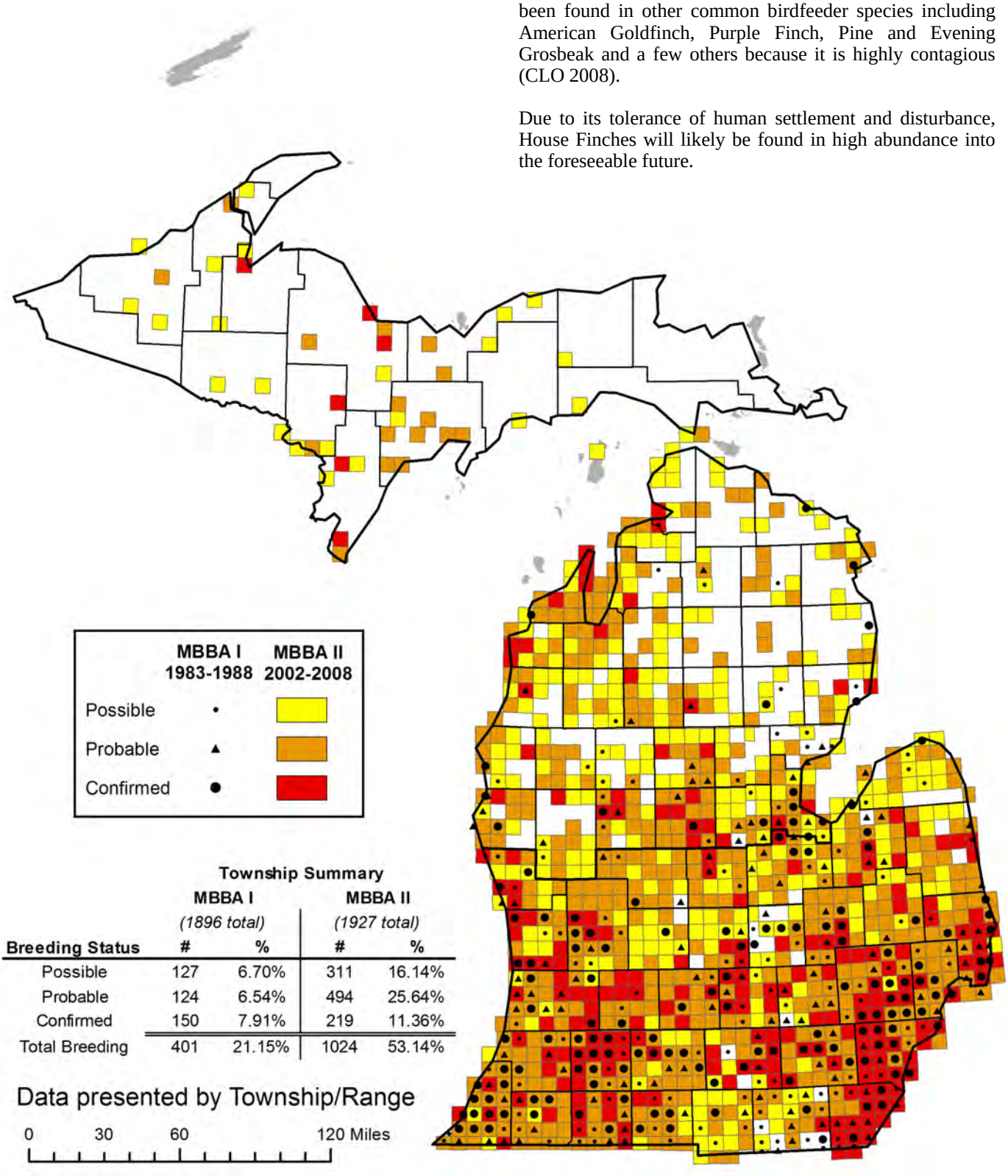
House Finch *(Haemorhous mexicanus)*

John Brenneman

Conservation Needs

The House Finch is under no conservation threat. The main threat to the population could be from the disease, mycoplasmal conjunctivitis. The first report of this disease was in suburban Washington D.C. in January of 1994 (Dhondt et al. 1998). Mycoplasmal conjunctivitis is a respiratory infection with one of the main symptoms being red and swollen eyes. The disease itself does not usually kill the bird outright, but does impair vision and the overall health of the bird to the point that it will either starve to death or become an easy target for predators. Initially this disease was isolated to House Finches but has more recently been found in other common birdfeeder species including American Goldfinch, Purple Finch, Pine and Evening Grosbeak and a few others because it is highly contagious (CLO 2008).

Due to its tolerance of human settlement and disturbance, House Finches will likely be found in high abundance into the foreseeable future.



Red Crossbill *(Loxia curvirostra)*

David C. Evers



Dave Pavlik ©

The Red Crossbill has the Darwinian finch quality of adapting its bill size and shape to various types of food. The consequential taxonomic classification for separating subspecies and identifying new species based on bill morphometrics and flight calls continues. For now, the group of birds known as Red Crossbills inhabits a broad area of North America, from Alaska south to Nicaragua (Adkisson 1996). In the U.S., its breeding range is primarily contained to coastal and mountainous habitats of the West, the northern Great Lakes region and into New York and New England. Scattered populations along the Appalachian Mountains and elsewhere occur (Adkisson 1996). In Michigan, it is a year-round resident and breeds primarily in the UP, but it can be found throughout the state, especially in winter when northern cone crops are sparse.

Distribution

The nomadic nature of the Red Crossbill makes its historical status difficult to interpret. Pre-Atlas confirmed breeding records are known from three southern LP counties, whereas six counties in the northern LP have confirmed breeding during both Pre-Atlas (Zimmerman and Van Tyne 1959, Payne 1983) and MBBA I periods. However, these are by and large scattered records over the past century that account for the Red Crossbill's irruptive tendencies to follow cone crops combined with an ability to breed in nearly any month of the year. The regular breeding range of the Red Crossbill in Michigan is confined to the UP. Summer records are known from most UP counties during both Atlas periods. Confirmed breeding in the UP is known from Chippewa, Luce, and Schoolcraft counties during MBBA I and Marquette and Schoolcraft counties during MBBA II. Breeding records are not fully representative of the Red Crossbill's regular breeding range because of its erratic nesting season and choice of nest sites high in conifers. Based on probable and confirmed breeding observations in the UP during both Atlas periods, there are three primary centers of breeding activity – northern Chippewa-Luce counties, central Schoolcraft County, and northern Marquette County. Western Ontonagon County and the tip of the Keweenaw Peninsula also have regular summer observations.

The Red Crossbill is closely associated with conifer forests throughout the year. In Michigan, savannah-like stands of mature red pine comprise preferred habitat. These areas are used by family groups and may serve as important food sources for fledglings. Jack pine plains, sand ridges with mature pine, black spruce-tamarack bogs, and recent clearcuts are also used in the summer by foraging flocks.

Breeding Biology

Breeding activity is generally dictated by abundance of cone crops and, while North American breeding records are known from a variety of months, photoperiod is an important regulator (Adkisson 1996). Michigan nesting records from March likely represent an initial period that, based on nesting records from Wisconsin (Cutright et al. 2006), primarily extends to early May. Conversely, in Ontario, breeding occurs in late summer-early fall or in late winter to coincide with maturing cone crops (Cadman et al. 2007).

Abundance and Population Trends

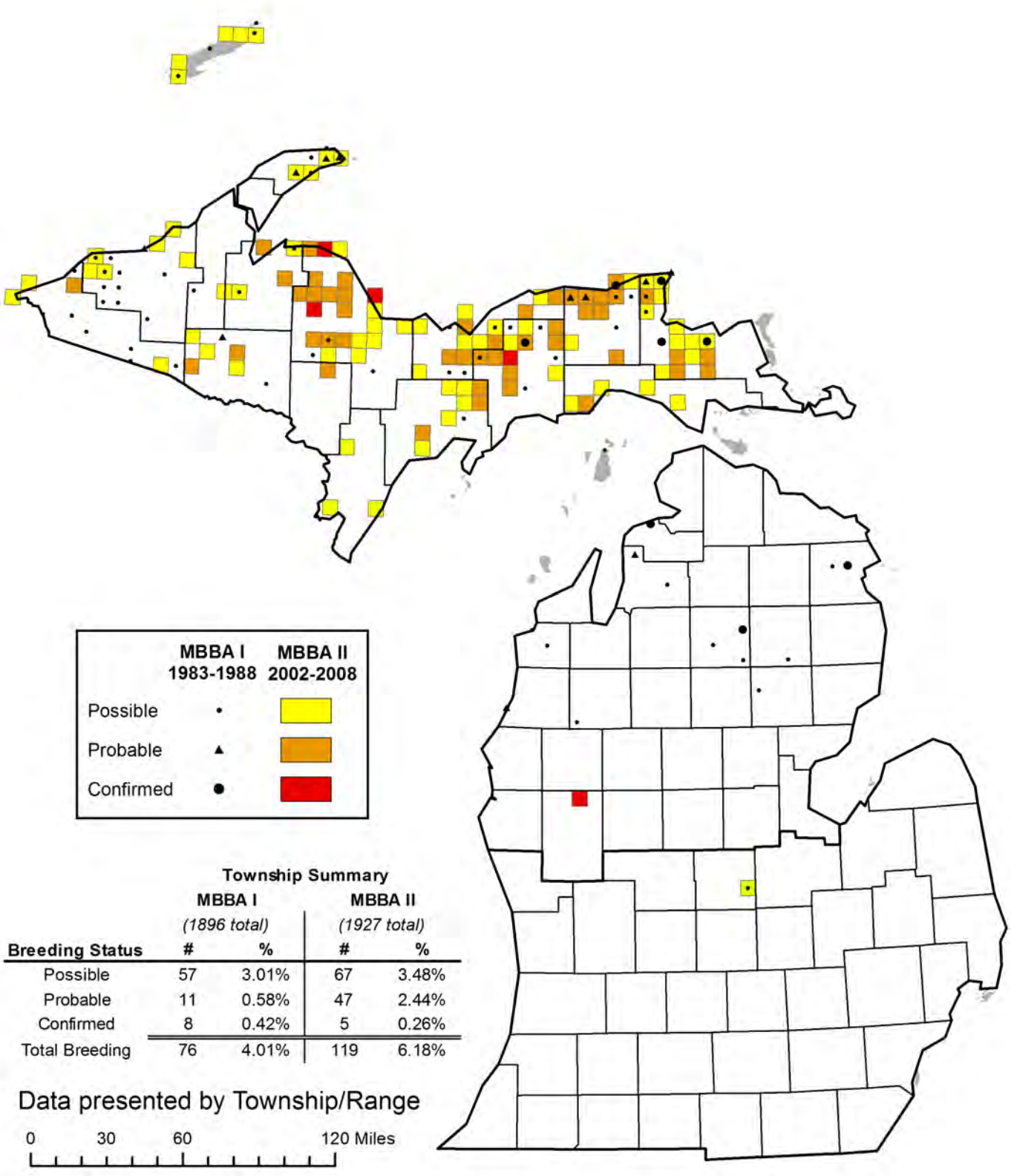
The Red Crossbill is regularly found during the breeding season across the UP. The number of confirmed breeding records declined from MBBA I (n=9) to MBBA II (n=4); however the total number of records nearly doubled during the second Atlas. The Red Crossbill was found in 9.8% of the UP townships during MBBA I and in 17.4% in MBBA II.

Conservation Needs

The Red Crossbill benefits from the widespread number of red pine plantations and the natural regeneration in some areas of both red and white pines. Mature pines appear to be the favored habitat in the UP and such stands are still uncommon. Classification of North American Red Crossbills into species, subspecies and type remains challenging and could influence future conservation and management efforts, especially if through the identification of new species, associated population size is small (e.g., the South Hills Crossbill in Idaho; Benkman et al. 2009). For now, however, it appears that the Red Crossbill complex does not have a restricted range in Michigan and remains widespread with stable and potentially increasing breeding populations.

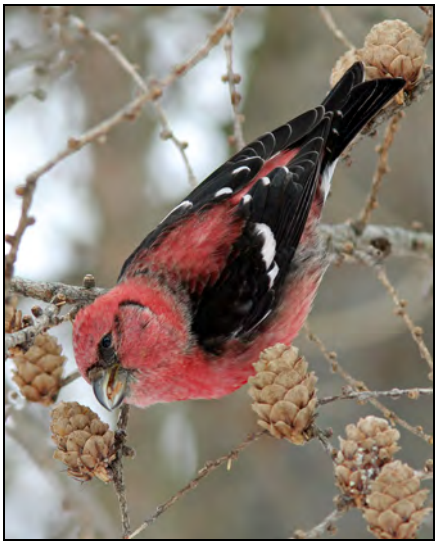
Red Crossbill *(Loxia curvirostra)*

David C. Evers



White-winged Crossbill *(Loxia leucoptera)*

Skye Christopher G. Haas



Darlene Friedman ©

A nomad of the north, the White-winged Crossbill is renowned for its nomadic movements across the Nearctic on its continual search for conifer cone crops. Normally only a resident of the boreal forest, this species has irregular irruptive flights that can bring the species as far south as the SLP and beyond. Beginning in summer 2008, an irruption of White-winged Crossbills became one of the largest movements of this species ever documented in North America (Brinkley 2009). By the end of winter 2009, this species had been recorded in all 83 of Michigan's counties with flocks of up to 1,000 birds counted (Wuepper 2009). More typically, they are found only in the Upper Peninsula, and even then White-winged Crossbills are not observed every year.

The peculiarities of this handsomely-colored finch do not end with their peregrinations across the continent. The species will nest anytime of the year, as long as there are ample food resources present. With their specialized curved bills, the birds deftly pry open cones (primarily spruce and fir, but hemlock, tamarack, cedar and some pines are used) and feast upon the seeds. As this species and others in the genus *Loxia* are aptly named, the tips of bills cross over each other, with bills oriented to the right on some individuals and to the left on others.

Distribution

The White-winged Crossbill is one of the most poorly understood breeding species in Michigan. Remoteness of habitat and lack of proper surveying attempts outside of summer have contributed to the knowledge gap that exists for this species. White-winged Crossbills were likely found in the region after the retreat of the last glacial period and were first documented breeding in Michigan on 21 April 1891 in Delta County (Barrows 1912). Only one other breeding record is known before the 1980s, and during MBBA I only two breeding records were confirmed, both at the base of the Keweenaw Peninsula. Nearly all other observations were restricted to the western UP.

Overall this species was recorded in only 40 townships during MBBA I. This is in stark contrast to the findings of the MBBA II, where atlas observers tallied White-winged Crossbills from an impressive 155 townships; all but three records from the UP. In the period between the two atlases, White-winged Crossbills oscillated between large numbers recorded in fall 1989 to spring 1990, and again in 1992-1993, to none recorded from summer 1990 to spring 1992 (Granlund 1994). During summer 1992, over 50 singing males were recorded along two BBS routes in southwestern Chippewa County. Visits to the area later in the summer found numerous family groups, indicating a successful breeding attempt (Granlund 1994).

MBBA II results showed birds fairly evenly distributed across the entire UP. Particularly notable are confirmed breeding records from four different counties. Two records pertain to occupied nests on the Keweenaw Peninsula. One was thought to be unsuccessful, but the nest from Houghton County recorded nest-building on 12 April 2003, with subsequent incubation by the female and both adults feeding nestlings on 9 May (Binford 2006). The breeding confirmation from Marquette County was a male with pre-juveniles in a spruce bog near the Pine River in the Huron Mountain Club in early June (pers. obs.). Also remarkable are the numbers of probable breeding records, with records coming from 60 townships. Many of these records were of males singing on or defending territory, mated pairs, and several sightings of females disappearing within the tops of tall spruces, presumably incubating.

This surge in observations was not just restricted to the super-flight of 2008/09. While that avian spectacle billowed out over much of the northern and central United States, the UP saw particularly strong incursions of White-winged Crossbills in 2002 and 2005. Many birds were recorded on territory in March and April of 2005, earlier than most atlasing efforts. In the case of the most recent super-flight, it appeared that White-winged Crossbills bred in the UP in summer 2008 shortly after arriving en masse. Flocks quickly broke apart into territorial pairs, and family groups were recorded in late summer before the record-breaking and unprecedented waves moved south into the United States that fall (pers. obs.).

Breeding Biology

White-winged Crossbills are opportunistic breeders, perhaps even more so than their cousin, the Red Crossbill. The availability of cone crops dictates the timing of reproduction. The birds nest when there are enough food resources to support egg formation and that will remain available three weeks later during the nestling stage (Benkman 1990). While White-winged Crossbills are able to initiate breeding at any time during the year, there are three primary nesting periods that correspond to cone maturation phenology: first in early July to take advantage of the developing cones of white spruce and tamarack; a

second less-used strategy utilizes mature cones of white spruce in January and February; while a third and frequent practice is to nest from March into June when black spruce cones open (Benkman 1992). When there are sufficient crops available, White-winged Crossbills will frequently double-brood, with the female incubating a second clutch while the male feeds the fledglings from the first nesting (Benkman 1989).

Abundance and Population Trends

White-winged Crossbills showed a shocking 287.5% increase in the number of detections per township between the two Michigan atlases. There are a myriad of possible hypotheses for this increase. Some possible reasons include better coverage of the UP by atlas workers, increased coverage outside of typical atlas seasons, maturation of suitable conifer forests, as well as the MBBA II corresponding to a number of invasion years whereas the MBBA I may have not experienced such a run on crossbills to the upper Great Lakes. Whatever the causes may be, the MBBA II period has set a high-water mark in trends of this species for Michigan. There was a significant irruption year in Ontario in 1984, but widespread movement into Michigan was not recorded until early winter, and if there was a breeding attempt initiated, it was not documented by atlas efforts (Powell 1985, Coady 2007).

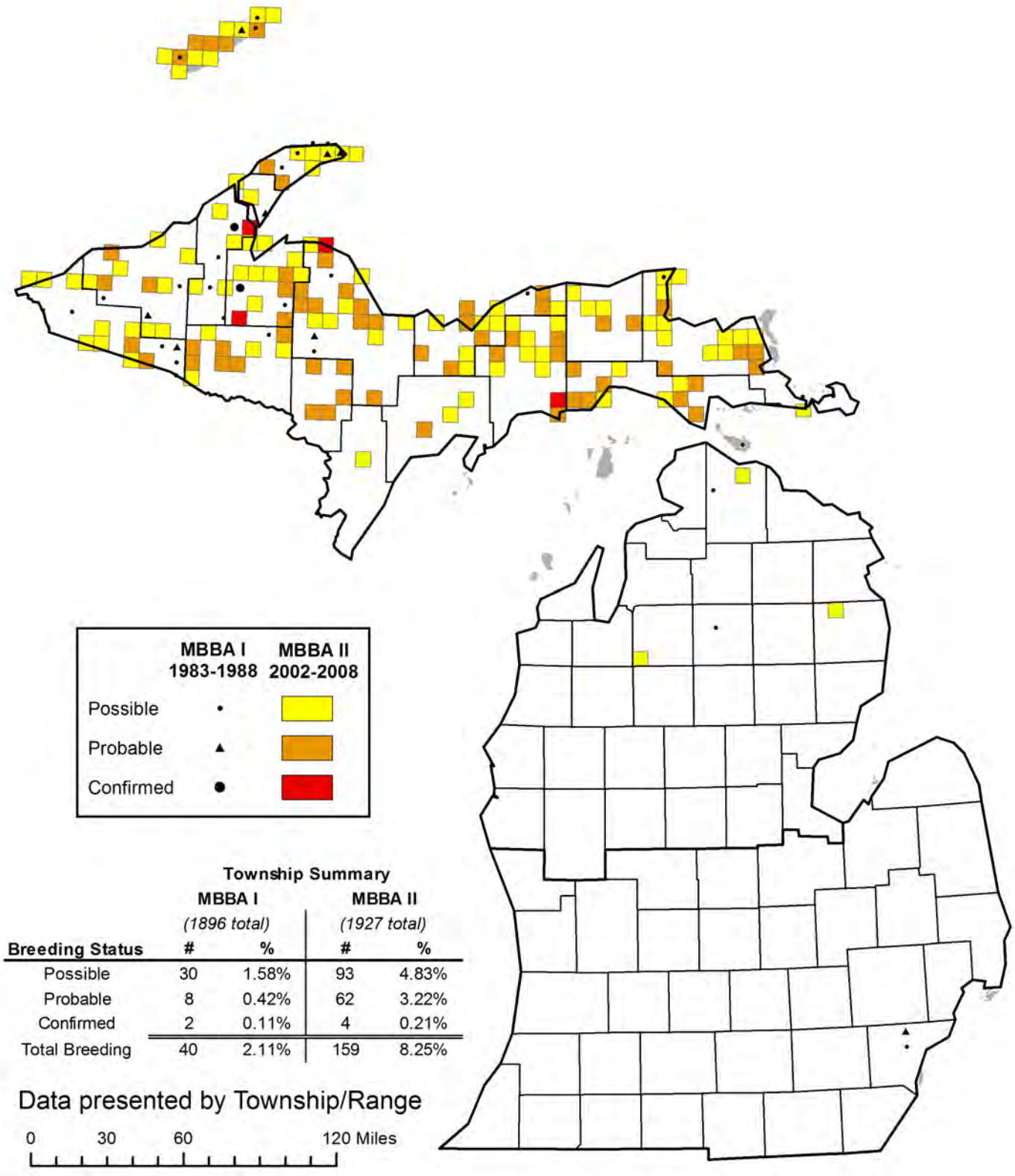
White-winged Crossbills are difficult to monitor accurately due to their nomadic and irruptive biology. The BBS has shown no long-term trends, likely due to the wide-ranging tendencies based on cone crops, and lack of survey routes over the majority of its range (Sauer et al. 2008). In Michigan, at the southern fringe of its range, it would be extremely difficult to determine if recent atlas results represented an actual increase in the continental population. The Ontario BBA showed a slight but significant increase of breeding in the Canadian Shield as well as an increase in localized areas in the Southern Shield (Coady 2007). Numbers in New York were similar between their two atlases, though a shift in distribution was noted with far fewer birds recorded along the Appalachian Plateau and an increase in detections per block in the Adirondacks (McGowan 2008). In Wisconsin, the species is considered a rare breeder with a similar status to Michigan, with birds operating on a boom-bust cone dependency. A major irruption into Wisconsin was recorded in 1996-1997 with several confirmed breeding records documented in spring 1997 (Baughman 2006).

Conservation Needs

The conservation needs of the White-winged Crossbill, while in some aspects simple, become more complex due to the regional importance of a transitive meta-population. Being so closely tied to conifers, protection and proper management of the Canadian boreal forest is integral for this species' long-term survival. Because cone production and correlating White-winged Crossbills can be limited to one or several regions of the continent during any year, the importance of maintaining large tracts of mature boreal forest are significant (Benkman 1992). The rates at which forests are harvested are also of concern. When logging rotations are shortened, the productivity of a conifer forest is lessened for crossbills. Most conifers do not begin producing numerous cones until 30 years of age, and maximum cone production does not occur until trees are over 60 years of age (Benkman 1992). Black spruce, a primary White-winged Crossbill food source, in particular matures slowly. Even with the proper management of mature boreal forests, spruce forests will decline due to global warming, so maintaining large tracts of suitable forest becomes even more critical.

White-winged Crossbill *(Loxia leucoptera)*

Skye Christopher G. Haas



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	30	1.58%	93	4.83%
Probable	8	0.42%	62	3.22%
Confirmed	2	0.11%	4	0.21%
Total Breeding	40	2.11%	159	8.25%

Data presented by Township/Range

0 30 60 120 Miles

Pine Siskin *(Spinus pinus)*

Allen T. Chartier



Jacob Gardner ©

A rising, mechanical *"zzzhhheeeee"* call note often gives away the presence of the Pine Siskin. The observer may note a small, nondescript brown-streaked bird with a pointed conical bill feeding in the treetops, with a bright flash of yellow on the wings and tail when it takes flight. Until recently the Pine Siskin, along with the American Goldfinch, was classified in the genus *Carduelis*, but the American Ornithologists' Union (Chesser et al. 2009) reassigned it back to the genus *Spinus* where it had been prior to 1983. Breeding mainly in the boreal forest, the Pine Siskin ranges from Alaska to Newfoundland, south to northern Wisconsin and northern Michigan in the east, and in western montane areas south to Arizona, with a disjunct resident subspecies in the mountains of western and southern Mexico (Dawson 1997). They spend the winter within the breeding range in most years, with irregular irruptions in winter once every two or more years as far south as the southernmost U.S. and northern Mexico, though substantial east-west movements have been documented with banding recoveries (Dawson 1997, Pittaway 2007).

Distribution

In the Great Lakes, the Pine Siskin breeds regularly only in Minnesota, Wisconsin, Michigan, and Ontario. In Wisconsin, 75% of the probable and confirmed breeding records came from the dozen or so northernmost counties with scattered but not insignificant numbers of records from southern portions of the state (Berner 2006). Common throughout the boreal forest of Ontario, the Pine Siskin is rare to the north in the Hudson Bay lowlands and uncommon and irregular in the southernmost regions of the province (Pittaway 2007). To our south, the Pine Siskin is a rare and sporadic breeder in Illinois, mainly from counties in the northeastern part of the state adjacent to Lake Michigan (Kleen et al. 2004). It is also an extremely rare breeder in Indiana with only two blocks reporting the species in their atlas (Buskirk 1998). In Ohio, nesting Pine Siskins were found in 10 counties during every year between 1978-1989, even after non-irruption years, but always in very small numbers (Peterjohn and Rice 1991).

In the UP, the breeding distribution between the two atlas periods is very similar, with an increase from 12% in MBBA I to nearly 14% in MBBA II, possibly due to increased effort. Increased observations in Schoolcraft, Delta, and Marquette Counties and fewer in Gogebic, Ontonagon, and Luce Counties may be representative of this species' nomadic nature. Significantly fewer blocks in the northern LP recorded Pine Siskins, (3.5% in MBBA I to only about 1.4% in MBBA II). The northern LP received less coverage in MBBA II, which may partly explain the reduced range there. But it may also have been due to the same factors that may have affected the more notable change in distribution in the southern LP, which found far more Pine Siskins in MBBA I (38 blocks with 6 confirmations) than in MBBA II (5 blocks with no confirmations). Although probably not the only explanation for southerly breeding records, the Pine Siskin is also known to nest early in the season south of its normal breeding range after big winter irruptions (Dawson 1997). This may partly explain their increased presence in the southern LP during MBBA I, though Higgins (1991) did not specifically assign southern LP breeding records in MBBA I to any irruptive events. No significant winter irruptions of Pine Siskins occurred into the LP during the MBBA II period.

The winter of 2008-2009 (post-data collection for MBBA II) brought a significant irruption of Pine Siskins to the southern LP, with numbers found as far south as Florida in early December (pers. obs.). In February, large numbers were observed singing and chasing in the southern LP. By early March, siskins were seen carrying nesting materials, and by late March and early April nesting was further confirmed with birds sitting on nests (G. Norwood, pers. comm.), and physiological evidence of breeding (visible eggs, brood patches, etc.) found on banded birds (D. Miller pers. comm., A. Chartier unpub. data). By late April into early May adults were seen feeding fledglings at feeders and by late May few birds remained in the southern LP. Breeding evidence in 2009 from the southern LP was obtained from 83 locales in 24 counties (A. Chartier, 2009). This evidence included confirmations of breeding at 19 locales from 11 counties, probable breeding, in the form of territorial chases and/or singing groups of birds on multiple dates, from 14 locales in 11 counties, and possible breeding in the form of birds lingering into early May, singing birds, or possible pairs, from 50 locales in 18 counties.

Breeding Biology

Pine Siskins have a strong preference for nesting in conifers. Their well-insulated, open cup nests are constructed from twigs, grasses, leaves, and other vegetation and lined with hair, fur, feathers, grass, or woolly material. They are placed six meters above the ground, on average, and in loose colonies. Nesting is often opportunistic and can begin as early as March in some areas, including Michigan (Granlund 1994, Dawson 1997), which may reduce its detectability to observers who may begin searching for

Pine Siskin *(Spinus pinus)*

Allen T. Chartier

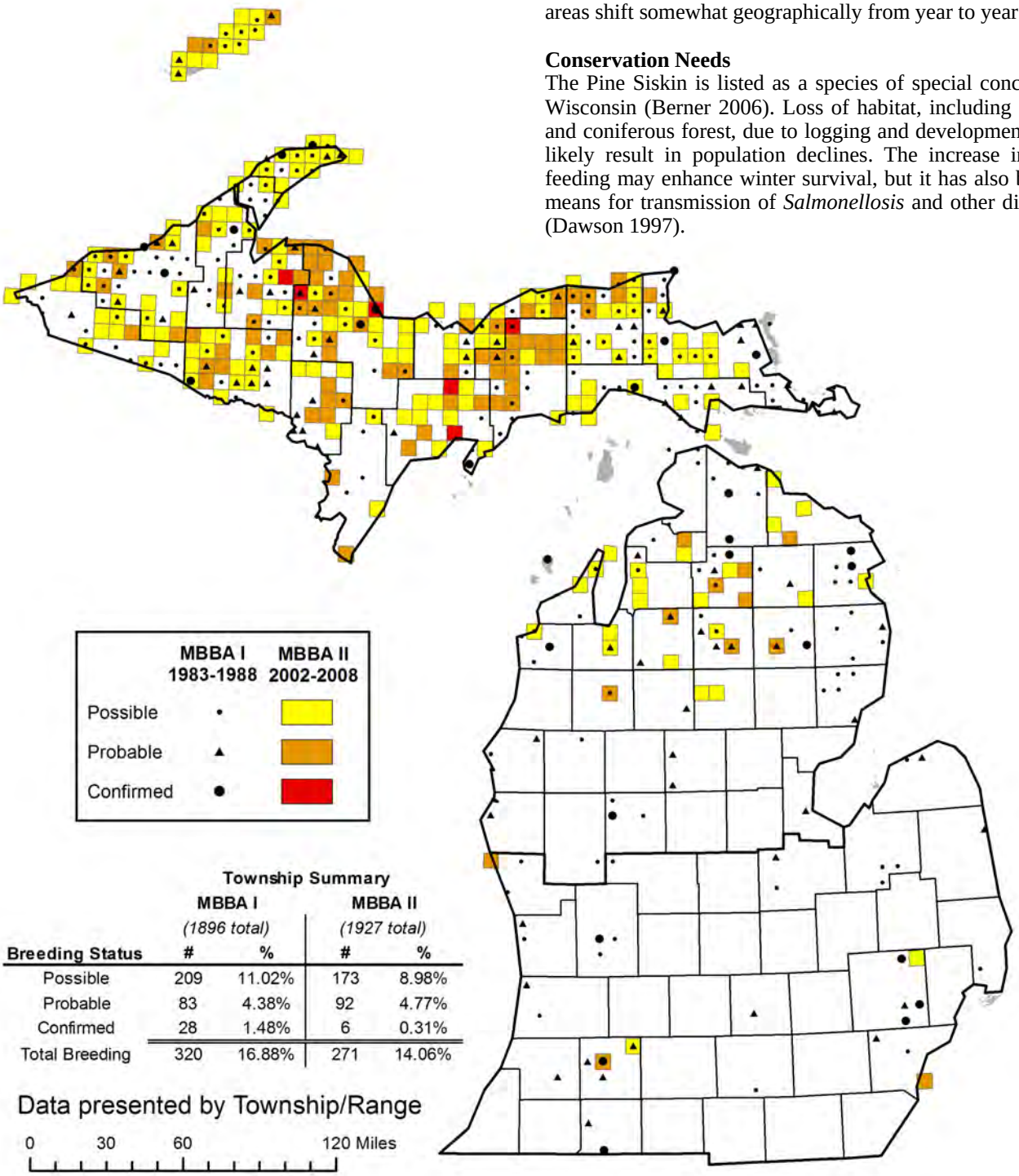
nesting birds months later. The clutch size is typically three to four eggs, which are incubated only by the female for about 13 days before they hatch. The altricial young take about 15 days to reach the fledging stage, and the young are typically fed by adults for three weeks after fledging, though they often will depart the breeding area in family groups soon after the young fledge. Although breeding has been recorded between February and August in various areas in North America, it is not clear how often the Pine Siskin is double brooded, but it may do so on occasion at areas north of where the first brood was raised (Dawson 1997).

Abundance and Population Trends

The irruptive and nomadic nature of this species makes population estimates difficult. Christmas Bird Count data vary significantly in how many individuals are counted in Michigan each winter (Granlund 1994), and breeding populations are not well censused. Higgins (1991) suggested that breeding populations in Michigan were stable up to the MBBA I period. Only about 10 BBS routes in Michigan detect this species annually (Sauer et al. 2008), so these data are not very useful for determining populations or trends. Breeding often occurs before routes are run, and breeding areas shift somewhat geographically from year to year.

Conservation Needs

The Pine Siskin is listed as a species of special concern in Wisconsin (Berner 2006). Loss of habitat, including mixed and coniferous forest, due to logging and development, will likely result in population declines. The increase in bird feeding may enhance winter survival, but it has also been a means for transmission of *Salmonellosis* and other diseases (Dawson 1997).



American Goldfinch (*Spinus tristis)* ***Torrey Wenger***



Willie McHale ©
Species sponsored by: Monica Ann Evans

The American Goldfinch is one of the most common and widespread birds in Michigan, but it can seem to disappear during the winter. During the fall, the bright yellow males molt into the same muted brown as the females and juveniles. While these "brown-finches" will remain all winter, casual observers don't notice them, searching instead for the summer-attired male. As goldfinches are gregarious during all parts of the year, even feeding together during the breeding season, it's easiest to find the flock.

The American Goldfinch truly deserves its name: it can be found in all of the 48 contiguous states during some portion of the year. The population retreats from the southern third of Canada and expands into the southern U.S. and Mexico during the winter.

Distribution
A bird of edges and early successional habitats, the American Goldfinch occurs throughout Michigan, becoming less common farther north. From MBBA I to MBBA II, the goldfinch increased its distribution in the UP and remained stable in the NLP and SLP. Looking at blocks, the UP increase is more pronounced (going from 10% to 40%) but the NLP and SLP both show a decrease of about 20%. Overall, while this species was found in slightly more townships in MBBA II compared to MBBA I, it was documented in approximately 10% fewer blocks in MBBA II. Observer effort was similar between the two Atlases.

As in Michigan, the second Atlas efforts in both New York and Ontario found the goldfinch mostly unchanged in its distribution (Young 2008, Leckie and Cadman 2007).

Breeding Biology
As a breeding species in Michigan, the American Goldfinch is unusual. Unlike more than 95% of other terrestrial birds, the goldfinch feeds its nestlings only seeds (Burghardt et al. 2009, Middleton 1993). Brown-headed Cowbird chicks, which thrive in the nests of insect-eating warblers, rarely survive past three days and never fledge from goldfinch nests (Middleton 1993). The goldfinch is also one of the latest nesting songbirds. The birds may pair up during the winter flock (Middleton 1993) but most nesting in Michigan occurs July through September (Sydlik 1991).

Nests are placed in open areas with shrubs and small trees, such as residential areas and old fields (Sydlik 1991). Females choose their mates based on the brightness of their plumage, using that as a signal of their overall health (Johnson et al 1993). First-time nesters raise a single brood; experienced females leave their first brood with their mate and attempt a second nest with a new male (Middleton 1993).

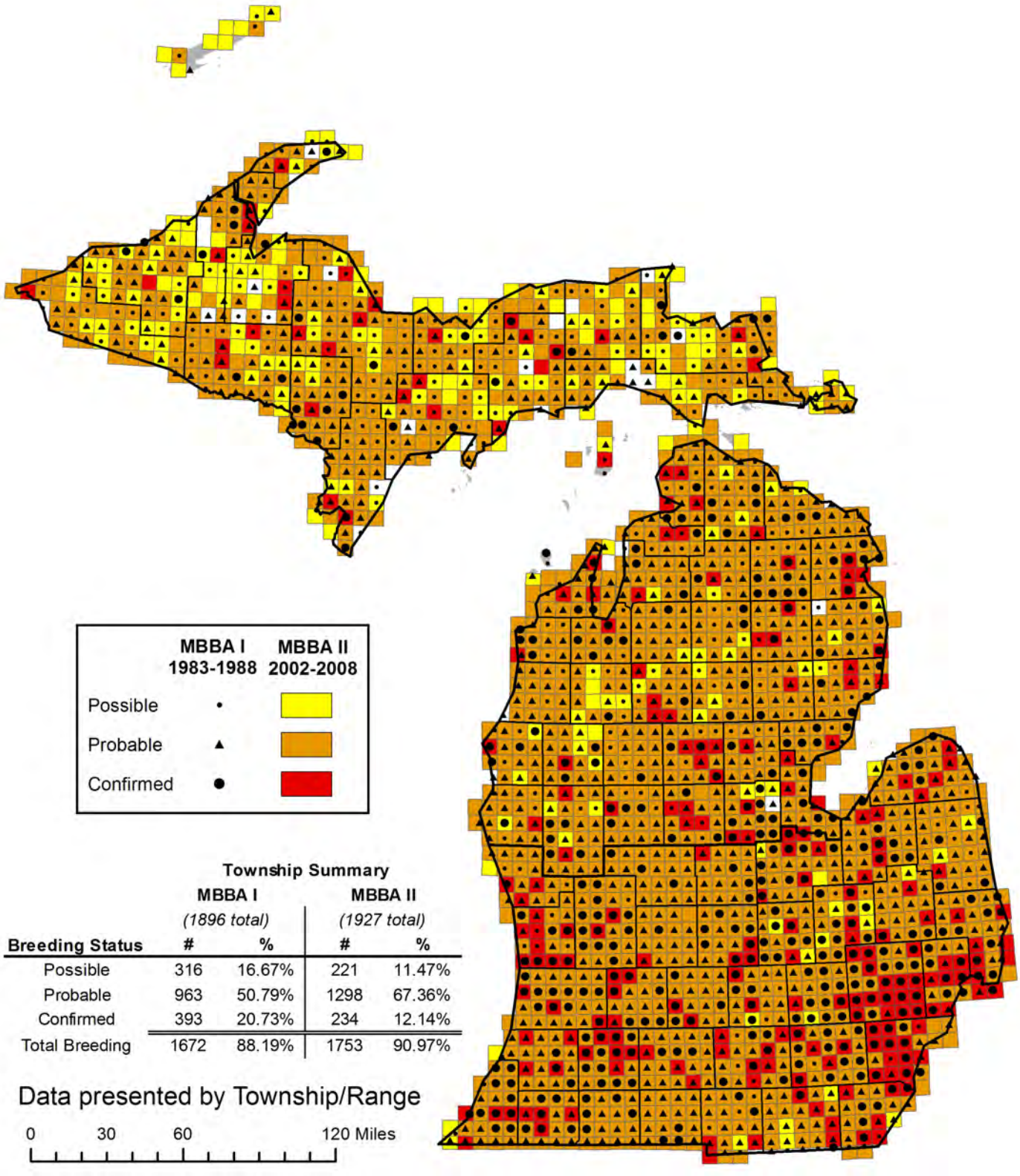
Abundance and Population Trends
Since 1966, American Goldfinch breeding populations have remained stable nationally and increased both regionally (0.6% per year) and within the state (2.0% annually) (Sauer et al. 2008). Winter populations are also widespread and apparently stable across the state, with goldfinches consistently among the "top five" Winter Feeder Survey birds in both total numbers and percent of feeders visited (Kalamazoo Nature Center 2009, unpublished data).

Fewer breeding attempts were confirmed in part due to the late nesting season (many observers had turned in their records before young goldfinches left the nest). Additionally, less emphasis was placed on "confirming" a species during this MBBA effort, unlike during MBBA I (Kalamazoo Nature Center 2004).

Conservation Needs
European settlement was beneficial for the American Goldfinch, increasing both edge habitat for nesting and "weedy" food sources (Middleton 1993). The Conservation Reserve Program, a farm management plan that sets aside land for grassland-nesting species, has also benefitted goldfinches (McCoy et al. 1999). While forest succession and the move towards "clean" farming both work to decrease appropriate habitat and food availability, this can be easily countered by thoughtful landscaping of urban and suburban yards (Middleton 1993). Natural landscapes should be allowed to experience disturbances that produce the desired habitat (Brawn et al. 2001). The American Goldfinch is a species that fits easily into the human-dominated landscape, requiring little management attention at this time.

American Goldfinch (*Spinus tristis*)

Torrey Wenger



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	316	16.67%	221	11.47%
Probable	963	50.79%	1298	67.36%
Confirmed	393	20.73%	234	12.14%
Total Breeding	1672	88.19%	1753	90.97%

Data presented by Township/Range

0 30 60 120 Miles

Evening Grosbeak *(Coccothraustes vespertinus)* ***Zach Gayk***



Elizabeth Rogers ©

An irruptive denizen of boreal and montane conifer forests across North America, this thick-billed finch breeds from southern Newfoundland to northern British Columbia, extending south into the U.S. along the Rocky Mountain chain in the west and along the Canadian border states in the east. In Michigan, the Evening Grosbeak breeds in the UP and locally in the northern LP. In winter it may range southward into the southern LP and across the central U.S. Evening Grosbeak is the only species in which the type specimen was collected in Michigan. Henry Schoolcraft collected the first known Evening Grosbeak near Sault Ste. Marie, Michigan in April 1823 (Barrows 1912). It also appears that this species was localized and rare east of the Mississippi River prior to the 1850s, when a massive eastward range expansion from the west occurred, with the Atlantic states being reached in the 1930s (Gillihan and Byers 2001). Currently it appears Evening Grosbeaks may be undergoing a significant range contraction (Butcher and Niven 2007).

Distribution

Historical distribution in Michigan prior to the presumed eastward range expansion is largely unknown, but the Evening Grosbeak was probably present as a scattered breeder. Currently, it is a widespread but irruptive resident, with variable seasonal and annual detectability. In MBBA I, the Evening Grosbeak was recorded as at least possibly breeding in 57.5% of UP townships and 15.4% of northern LP townships. In MBBA II, it was recorded as at least possibly breeding in 36.8% of UP townships and 4.54% of northern LP townships. This decline equates to a 34% and 70% decrease in townships in the UP, and northern LP, respectively. Michigan distribution in MBBA II remains similar to that in MBBA I at the county scale. Wide scale distribution remains the same, but individual breeding birds are becoming more localized within that region. In the UP, there appears to have been a decrease in township detections in western Houghton and Ontonagon Counties from MBBA I to MBBA II and an increase in township detections in Marquette County. Menominee and south central Delta Counties had minimal breeding evidence in both atlases. Notable also is the northward contraction of township detections in the northern LP between MBBA I and MBBA II. In MBBA I, a possible record from Lake County and a confirmation from Arenac County comprised the southern terminus of the breeding range; in MBBA II, northern Iosco and Ogemaw Counties had the southernmost breeding evidence found.

In the UP, breeding habitat is comprised of mesic mixed forests and open boreal forests of spruce, balsam fir, and aspen (pers. obs.). Payne (1983), citing N.E. Sloan, observed that Evening Grosbeak was found in deciduous forests adjacent to jack pines, which were used during spruce budworm outbreaks. In Quebec, Evening Grosbeak breeds in second growth and mature conifer woodland of balsam fir and spruce, with deciduous woodland secondarily occupied (Vincent 1996).

Breeding Biology

In the eastern U.S., pair bond formation typically occurs in May (Shaub 1954), with nest construction occurring from mid-May through mid-June (Gillihan and Byers 2001). Christy (1930) reported a nest under construction in eastern Baraga County on 19 June. Loose platform nests of twigs lined with mosses are typically placed at 5-35 meters, or 60-80% of the tree's height (Bekoff et al. 1989); white pine and sugar maple have been used as nest trees in Michigan (Christy 1930). Little information on fledging dates in Michigan exists, but an unattended pre-juvenile in Houghton County on 17 June and a juvenile being fed on 14 July in Houghton County give some indication (Binford 2006).

Abundance and Population Trends

PIF Landbird Population Estimates Database (PIF 2007) lists the Evening Grosbeak population in Michigan to be 50,000 individuals of a 5,700,000 worldwide population, or 0.9%. In MBBA I, there were 351 and 91 total township detections in the UP and NLP, respectively. In MBBA II, there were 229 and 27 total township detections in the UP and NLP, respectively. Thus, MBBA data do not show a decline in Evening Grosbeak abundance directly, but rather a decline in range as a function of a presumed decline in abundance.

Bonter and Harvey (2008) analyzed Project Feederwatch data from the U.S. and Canada between 1988 and 2006 and indicated a massive contraction in both range and abundance for Evening Grosbeak during those years. For the western UP, mean abundance at feeders decreased from 8-16 individuals from 1989-1994 to less than one individual per feeder from 2001-2006 (Bonter and Harvey, 2008). Similarly, much of the northern LP had a mean abundance of four to eight individuals per feeder from 1989-1994, while in the years 2001-2006, the mean abundance has

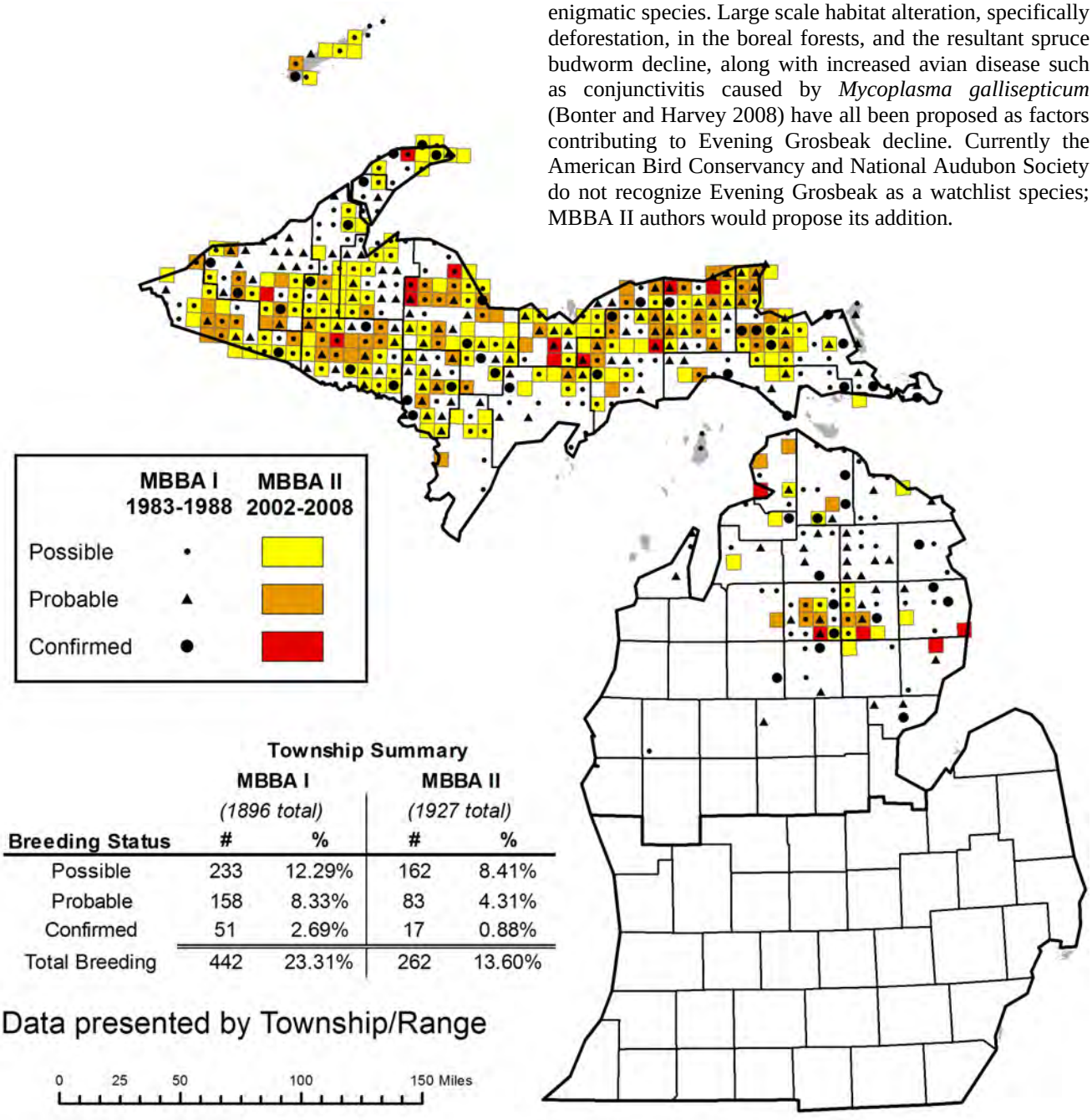
Evening Grosbeak *(Coccothraustes vespertinus)* ***Zach Gayk***

decreased to less than one individual per feeder (Bonter and Harvey, 2008).

Several explanations have been proposed for the widespread decrease in abundance of Evening Grosbeak in Michigan and the Great Lakes region. While Bolgiano (2004) suggested that this decline is tied to significant decreases in abundance of spruce budworms, it seems uncertain how important a role budworms play in the summer diet of Evening Grosbeak. Further research is needed tracking frequency of budworm consumption to determine that results as obtained by Mitchell (1952) [one Maine specimen from the area of a budworm outbreak was found with stomach contents comprised of 80% budworm larvae and pupae] are not simply the result of exploitative feeding on a nearby resource rather than adaptation. Deforestation of Canadian boreal forests, where more than one million hectares were cut in 2006 alone (Bonter and Harvey 2008), may be influencing Michigan declines due to decreased connectivity between the two populations.

Conservation Needs

Evening Grosbeak may be an immediate conservation concern in Michigan; the widescale range reduction that has occurred since at least the late 1980s may also be a natural process mirroring the eastward expansion of Evening Grosbeak during the 19th century. More research must be done to better determine the causes of the decline in this enigmatic species. Large scale habitat alteration, specifically deforestation, in the boreal forests, and the resultant spruce budworm decline, along with increased avian disease such as conjunctivitis caused by *Mycoplasma gallisepticum* (Bonter and Harvey 2008) have all been proposed as factors contributing to Evening Grosbeak decline. Currently the American Bird Conservancy and National Audubon Society do not recognize Evening Grosbeak as a watchlist species; MBBA II authors would propose its addition.



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	233	12.29%	162	8.41%
Probable	158	8.33%	83	4.31%
Confirmed	51	2.69%	17	0.88%
Total Breeding	442	23.31%	262	13.60%

Data presented by Township/Range

House Sparrow *(Passer domesticus)*

Jennifer Baldy



John Van Orman ©

This gregarious little bird is found in virtually all areas of North America, but has a distinct preference for areas of human residence where food and shelter are readily available. The House Sparrow is an invasive exotic that rapidly filled the sub-tundra portions of the North American continent since its introduction as early as 1850, followed by a series of re-introductions both intentional and accidental. The purposeful and persistent introduction of this species to North America was supported by ornithologists of the time as a method of biological control of caterpillars, an idea which soon proved misguided, as grains are the primary food source although some insect foods are utilized during the breeding season (Eastman 1991). Introduction was also promoted by naturalists who wished to bring Old World species to the Americas.

The House Sparrow, which began its existence in North America because it was so beloved by fellow human immigrants, has since become despised because of its effect on the native avifauna. Other cavity-nesting species such as the Eastern Bluebird, Tree Swallow, Tufted Titmouse, Cliff Swallow, Purple Martin, Downy Woodpecker and Chickadee must all compete with the aggressive House Sparrow. Some cavity-nesting species population declines are directly attributed to competition from the House Sparrow.

Distribution

The initial rapid expansion of the House Sparrow across the North American continent can be attributed to its colonial nesting habits. It initially found plentiful habitat in a largely rural America within barns and architecture. Staying near people where it could feed on oat-laden horse-droppings, farm fields and barn-yard waste it reached a peak of abundance in the early 1900s (Eastman 1991). Around the turn of the last century the species began a steady decline that continues today. Beginning with bounties in 1887, the replacement of the horse with the automobile, and the decline of the family farm, the nesting and feeding options for this still numerous species are becoming more limited as modern architecture creates designs that limit the cracks and crevices that have been home to the House Sparrow since its introduction. There is speculation that competition with the House Finch, a relatively new species in the Midwest, has contributed to the decline of the House Sparrow (Peterjohn and Rice 1991), however this is disputed by Bennett (1990) and Holder (2003).

The species' range in Michigan, as in other northern states and territories, is showing a contraction from higher latitudes. While breeding observations in MBBA II were made almost as far north as in MBBA I, they were less prevalent. Only about 10% of the townships in the UP reported breeding evidence, down from 23% despite an increase in the number of records collected in this region during MBBA II. Distribution was also patchier in the NLP with only about 58% of townships reporting breeding evidence, down from 72%.

Breeding Biology

Eleven subspecies of the House Sparrow are described from the Old World. The subspecies introduced into North America is *P. d. domesticus*, which is native to parts of the United Kingdom and Germany. Though derived from a single subspecies, the House Sparrow has developed geographic variation in the short time since its arrival. Birds tend to be larger in size with shorter limbs at higher latitudes and altitudes, following both Bergman's and Allen's Rules (Lowther and Cink 2006). The closest relative of the House Sparrow present in North America is also an exotic from Europe, the Eurasian Tree Sparrow, a more recent arrival. Fertile hybrids have been reported between these two closely related species (Barlow and Leckie 2000). The House Sparrow can have two or three broods per year, enhancing its reproductive success.

While the House Sparrow is active in Michigan year round, courtship activities occurred as early as 1 March, and nest building as early as 24 March. This member of the Old World Sparrow family can construct a nest of grasses in the forked branch of a tree in rural areas, but prefers and competes for cavities of nest boxes, and those provided by architecture (Harrison 1975). Nest building observations continued through the summer ending by 22 July. Nests with young were observed from 6 May until 31 July, however active nests have been reported outside this period.

Abundance and Population Trends

There has been a significant annual decline in House Sparrow numbers in Michigan of 4.15% according to the Breeding Bird Survey over the years 1983-2007 (Sauer et al. 2008). This is greater than the 3.6% decline for the region, however this is expected as Michigan is the state farthest north within the region where there is a contraction of the range as well as a decrease in abundance.

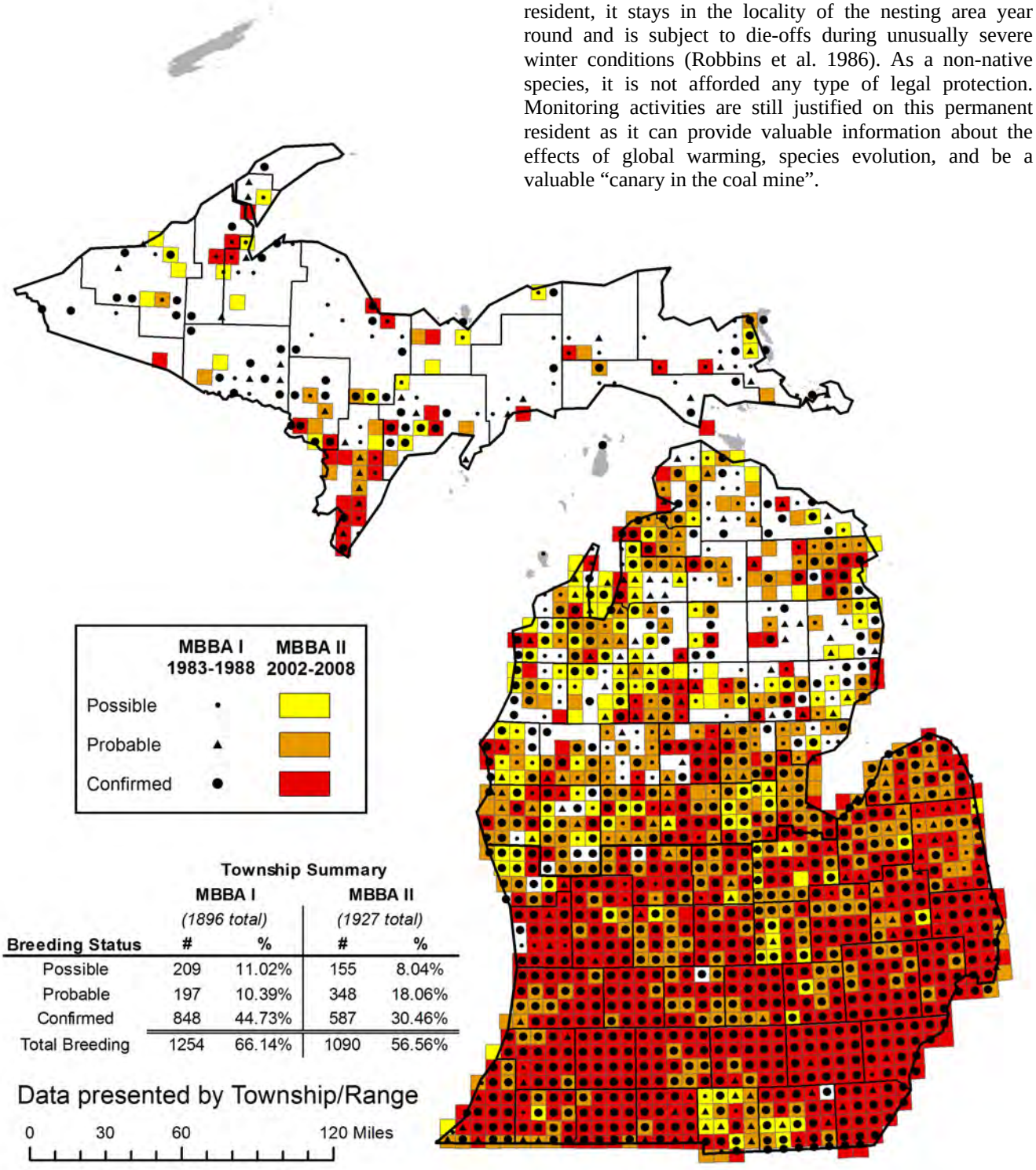
House Sparrow *(Passer domesticus)*

Jennifer Baldy

House Sparrows reached a peak around 1910-1920 in both distribution and abundance. Declines since then have been due to introduction of the automobile, cleaner livestock and farming operations, conversion of marginal farm areas to forest, severe winter weather, and increased use of pesticides (Lowther and Cink 2006).

Conservation Needs

As an invasive exotic species, views on conservation needs range from extermination to tolerance. Its high degree of success indicates that it does fill a vacant ecologic niche, perhaps left vacant with the demise of other colonial species such as the Carolina Parakeet or the Passenger Pigeon. Despite declines in both range and abundance, there is still a great chance that you will see a House Sparrow in all but the very farthest reaches of northern Michigan. As a year-round resident, it stays in the locality of the nesting area year round and is subject to die-offs during unusually severe winter conditions (Robbins et al. 1986). As a non-native species, it is not afforded any type of legal protection. Monitoring activities are still justified on this permanent resident as it can provide valuable information about the effects of global warming, species evolution, and be a valuable "canary in the coal mine".



Eurasian Tree Sparrow *(Passer montanus)*

Caleb G. Putnam

Status: *Casual (MBRC)*

The Eurasian Tree Sparrow is a recent addition to Michigan's avifauna, the first fully documented record occurring only in 2005. Closely related to the House Sparrow, this slightly smaller species is native to Europe and Asia where it is widespread. Unlike the House Sparrow, the sexes are similar. It was first introduced to the New World in 1870 in St. Louis, Missouri, but it has not enjoyed the success of the House Sparrow in colonizing the continent. Indeed, the species remains largely confined to an area encompassing west-central Illinois, southeast Iowa, and eastern Missouri (Barlow and Leckie 2000).

Distribution

No previous author mentions this species in Michigan. All historical reports have lacked sufficient documentation prior to the discovery of a single adult in Cass County on 2 November 2005 (Putnam 2007). Subsequently, Michigan has had seven additional records of this species from three widely-separated locations (MBRC 2009), three of which provided breeding evidence for MBBA II. The Cass County bird likely hybridized with House Sparrows during 2006 as evidenced by the presence of at least three hybrid individuals in the fall of 2006 (Putnam, *in prep.*). Additionally, the adult at this location was seen carrying a feather in May 2007, confirming that nest building did take place.

Three records of one individual Eurasian Tree Sparrow at a farm near Topaz in Ontonagon County spanned the period from 18 April 2006 to 31 May 2007 and are interpreted as probable evidence of breeding, though no hybrids or young were observed. An anomalous record of three individuals in downtown Copper Harbor, Keweenaw County on 5-11 May 2007 provided possible breeding evidence, but no young were observed and the adults presumably disappeared after their weeklong stay. Two final records of a single bird at Whitefish Point during May 2008 and May 2009 provided no breeding evidence.

Whether the recent spate of records in Michigan represents a wave of new founders from the south or relicts of undiscovered birds which had been here for some time is unknown. But the fleeting presence of individuals at such distant outposts as Copper Harbor and Whitefish Point does suggest some movement within the state. An additional, unlikely explanation is that these birds resulted from the release of several species of Eurasian songbirds near Chicago, Illinois, at some point in the early 2000s (see discussion in Chu 2005 and Craves 2008). However, previous authors appear not to suspect this species as having been involved, and some natal dispersal is typical in this species (Barlow and Leckie 2000). Presumably, Michigan will continue to host small numbers of this species, but it remains to be seen whether we will support an established breeding population.

The Eurasian Tree Sparrow is a human commensal, preferring wooded parks, farms, cities, and other human-modified habitats. It is often found in the company of House Sparrows, but is decidedly less competitive in defending nest cavity sites from its larger cousin, a fact which may be related to its limited distribution in the New World.

Breeding Biology

Current records of this species span the entire year, and it is a resident non-migratory species in its North American range. The only direct evidence of breeding for Michigan was feather carrying which was observed on 4 May 2007 in Cass County (D. Johnson, pers. comm.). Hybrid young were first observed at this site in August of 2006 (Putnam, *in prep.*). Hybrids of these two species are known from one other North American pairing, in Manitoba (Lang 1992) and from at least 51 occurrences in Europe (Solberg and Ringsby 1996). The species is often triple-brooded in Illinois (Oehmke 2004), with nest building occurring mainly between March and June (Barlow and Leckie 2000), and third broods initiated by early August on average. Breeding in Michigan presumably could occur any time between March and September.

Abundance and Population Trends

This species presumably first entered Michigan at some point during the last decade. It remains to be seen whether any of these founders are able to establish a long-term presence in Michigan. Although it seems likely that most individuals will be unable to find others of the same species with which to breed, the Copper Harbor record shows that occasionally these birds travel in numbers. Perhaps such birds will eventually produce young Eurasian Tree Sparrows, but it remains unclear whether a self-sustaining population would result.

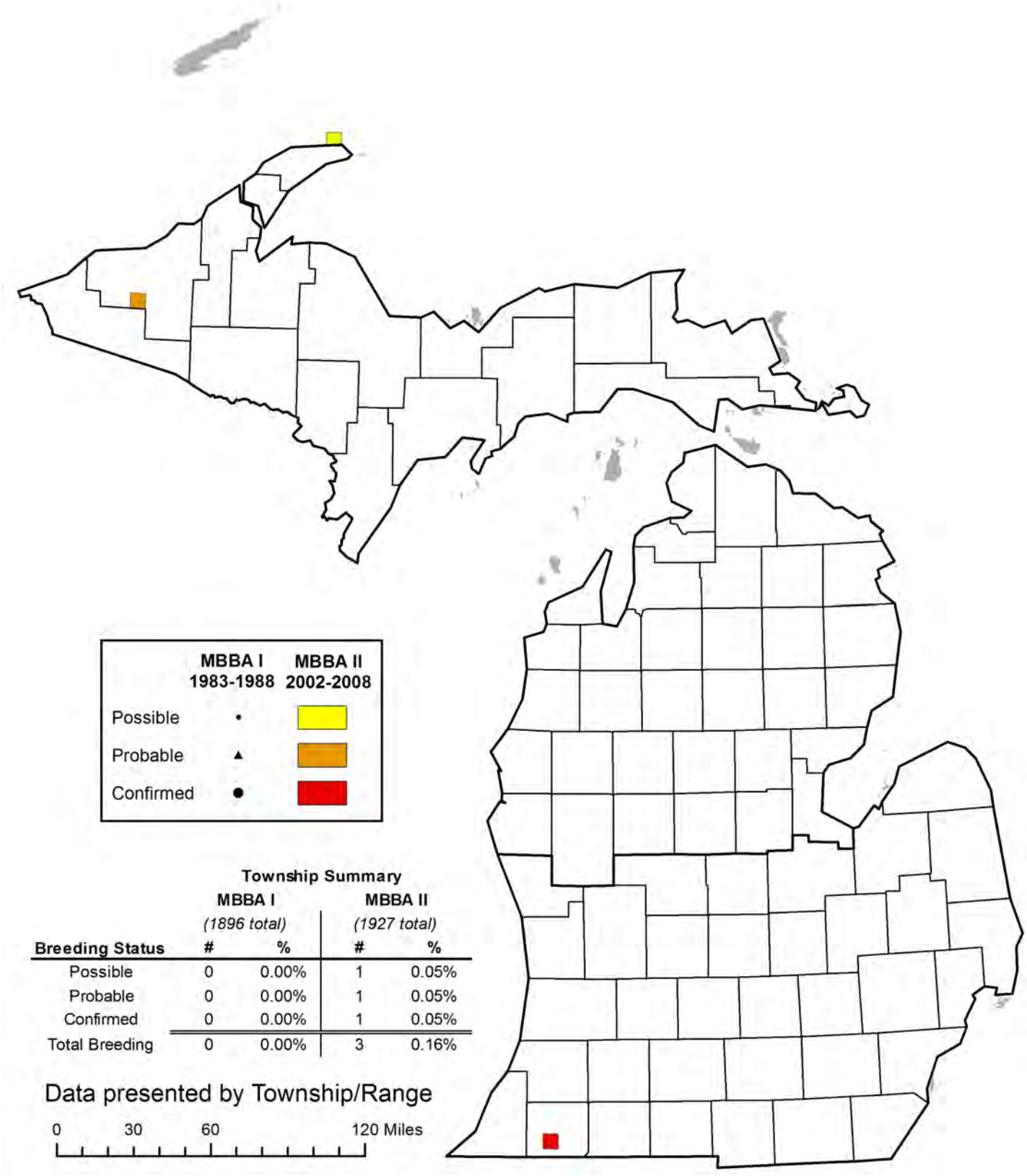
Conservation Needs

Because it is an introduced species in North America, the Eurasian Tree Sparrow is exempt from the protection of the Migratory Bird Treaty Act.

Eurasian Tree Sparrow *(Passer montanus)*

Caleb G. Putnam

Status: *Casual (MBRC)*



Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	0	0.00%	1	0.05%
Probable	0	0.00%	1	0.05%
Confirmed	0	0.00%	1	0.05%
Total Breeding	0	0.00%	3	0.16%

Data presented by Township/Range

0 30 60 120 Miles

Unconfirmed Breeding

Northern Pintail *(Anas actua)*

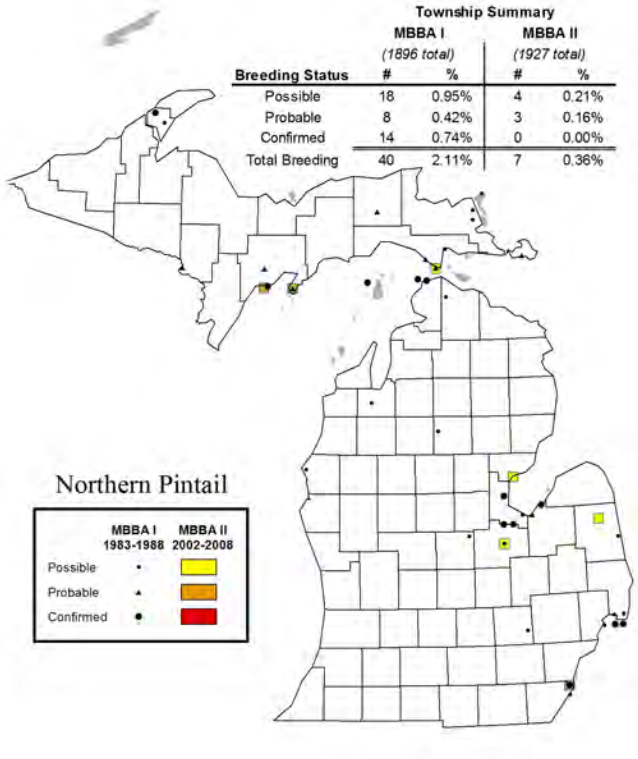


John Van Orman ©

One of the more beautiful Michigan ducks, the Northern Pintail is number three on the National Audubon Society's list of the Top Ten Common Birds in Decline (Butcher 2007). The pintail is a medium sized duck, with a long neck, and in breeding plumage, the male has a rich brown head with a gray bill, white neck and breast, upperparts and underwings mainly gray with a green speculum, and long dark central rectrices. In flight the bird looks slim and long-winged. The female is buffy overall, with a gray bill and plain buffy head. The pintail is circumpolar in distribution, and the bird's breeding range in North America is primarily in Alaska and western Canada, and in the prairie pothole region of the Northern Great Plains in the U.S., though it extends to central California in the west and the Maritimes in the east (Austin and Miller 1995). Northern Pintails winter from the southern U.S. south to northern South America in the Americas. The pintail is one of the earliest ducks to nest in North America, soon after ice has melted in many areas (Madge and Burn 1988).

Distribution

Pintails have probably never nested extensively in Michigan, as it is at the southern edge of the bird's breeding range although nests have been documented since at least the early 20th century (Brewer et al. 1991). The first atlas described the pintail as an uncommon breeder, confined mainly to the marshes of the Great Lakes, including the St. Clair flats in St. Clair County; Pte. Mouillee, Monroe County; the Saginaw Bay area; the coastal marshes of Delta County; and sites in Emmet and Houghton Counties, with breeding confirmed in 12 townships (McPeek and Adams 1994). For the second atlas, there are only two probable and three possible breeding records. The locale of the breeding sites for the second atlas mirrors those for the first atlas, with at least possible breeding in Monroe, St. Clair, Saginaw, Sanilac, and Delta counties. However, there were no incidences of confirmed breeding for the second atlas, and only five townships had possible and probable breeders.



Breeding Biology

The pintail begins to nest around mid-April in the south and about a week later in the north (McPeek and Adams 1994). Females build nests on the ground among short vegetation such as smartweed, or taller vegetation such as willow, often at long distances from water. As is the case with most duck species, the male leaves soon after incubation begins, with the female performing all nesting duties. Pintails in Michigan have single broods, with egg dates from late April to early June. Ducklings from the same nest hatch all at the same time, after 22 – 26 days, and follow the mother to water after spending a day in the nest (Johnsgard 1975, MDNR 2005). During the breeding season, ducklings and adults feed mainly on aquatic invertebrates. The ducklings fly at seven weeks. In North America, hybridization between dabbling duck species, including Pintail, in the wild sometimes occurs (Austin and Miller 1995).

Abundance and Population Trends

In Michigan, the pintail is a fairly common migrant at peak migration in mid to late April in the LP, and in late April and early May in the UP; casual to accidental in the summer statewide; fairly common in the last week of September through November in the southern LP; and in winter, rare to accidental in the LP, and mainly absent in the UP (Chartier and Ziarno 2004). The first atlas listed 38 occurrences of pintail, whereas the second atlas survey had less than half that number (Brewer et al. 1991). States surrounding Michigan reported even fewer occurrences in their atlases; Ohio had two with one confirmed nesting (Peterjohn and Rice 1991); Indiana had no reports for their atlas or

breeding bird survey routes (Castrale et al. 1998); Illinois had one confirmed, two probable and four possible breeding records (Kleen et al. 2004); Wisconsin had two confirmed nesters with two probable and three possible (Cutright et al. 2006). The second Ontario atlas showed a decline in the probability of observation in four of five regions of the province, and an overall decline from seven percent for the first atlas versus 5.4 percent for the second atlas (Cadman et al. 2007). Though the primary breeding range for the pintail is north and west of Michigan, the decline of the species in Michigan mirrors the overall decline in population in North America from a high of 16 million to the current 3.6 million (Butcher 2007).

Conservation Needs

The decline in North America is due to the intensification of farming in the Prairie Pothole Region. Spring cultivation of stubble fields, a frequent nesting site for pintails, causes high nest loss for these early nesting birds. The conversion of grasslands to row crops in the western Dakotas is especially harmful to the population. An effort to promote fall planting in areas that remain in crops, combined with programs to conserve wetlands and grasslands, will help to increase populations of these ducks (Butcher 2007). Farm bill conservation programs that encourage conversion of marginal farmlands to grasslands will also help. Similar programs in Michigan may help to increase nesting attempts by this species.

Mike Sefton

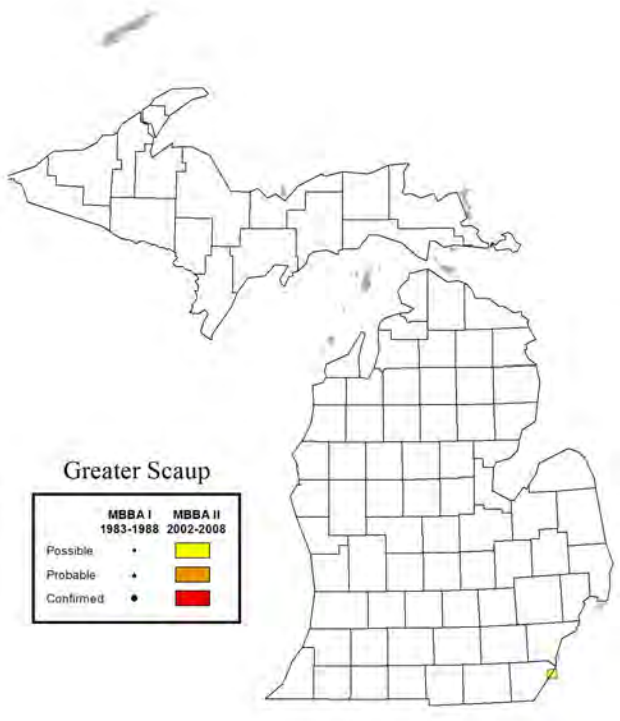
Greater Scaup *(Aythya marila)*



Greg Schneider ©

Not easy to distinguish from its close relative, the Lesser Scaup, the Greater Scaup is a fairly common migrant and fairly common to common winter resident in Michigan. Michigan harvests more Greater Scaup than any other state in the Mississippi Flyway (Raftovich et al. 2011). Migrants occur primarily on the Great Lakes and occasionally larger inland lakes (Payne 1983, Chartier and Ziarno 2004). The primary breeding grounds are in Alaska (Kessel et al. 2002). In the Mississippi Flyway, the Greater Scaup breeds primarily in the Hudson Bay lowlands of Ontario in wetlands in taiga, tundra, and muskeg (Kessel et al. 2002, Badzinski 2007).

Depending on ice cover, variable numbers of Greater Scaup have wintered on Lakes Erie and Ontario since the 1980s (Kessel et al. 2002). The peak number found on Christmas Bird Counts (CBCs) in Michigan since 1993 was 20,917 in the winter of 2005-2006 (Palmgren 2006). While these counts often occur before Lakes Erie and St. Clair freeze up completely, other high counts have been recorded later in winter, if these lakes do not freeze up completely. These later-season high counts include 7,000 on 16 February 1995 on Lake St. Clair (McWhirter 1995) and 4,750 on 21 February 2008 on the Detroit River at Grosse Ile, Wayne Co. (Wuepper 2008). From 1993-2008, the average number of CBCs recording Greater Scaup in Michigan each year has increased from 12-13 to 14-20. The overall number of individuals wintering on the Great Lakes also seems to be increasing, which may be related to ice cover throughout the winter, and possibly other causes.



During the MBBA I period, five Upper Peninsula and eight Lower Peninsula counties reported Greater Scaup. Most observations were of one to five birds per sighting, but one observation was 50 birds in St. Clair County. No records of Greater Scaup were submitted from Monroe County during MBBA I, and none were reported in the summer Michigan Bird Surveys from 1983-1988. From 1993 and during the MBBA II period (through 2008), however, summering Greater Scaup were reported in the Michigan Bird Survey in every year. The majority of summer records (15 of 24) were from Pte. Mouillee State Game Area, Monroe County, where they were reported annually from 1993-2008. The

number reported has ranged from two individuals in 2005 (Byrne 2006) to 15 individuals in 2003 (Byrne 2004). These reports have often included both males and females, meeting the atlas definition for possible breeding. A few other individuals were also reported in early June during the MBBA II period from Bay, Oakland, St. Clair, Muskegon, Alpena, Delta, and Houghton Counties, but were likely tardy migrants. The increasingly frequent observations of summering pairs and groups of Greater Scaup should be monitored carefully in the future for a potential first breeding record for the state.

The population and trends of Greater Scaup are largely unknown as surveys (mainly aerial) do not distinguish between the Greater and Lesser Scaup. The continent-wide breeding ground population estimate in 2001 was 634,000, while the total U.S. midwinter estimate for 2000 was 192,000 (Kessel et al. 2002). The continental scaup population was estimated at 4.2 million in 2009, which represented a decline of 18% from the long term average. Approximately 11% of these are Greater Scaup (Afton and Anderson 2001, USFWS 2009). Better survey methods for distinguishing Greater from Lesser Scaup are definitely needed in order to ascertain its true status. Recent studies have focused on causes of decline of Lesser Scaup. Austin et al. (2000) suggest that "biologists and agencies need to gather and improve information needed to manage Greater and Lesser Scaup populations separately; this includes monitoring the breeding populations of each species separately, closer examination of existing data to improve surveys and data collection, and re-evaluation of the [North American Waterfowl Management Plan] population goal."

Allen T. Chartier

Lesser Scaup *(Aythya affinis)*



Jerry Jourdan ©

The Lesser Scaup has been known by colloquial names including Black Jack, River Broad-bill, Bluebill, and Little Bluebill (Job 1936, Johnsgard 1975, Bellrose 1976). It is a common breeding species from the prairie potholes of the Dakotas and Manitoba west through the northern Rocky Mountains from Montana to Alaska, and more sparsely distributed east across northern Ontario to western Quebec. The breeding habitat is generally wetlands with emergent vegetation including ponds, marshes, and lakes in tundra, taiga, and prairie (Austin et al. 1998).

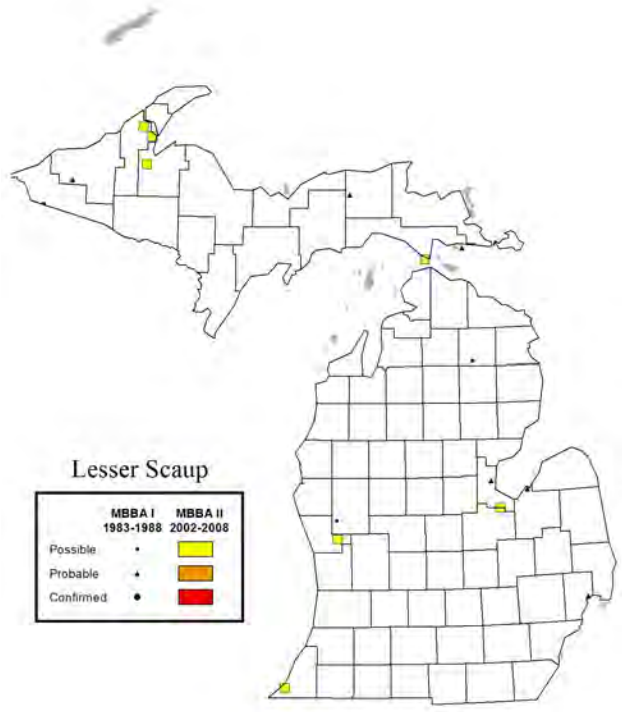
The Lesser Scaup is one of the most common diving ducks during spring and fall migration in the Great Lakes, also occurring frequently on inland ponds, lakes, and rivers. In winter they tend to vacate the region but a few will remain on the larger lakes and some rivers until freeze-up. Spring migration usually extends into mid-May in Michigan, however, presumably late spring migrants are occasionally reported on inland lakes and sewage ponds in the first week of June. The sex ratio of the Lesser Scaup is skewed toward males, with numbers of unpaired males remaining south of the breeding grounds. In addition, a significant proportion of one- and two-year old females will delay breeding and may accompany these males (Austin et al. 1998). As a result, finding males and females together cannot reliably be considered pairs, and should not be considered probable breeders unless courtship behavior is observed.

Breeding in the Great Lakes region is concentrated in Ontario north of Lake Superior, although smaller numbers have been found in southern areas of the province, including confirmed and probable breeding on Lake St. Clair and Lake Huron (Badzinski 2007). A few individuals are reported each summer in marshes of northwestern Ohio, where the last confirmed breeding record was in 1954 (Peterjohn and Rice 1991). Indiana has reported only three nesting records with the most recent in 1952 (Castrale et al. 1998). The Wisconsin Breeding Bird Atlas recorded one confirmed, two probable (pairs observed), and three possible breeding records from the central and north-central portions of the state (Cutright et al. 2006).

There is just a single confirmed breeding record for Lesser Scaup in Michigan, from Dickinson County in 1941 (Payne 1983). Evidence of breeding during MBBA I was limited to observations of courtship or pairs from seven counties (Ontonagon, Dickinson, Luce, Mackinac, Bay, Tuscola, and Macomb). These records may have over-stated the breeding status in the state given the tendency for numbers of both males and females to delay breeding and linger south of the normal breeding range.

No evidence of breeding was noted in MBBA II. Lesser Scaup were reported in the Michigan Bird Survey every summer between 1993-2007 (published in *The Jack-Pine Warbler* and *Michigan Birds and Natural History*), and apparently in increased numbers from the first atlas. Pointe Mouillee State Game Area (Monroe County) is the most regular locale for summering Lesser Scaup in Michigan, with annual records from 1993-2007. As few as four individuals were recorded in 2007 (Dombroski 2008) and as many as 30 in 1998 (Byrne 1999). In most years, 10-15 are typically observed. Often, both males and females are present but no courtship activity has been reported, and no

broods have yet been discovered. Erie Marsh Preserve, farther south in Monroe County, had summering individuals in 1998 (Byrne 1999), 2000 (Byrne 2001), and 2004 (Byrne 2005). The Saginaw Bay wetlands are the next most favored summering area. Single Lesser Scaup have been noted most often in Bay County, reported in six summers from 1993-2007 (half from Nayanquing Point State Wildlife Area), and in Saginaw County in five summers from 1993-2007 (most from Shiawassee NWR). The greatest summer count from this region was four in 1998 at Nayanquing Point SWA (Byrne 1999). Sewage lagoons, marshes, and natural ponds and lakes throughout the state have also occasionally hosted summering individuals. If Lesser Scaup are ever to be confirmed breeding in Michigan again, the Monroe County marshes and the Saginaw Bay wetlands would seem to be the most likely places for this to occur.



Although still a common species, Lesser Scaup populations should continue to be monitored. Most waterfowl surveys tend to combine both Greater and Lesser Scaup, though it is estimated that 89% of the birds continent-wide are Lesser Scaup (USFWS 2009) while researchers suggest improvements to survey methods to allow better evaluation of scaup declines (Afton and Anderson 2001). The 2009 scaup population estimate was 4.2 million, which was 18% below the long-term average of 5.1 million (USFWS 2009). Afton and Anderson (2001) noted scaup declines over the past 20 years based on decreased survey numbers of both species continent-wide, changes in age and sex ratios of Lesser Scaup in U.S. harvests with more males now than females, and fewer immatures than adults.

Some possible reasons for decline include reduced food resources during spring migration resulting in poorer body condition of females arriving on breeding grounds (Anteau and Afton 2004), mortality from entanglement in fishing nets and lines, pesticides entering wetlands from agricultural runoff, heavy metals including mercury in fish, selenium acquired from feeding on Zebra and Quagga Mussels, and wetland loss and degradation (Austin et al. 1998, Austin et al. 2000, Rouse et al. 1997, USFWS 2009), while little evidence was found that harvest was associated with scaup declines (Afton and Anderson 2001).

Allen T. Chartier

Bufflehead *(Bucephala albeola)*



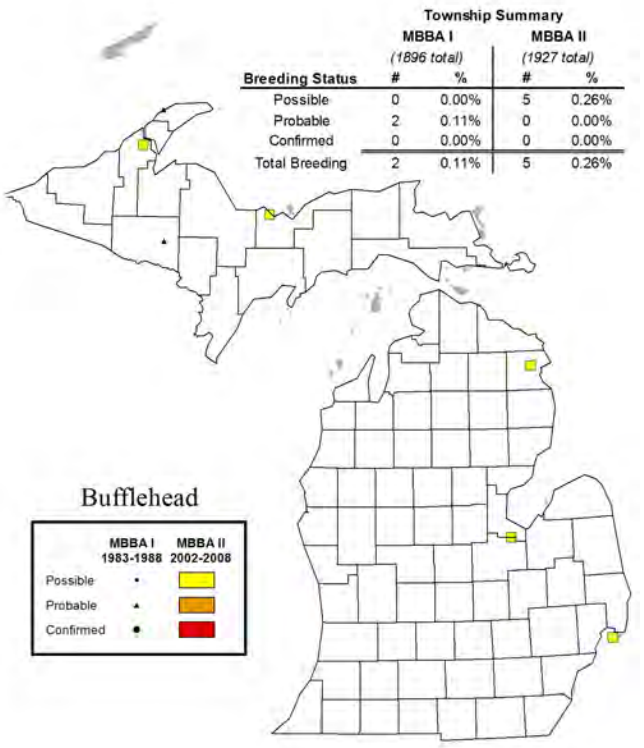
Greg Schneider ©

The Bufflehead, which breeds only in North America, is our smallest diving duck. It nests in flicker-sized woodpecker holes near ponds and small lakes in the boreal forests of Canada. Bufflehead breeding habitat is dominated by ponds and small lakes, where the birds dive for insect larvae and amphipods (Gauthier 1993). It faces competition for nesting cavities from both larger ducks (such as the related goldeneyes) and smaller passerines (Gauthier 1993).

Pair-bonding has generally occurred by the time the ducks head north, somewhat later than other waterfowl (Gauthier 1993). The possible breeding observations in the Lower Peninsula are most likely these north-bound pairs. Probable breeding was documented during MBBA I in Iron and Keweenaw counties (Adams 1991). During MBBA II, two UP counties (Alger and Houghton) recorded possible breeding. Nesting has been confirmed at UP latitudes in southern Ontario, including a probable nest near the St. Marys River west of Sault Ste. Marie (Mallory 2007). It is not impossible that Bufflehead may nest in the UP.

Both males and females are highly territorial. They do not breed until two years of age but enjoy a nest success rate of 78% or more (Bellrose 1980). Nest selection probably occurs in two stages. The first stage occurs in summer, when groups of failed or nonbreeding females visit nest cavities and exhibit typical vocalizations and flight patterns (Palmer 1976, Gauthier 1993). Prospecting flights coincide with the late incubation stage and may be used by females to

gain information on the status or quality of a cavity (Eadie and Gauthier 1985). In the second stage, nest cavities are sought directly before egg laying. Females presumably visit sites they inspected the previous summer. Pre-laying nest searches are more secretive than those post-laying; females fly alone (or with their mate) and never vocalize (Eadie and Gauthier 1985). The easiest way to confirm breeding is to spot a female with ducklings on a feeding territory, especially if two females become involved in a territorial dispute. Unfortunately, any Bufflehead breeding in the UP is likely on a remote lake not frequented by human observers.



The population is limited by the availability of nesting cavities and by territory size; additionally, Buffleheads are supplanted by goldeneyes during territorial disputes. Logging in the boreal forests may both reduce the number of cavities and degrade lakeside habitat. Nest boxes are an effective management tool when properly sized and placed in appropriate habitat (Gauthier 1993). Bufflehead harvest has been trending up in both Michigan and the U.S. since 1961 (USFWS 2010), reflecting the population increase shown by BBS data (Sauer et al. 2008). Rangewide, its population has shown a statistically significant increase of 3.5% annually since 1966 (Sauer et al. 2008), despite hunting pressures.

In 2008 and 2009, Buffleheads comprised approximately 10% of the total ducks harvested in Michigan, approximately 1.5% of those harvested in the Mississippi Flyway, and approximately 1.8% of those harvested in the U.S. (Raftovich et al. 2010). Regulated hunting has not adversely affected the population; however, since Buffleheads exhibit strong site fidelity to both their wintering grounds and breeding lakes, recolonization of over-hunted areas may be slow (Gauthier 1993). At this time, Buffleheads seem to have a secure future.

Torrey Wenger

Snowy Egret *(Egretta thula)*



Joan Tisdale ©

The Snowy Egret is a fairly common species of "southern" heron, found mainly in southeastern swamps and marshes, breeding along the Atlantic coast north as far as Nova Scotia (rarely), and in the southern portions of the Mississippi River drainage. It also is fairly common in portions of the Great Basin and the Pacific Coast (Sibley 2000). Snowy Egrets also breed in the West Indies and throughout Central America to northern South America south to Argentina and Chile (Parsons and Master 2000). Most often Snowy Egrets are found nesting at isolated locales, including barrier and dredge spoil islands, estuarine habitats, freshwater swamps, river bottomlands, and inland lakes and rivers (Parsons and Master 2000).

The nearest breeding locale to Michigan is on West Sister Island, Ohio; this is the only site in that state where numbers have increased from two pairs in 1983 to 8-10 pairs through 1989 (Peterjohn and Rice 1991) and 12 were counted there in 2007 (Cuthbert and Wires 2008). Ontario has had only a single confirmed nesting near Hamilton in 1986 (Cadman et al. 2007). Southernmost Indiana has had only one possible nesting (with Cattle Egrets) in Gibson County in 1996, but that colony was abandoned before nesting succeeded (Castrale et al. 1998). Nesting in Illinois is limited to nearly 50 pairs at a single site in Cook County in the northeastern part of the state (Kleen et al. 2004). In Wisconsin, a few Snowy Egrets (2-10 pairs) nest annually at a single site in the Green Bay area, Brown County (Cutright et al. 2006).

There are no historical records suggesting nesting in Michigan. Adams (1991) and Reinoehl (1994) predicted that the Snowy Egret would eventually be found nesting in Michigan, but no evidence was found during MBBA I, between the two atlases, nor during the current atlas period.

Unconfirmed Breeding

The formerly accidental Snowy Egret has become an uncommon spring overshoot migrant and a post-breeding wanderer in summer and fall (Payne 1983). The first state records claimed in the 1870s by Barrows (1912) were considered to be misidentified Great Egrets or immature Little Blue Herons by Wood, who suggested that the first definite record for Michigan was from 1935, though he still considered it very rare after that time (Wood 1951). Reinoehl (1994) noted that the Snowy Egret was a regular visitor to Michigan, mainly to the southeastern part of the state (peak of 14 birds at Erie Marsh Preserve in August-September 1992) and Saginaw Bay, but also including a few Upper Peninsula records.

A review of Snowy Egret records from the Michigan Bird Survey between 1993 and 2007 shows about 170 individuals reported. Fall (mainly August-September) accounted for 54% of these records, with the latest on 12 October 2006 (Dombroski 2007) and a peak of up to 14 individuals at Pointe Mouillee State Game Area, Monroe County in 2003 (Chartier 2004). In addition, up to 14 individuals were noted at the Karn/Weadock Generating Complex, Bay County, in fall of 2006 (Dombroski 2007). Spring represented 25% of the records, most in May with the earliest on 15 April 2002 (Reinoehl 2002), and 21% of the records (36) were from summer. The majority of all 1993-2007 records were from the southeastern LP (49%) and the Saginaw Bay area (33%), with only nine records (4%) from the southwestern LP, three (<2%) from the northern LP, and four (2%) from the UP. During the MBBA II period, 87 records pertained to spring overshoot migrants and summer/fall post-breeding dispersers, a slight increase over the period between atlases. Most summer records were from Pointe Mouillee State Game Area and the Karn/Weadock Generating Complex. There were no summer records of Snowy Egret in 2002 and 2006.

BBS trends for the region cannot be estimated as this species is observed on too few routes for statistical analysis. Snowy Egret populations in the southeastern U.S. have increased and are now fairly stable after being decimated in the late 1800s for the millinery trade, but they are declining along most of the Atlantic coast (Parsons and Master 2000).

Allen T. Chartier

Little Blue Heron *(Egretta caerulea)*



John Van Orman ©

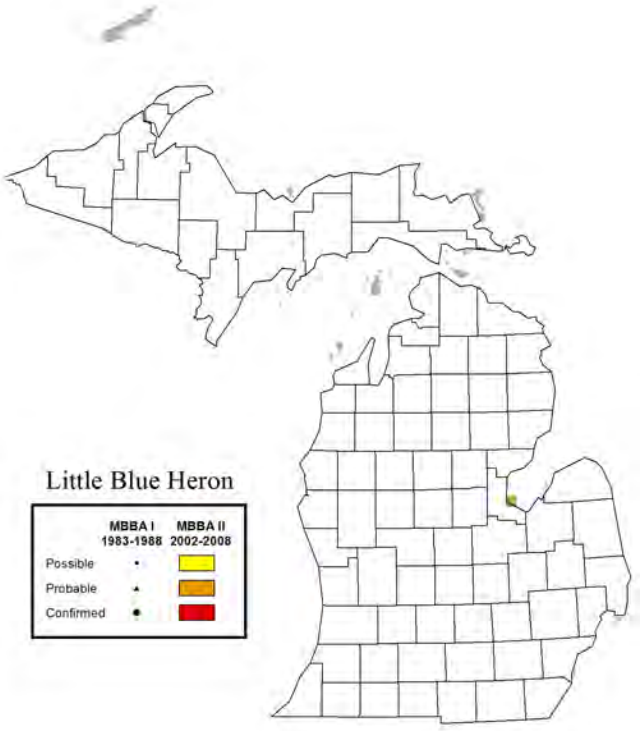
The Little Blue Heron is a fairly common species of southeastern swamps and marshes, along the Atlantic coast north to southern New England, in portions of the southern Great Plains in Oklahoma and Kansas, and in the southern portions of the Mississippi River drainage (Sibley 2000). They also breed in the West Indies, throughout Central America to northern South America south to Peru, central Brazil, and Uruguay (Rodgers and Smith 1995). Most often found nesting in mixed species heron rookeries; they are also sometimes found breeding in smaller numbers on their own (Rodgers and Smith 1995).

The closest breeding Little Blue Herons to Michigan are in Ohio at a colony on West Sister Island in western Lake Erie, which has been occupied since 1983. This is the only Ohio breeding locale and only 2-3 pairs are typically present at this location (Peterjohn and Rice 1991). In addition, there is a single Little Blue Heron nesting record in Vigo County of west-central Indiana (Castrale et al. 1998). About 750+ pairs nest at a single location in St. Clair and Madison counties in southwestern Illinois, with sporadic nesting farther south in Alexander County; in addition, two pairs were found breeding in Cook County in the northeastern part of the state (Kleen et al. 2004). These breeding areas may be the source of the increasing number of wanderers to southwestern Michigan. In Wisconsin, the Little Blue Heron was suspected of nesting near Green Bay (Brown County) in the mid-1970s (Cutright et al. 2006). More recently, in the summer of 2005, Little Blue Herons were more numerous in Wisconsin than in many recent years (Svingen 2006), and may be the source, or at least the most likely path of entry, for recent records in Michigan's western Upper Peninsula.

Since the first record from Detroit in May 1882, the Little Blue Heron has been primarily a spring overshoot migrant and a post-breeding wanderer in summer and fall (Barrows 1912, Payne 1983). Although rare in Michigan during the early 1900s, there were annual sizeable influxes of birds in Monroe County, as well as in the Toledo, Ohio area towards mid-century; up to 85 birds were reported in this area in 1930. Scattered additional individuals were reported throughout the southern Lower Peninsula (Wood 1951).

Unconfirmed Breeding

Fewer records were published after this initial influx until the 1970s, when there was a slight increase in reports, with multiple records most years published in the Michigan Bird Survey between 1971-1978. From 1986-2008 the species was recorded nearly every year in varying numbers statewide, varying from zero in 2007 (Reinoehl 2007, Dombroski 2008a, Dombroski 2008b) to eight birds in 2006 (Reinoehl 2006, Dombroski 2007a, Dombroski 2007b). Most records are from the southern LP, particularly Wayne and Berrien counties, but the first UP record was a bird found dead in Baraga County on the extremely late date of 17 November 2003 (Richter and Chartier 2003). Additional UP records of live birds were noted in spring and summer of 2006 (Reinoehl 2006, Dombroski 2007a).



During the MBBA II period, 28 records pertained to spring overshoot migrants and summer/fall post-breeding dispersers. One summer record from June and July 2008 was of a single adult "holding territory" within a nesting colony of Great Egrets and Black-crowned Night-Herons at the Saginaw Bay Confined Disposal Facility (D. Duso and M. Willard, pers. obs.). This record meets the atlas definition for probable nesting, and is the first suggestion of breeding evidence in the state. BBS trends for the region cannot be estimated as too few routes report the species. Continent-wide, trends are difficult to determine as Little Blue Herons are difficult to detect when nesting, though most evidence suggests that populations are stable (Rodgers and Smith 1995).

Allen T. Chartier

Tricolored Heron *(Egretta tricolor)*

Status: *Casual (MBRC)*



Jerry Jourdan ©

The coast loving Tricolored Heron is a relatively new addition to Michigan's avifauna with the first confirmed record from Monroe County on 8 May 1965 (Payne 1983). The breeding range extends primarily on the immediate coastline of extreme southern Texas and southern Louisiana east to Florida, and irregularly along the Atlantic coast north to southern Maine (Frederick 1997). As with other "southern" herons, the Tricolored Heron is prone to post-breeding wandering well north of its normal range in spring and summer.

Between 1965-2007 the species has been less than annual in Michigan, with a total of 45 records (57 individuals), seven (12 individuals) during the MBBA I period and seven (7 individuals) during the MBBA II period. The early 1980s was a period of an increased number of records. Most Tricolored Herons in Michigan have been recorded from spring (26) and summer (16) with the earliest being 13 April 2006 from Marquette County and the latest 31 August 1988 from Ottawa County. The southeastern Lower Peninsula, particularly Monroe County, accounts for the majority of records (24), followed by a single county (10 records from Bay County) in the Saginaw Bay area. There have also been four records from the Upper Peninsula, two from Chippewa County and one each from Mackinac and Marquette counties (MBRC 2009).

In Ohio, only a single "possible" nesting was recorded from West Sister Island in Lake Erie in 1979 (Peterjohn and Rice 1991). A single individual carrying nesting materials to a Cattle Egret colony near Gibson Lake, southern Indiana in 1996 is the only record from that state. This colony was abandoned in early June of that year (Castrale et al. 1998). No breeding evidence during either atlas period was obtained from Michigan, and indeed Tricolored Herons are absent as a breeding species in the entire region making this a very unlikely addition to the breeding avifauna of Michigan any time in the foreseeable future.

Allen T. Chartier

Unconfirmed Breeding

Cattle Egret *(Bubulcus ibis)*



John Van Orman ©

The Cattle Egret is an Old World heron that was discovered in the New World in Suriname between 1877 and 1882, and in Guyana between 1911 and 1912 (Talfair II 2006). It is widely considered to have arrived in the New World on its own, not being ship-assisted, as the species is well known for its dispersal capabilities within its original range. From northern South America the Cattle Egret spread northward, being recorded in the United States for the first time in Florida in 1941 and first found nesting there in 1953. As of 2006, the Cattle Egret had been confirmed breeding in all but five U.S. states (MT, WA, AK, NH, WV) but confirmed in only three Canadian provinces (MB, SK, ON). Nests are usually in mixed species heronries in woodlands, swamps, wooded islands, and coastal islands (Talfair II 2006).

Although breeding was confirmed in Bay County and possible breeding was recorded in Monroe and Ingham counties during MBBA I, no evidence for breeding was found through the end of the MBBA II period (2008). This is similar to the status of the species in Ontario, which had confirmed breeding records in the early 1970s, but not since (Cadman et al. 2007). In Ohio, only two small breeding colonies are known, one from an island in Sandusky Bay (3-6 pairs through 1989) and the other from West Sister Island in western Lake Erie. This latter site was reduced to less than five pairs by 1987 (Peterjohn and Rice 1991) and 16 were counted there in 2007 (Cuthbert and Wires 2008). Nesting in Indiana was not confirmed until 1996 when a colony of over 500 birds was found near Gibson Lake (Gibson County) in the southernmost portion of the state, but this site was suddenly abandoned that same year and nesting has not been reported since (Castrale et al. 1998). Up to 1000 pairs consistently breed at a colony in Madison County, central Illinois, with additional colonies in other parts of the state typically involving much smaller numbers and often ending in failure or abandonment (Kleen et al. 2004). Three confirmed and one probable breeding sites were reported from northeastern Wisconsin (confirmed in Brown, Oconto, and Winnebago counties and probable in Langlade County). Colony size ranged from 11 to 100 pairs at the Brown and Oconto County sites (Cutright et al. 2006), which may be the source of records from Michigan's western Upper Peninsula as these birds disperse after breeding.

A review of Cattle Egret records from the Michigan Bird Survey between 1993 and 2007 shows nearly 200 individuals reported with nearly equal numbers during spring (earliest: 10 April 2001, Reinoehl 2001), summer (63 records, but none in 1999), and fall (latest: 22 November 2006, Dombroski 2007). The majority of reports were from the southern Lower Peninsula, with 40% from Wayne, Oakland, Macomb, Washtenaw, and Jackson counties; 42% from the Saginaw Bay area; and 14% from Berrien County. There were four records from the northern Lower Peninsula and 13 from the Upper Peninsula during this period. Michigan sites with the greatest concentration of summer records are areas in Bay and Monroe counties, where confirmed or possible breeding was noted in the first Atlas.

BBS trends for the Upper Midwest region cannot be estimated as too few routes report the species, but North American trends show a small annual increase (0.1% per year) from 1966 to 2004. However, this masks an initial exponential growth period, followed by a period of decrease, then stabilization (Telfair II 2006). Cattle Egret populations appear to be stable continent-wide but perhaps are decreasing in the region. More intense searches in some difficult areas to survey in Bay and Monroe counties could turn up additional confirmed nest records in the future.

Allen T. Chartier

Yellow-crowned Night Heron *(Nyctanassa violacea)*



Robert Epstein ©

More secretive than its close cousin, the Black-crowned Night-Heron, the Yellow-crowned Night-Heron is a recent addition to Michigan's avifauna with all records in the last 50 years. Another "southern" heron that finds its way north in spring migration and after breeding, the Yellow-crowned

Night-Heron is most common in coastal areas from Long Island, New York, south to Florida and west to Texas. Inland, it is found north in the central U.S. to southern Illinois and Indiana, and west to central Texas and eastern Oklahoma. They are mostly resident in the more southerly coastal areas but northern and inland populations move south in winter to the southern U.S., coastal areas in Mexico, and Central America. There are also resident breeding populations in northern South America, including the Galapagos, north to southern Mexico (Watts 1995).

Nesting has never been documented in Ontario (Sutherland 2007). In Wisconsin, the Yellow-crowned Night-Heron has been a rare annual visitor to the state since the first record in 1941, but the most recent breeding bird atlas there found them in only three locales in the southern half of the state (Anderson 2006). It is a scarce nesting species in Illinois, mainly from the southern half, but with a concentration of records around the Chicago area as well (Kleen et al. 2004). In Indiana, the Yellow-crowned Night-Heron was found at scattered locales, mainly in the southwestern and south-central portions of the state (Keller and Castrale 1998). Less than 1% of blocks in Ohio, mainly in south central portions of the state, reported nesting evidence of Yellow-crowned Night-Herons (Peterjohn and Rice 1991).

Although there have been more than 100 accepted records since 1960 (MBRC 2009), the status of Yellow-crowned Night-Heron in Michigan has varied from periods of scarcity to periods with breeding individuals in 1971-72, 1978-82, and 1988 (Fisher 1971, Kelley 1971a, 1971b, Greenhouse and Kleiman 1972, Kelley 1972, Pinkowski 1978, Powell 1982, Wolinski 1988, Granlund 1989, Granlund and Powell 1989, Carpenter et al. 1994). Only one record comes from the UP, ironically the first state record from Manistique, Schoolcraft County on 24 April – 8 May 1960 (Kenaga 1960, Dodge 1961, Tordoff 1966). All other state records have been from the southern LP, mostly from Wayne and Monroe Counties, with the northernmost from Tuscola County on 13 June 1981. The two probable nesting records during MBBA I, in 1982 and 1988 (Carpenter 1991), were the last until the present day. The Yellow-crowned Night-Heron is currently considered a casual spring and summer visitor, mainly to the southern LP (Chartier and Ziarno 2004). Only from 2003 to 2006, in Jackson County, was there some evidence of breeding with potentially returning adults to the same locale, and one additional second-year bird there in summer 2004 (Byrne 2005). But this does not meet even the minimum atlas definition for a possible breeding record, so no evidence of breeding was obtained in the MBBA II period.

In spring, the Yellow-crowned Night-Heron generally arrives in Michigan during May with a few earlier arrivals documented in mid-April (MBRC 2009). Nests are among colonies of other species of herons in southern areas, but they are less colonial than other herons (Watts 1995) and nests in Michigan and Ohio have mainly been isolated (Carpenter 1991, Peterjohn and Rice 1991). The height of nests, consisting of a platform of sticks placed in trees or shrubs, varies from about 9 to 18 meters in forested areas (Watts 1995). Egg laying typically begins about 21 days after birds arrive at the nest site and clutch size ranges from two to six eggs. Incubation period is not well known but appears to be about 24-25 days (Weeks 1976). Young are capable of short flights at the age of six weeks and they may receive food from their parents for an additional two weeks (Watts 1995). The Yellow-crowned Night-Heron generally departs Michigan by late summer, though there are a few records from early September (MBRC 2009).

Populations of the Yellow-crowned Night-Heron are declining in Ohio (Peterjohn and Rice 1991), Indiana (Keller and Castrale 1998), and Illinois (Kleen et al. 2004). Because it is an infrequent nesting species and casual migrant in Michigan, it has not been designated with any conservation status. It is listed as threatened in Wisconsin (Anderson 2006) and endangered in Illinois (Kleen et al. 2004). There are no indications that there will be any significant changes in the status of Yellow-crowned Night-Heron in Michigan any time soon.

Allen T. Chartier

Black Rail *(Laterallus jamaicensis)*

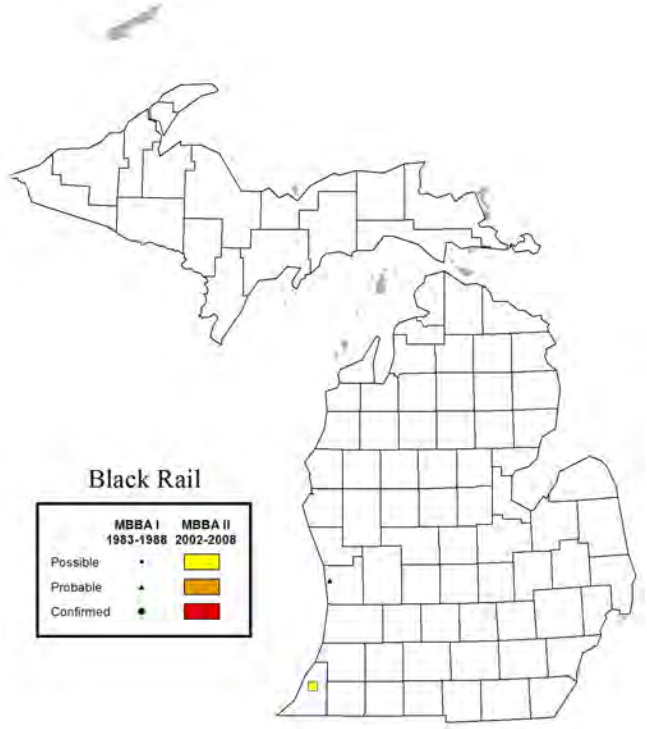


Brian Johnson ©

The cheerful *"kiki-doo"* calls of the secretive Black Rail are most often associated with salt marshes. With only four confirmed records (MBRC 2009), this species is an accidental visitor to Michigan. In addition to salt marsh breeding areas on the Atlantic coast from New York south to Florida, and in the San Francisco Bay area of California, Black Rails do also occur in freshwater habitats though mainly as isolated populations. The most persistent of these breeding areas include the lower Colorado River of Arizona and California, and marshes in southeastern Colorado and central Kansas (Eddleman et al. 1994, Sibley 2000).

Unconfirmed Breeding

In the Upper Midwest, nesting records are very rare with none in the last 40 years or more. Central Illinois has had historical confirmed breeding records, but the most recent was based on two young banded in Adams County in the summer of 1932 (Bohlen 1978). Migrant Black Rail presence has been confirmed in at least 11 of 24 years (1984-2007) in Illinois, especially in the Chicago region although many of these confirmations came from specimens which had flown into the windows downtown (Johnson et al. 1998; Johnson and Stotz 1999; Stotz and Johnson 2000, 2003; Stotz 2001, 2007, 2008). In Indiana, two Black Rails were captured in Tipton County in June 1936, and one of the birds laid an egg while it was captive (Castrale et al. 1998). This is the only evidence of nesting in the state in the last 100 years, and the species is otherwise an accidental migrant (Brock 2006). The only nesting record from Ohio is from Mahoning County in 1966, and there are a total of nine accepted records, six since 1980, all of them in April and June (OOS 2008).



Michigan's first confirmed record was a female collected at Portage Lake, Jackson County on 12 September 1951 (Zimmerman 1959, Payne 1983, Chu 1992). The second record occurred during the MBBA I period; a calling bird present at the Hofma Preserve in Ottawa County from 12 June – 9 July 1988 (Granlund 1989, Chu 1991), thus qualifying as a probable nesting record by the status definitions of the Atlas, though this was almost certainly a single unpaired individual. The third and fourth records occurred during MBBA II. One was heard calling, then captured and banded, in a sedge marsh on 3-4 June 2004 at the Munuscong Wildlife Management Area, Chippewa County (Svingen 2004, Byrne 2005, Chu 2005), which was not thought to be attempting to breed in the area. From 13-24 May 2007 a Black Rail was heard calling from a flooded field in Royalton Township, Berrien County (Byrne 2007, Reinoehl 2007, Wuepper 2008, MBRC 2009) and was also probably a spring migrant, not a breeding bird.

The Black Rail is a candidate for federal listing as a Threatened species. Little is known about current populations or trends mainly due to its secretive nature. Loss of coastal wetlands probably resulted in drastic declines between the 1920s and 1970s (Eddelman et al. 1994). With so few records from Michigan, the Black Rail has no designated conservation status in the state, and it is very unlikely to breed here any time in the near future.

Allen T. Chartier

Whooping Crane *(Grus americana)*

According to Barrows (1912), the Whooping Crane was formerly "…not uncommon throughout the entire Great Lake region…" with the most recent records being a second-hand account of one "taken" at Geddesburg, Washtenaw County on 8 June 1877, and three specimens from Brighton (Livingston Co.) apparently taken in April 1882. There are no confirmed extant specimens or historical breeding records of Whooping Crane from Michigan.

A pair of Whooping Cranes from a "nonmigratory" Florida reintroduction program conducted by the Florida Fish & Wildlife Conservation Commission (FFWCC), the International Crane Foundation, and USFWS, was found on a private sod farm near Sandusky, Sanilac County, in late May 2000 (Archibald 2000). They remained on site until mid-November, but with no evidence of breeding. As one of the birds was radio-tagged, its location and southeastward migration through Ontario and Ohio was tracked back to northwestern Florida, though one bird went missing while crossing Lake Erie (Archibald 2000, Chartier 2000). This record meets the MBBA II breeding criteria for "probable", with two birds, identified as a pair by Archibald (2000), present during the breeding season, but was outside the MBBA II data collection period. Efforts to establish a non-migratory flock in Florida were discontinued in 2007; remaining birds in the Florida population are monitored by FFWCC.

Beginning in spring 2004, individual Whooping Cranes from the Eastern Migratory Population being re-established by the Whooping Crane Eastern Partnership (WDNR 2006), to breed in Wisconsin and winter in Florida and the Southeastern United States, began showing up in Michigan every year. In 2004, at least one "spent over a month in the state visiting several counties in the southwest" (Reinoehl 2004). Two were at Custer, Mason County on 24 October 2004. A single bird was in Barry County on 1 November 2004 (Chartier 2005). On 3 April 2005 two birds were tracked in flight west of Pretty Lake, Kalamazoo County.

On 6 April they were detected in flight east of Lake Michigan. (R. Russell, pers. comm.). A color-banded individual, with Sandhill Cranes, was noted in Eaton County on 27 November 2006 (Dombroski 2007; K. Janousek, pers. comm.). A "four year old female with a history of errant migration [that] was located via [its] transmitter" was at Shiawassee NWR, Saginaw County on 31 March 2007 (Reinoehl 2007). One color-banded individual was present from 17 September – 20 November 2007 at the Michigan Audubon Society's Phyllis Haehnle Sanctuary, Jackson County (Dombroski 2008). Reports continued, via the Internet, during 2008 with reports from May in Kalamazoo (1), Bay (4), and Tuscola (5) counties; from July in Washtenaw County; and from November in Kalamazoo and Ogemaw counties. Four birds of a group of five at the Fish Point State Wildlife Area, Tuscola County, were captured and relocated back to Wisconsin (B. Avers, pers. comm.). No signs of breeding have yet been documented in Michigan.

If or when the Wisconsin population becomes established and stable in the future, the Whooping Crane could become a breeding species in Michigan if birds continue to wander off course from their Wisconsin to Florida migration route.

Allen T. Chartier

Lesser Yellowlegs *(Tringa flavipes)*



Darlene Friedman ©

One of the most common migrant shorebirds in Michigan, the Lesser Yellowlegs, can be found not only on mudflats but also along creeks, in flooded fields, along ditches, and almost anywhere else that is open and wet. Nonbreeding individuals are commonly encountered during summer in Michigan, and even south into northern South America (Tibbitts and Moskoff 1999). Complicating things further, it can sometimes be difficult to distinguish late spring migrants from early fall migrants, especially in early July when both might be possible.

Although there are a few breeding records from the 1800s from Wisconsin and northern Illinois (Cutright et al. 2006, Tibbitts and Moskoff 1999), the Lesser Yellowlegs only rarely is found breeding south of the Hudson Bay Lowlands in Ontario, with breeding primarily north of about 53°N latitude (Harris 2007). The southernmost Ontario breeding records from Pledger Lake and Moose River Crossing are at about 51°N latitude (Harris 2007). This is about 160 miles north of the north shore of Lake Superior (about 49°N).

Typical breeding habitat for Lesser Yellowlegs is open boreal forest and taiga, most often on the edge of subarctic and arctic tundra. Nesting areas are near shallow wetlands, trees or shrubs, and open areas (Tibbitts and Moskoff 1999). In MBBA I, a Lesser Yellowlegs was encountered during the summers of 1985 and 1986 in a boreal bog at Sleeper Lake in Luce County behaving in an agitated manner and calling from the tops of tamarack and spruce trees (Adams 1991). Michigan boreal forest patches and spruce bogs are generally not as open as the typical taiga and muskeg breeding habitat farther north, but the behavior of this bird (or birds) is intriguing nonetheless. No evidence of breeding was obtained in Michigan during the second atlas period.

The Canadian Wildlife Service has estimated the population of Lesser Yellowlegs at about 500,000 (Tibbits and Moskoff 1999). Breeding Bird Surveys cover only a tiny portion of this species' breeding range, so trends are difficult to interpret, and much of the population winters outside the U.S. and is not well censused on Christmas Bird Counts. Loss of wetlands is likely a significant factor affecting the survival of Lesser Yellowlegs during migration and at overwintering sites. Global climate change could affect the breeding habitat as well.

Allen T. Chartier

Unconfirmed Breeding

Great Black-backed Gull
(Larus marinus)



Robert Epstein ©

A gleaming white head and tail set off by a striking black back and wings make the Great Black-backed Gull unmistakable. This largest of Great Lakes gulls also has an attitude to match; its fearlessness has given it the nickname "the king of gulls" by many seasoned ornithologists (Bent 1921). As its scientific name suggests, this gull is often associated with marine systems and these habitats are its stronghold; these birds breed more commonly in marine coastal areas in the northeastern United States and northern Europe. They also breed locally along the Atlantic Coast as far south as North Carolina, and in the fresh water systems of the Great Lakes. This species may winter in many of these habitats, dependent on open water availability, or migrate to the Gulf of Mexico (Good 1998). Overall, since 1900, the number of Black-backed Gulls has increased in North America and this species has also expanded its range (Good 1998).

Distribution

The Great Black-backed Gull has never been a common breeder in Michigan. However, between the 1950s through the 1990s, this magnificent bird was reported often as a winter migrant across the state (Chu 1994, McKearnan et al. 1999). In Ontario, the Great Black-backed Gull has been sighted since the 1930s, and has been recorded year-round throughout Lakes Huron, Erie and Ontario through the present day (Weseloh 2007).

During both Atlas periods, no Great Black-backed Gulls were reported breeding in Michigan. However, birds have been observed in Lakes Michigan, Huron and Erie during the summer months. In MBBA I, Great Black-backed Gulls were observed in the LP in Monroe, Wayne, Macomb, St. Clair, Huron and Bay Counties. In MBBA II, observations were restricted to just a few counties, including Berrien and Alpena County in the LP, and Mackinac County in the UP. Between Atlas periods however, birds were documented breeding in Michigan.

Breeding Biology

In the Great Lakes, the Great Black-backed Gull shows a preference for larger islands, and often nests with other gulls, including Herring and Ring-billed Gulls (Good 1998, McKearnan et al. 1999, Weseloh 2007). Because there are few breeding records, further generalizations regarding reproduction are not available for this species. However, when nesting pairs are found, they show a similar breeding cycle to the gull species they often associate with at nesting colonies.

Abundance and Population Trends

The first breeding records in Michigan were reported in 1990 in Mackinac County on Goose Island (Evers 1991) and on Little Saddlebag Island (Ewins et al. 1992). These are not the first records of nesting Great Black-backed Gulls in the Great Lakes, however. In 1954, this species was documented to breed on the western shore of the Bruce Peninsula in Ontario (Weseloh 2007). By the 1980s, multiple nests were found at a colony site in eastern Lake Ontario, and the numbers of breeding pairs increased in this portion of the lake through the early 2000s (Weseloh 2007).

Meanwhile, in Michigan, the number of breeding Great Black-backed Gulls increased during the 1990s. There were several nesting reports of this species in the Michigan waters of Lake Huron, including one pair on Little Charity Island (Arenac County) in 1991 and four pairs at this location in 1992 (McKearnan et al. 1999). During the 1998 Michigan gull census, a record number of Black-backed Gulls were documented across the Michigan waters of the Great Lakes, with many suspected of breeding. In Lake Michigan, birds were recorded at Ile aux Galets (Emmet County), Gravelly Island (Delta County), and Pismire Island (Charlevoix County). In Lake Huron, pairs were noted on Scarecrow, Gull and Grassy Islands (Alpena County), as well as Goose Island (Mackinac County) (McKearnan et al. 1999). A possible reason for this increase in nesting Great Blacked-backed Gulls in Michigan was the mild, ice-free winter of 1997-1998 in the Upper Great Lakes. These conditions may have allowed more adult birds to overwinter in the region and establish nesting sites early in the breeding season (McKearnan et al. 1999).

The expansion of the breeding Black-backed Gull population continued across much of the Great Lakes through about 2002. However, the population is currently experiencing a decline, which is evident both in Michigan and at the Great Lakes population stronghold in Ontario. The decline in Michigan may indicate that conditions from the 1990s and early 2000s were ideal for the gulls, and that the expansion was a temporary phenomenon. However, in Ontario, where the birds have been established for a longer period of time, the decline could indicate a range contraction. During the current census period, there were no reports of Great Black-backed Gulls in the U.S. Waters of the Great Lakes (Cuthbert and Wires 2008). In Ontario, the number of pairs dropped from almost 50 breeding pairs, to

just a few possible breeders (Weseloh 2007). Type E botulism is a possible explanation for this quick decline. Between 2004 and 2006, more than 200 Great Black-backed Gulls died in eastern Lake Ontario alone from this disease (Weseloh 2007). Lake Michigan has also recently experienced Type E botulism outbreaks.

Conservation Needs

Throughout the last century and extending into the early 2000s, the Great Black-backed Gull expanded its breeding range into the Great Lakes. Currently, it is retracting. There are no management plans for this species; however, agency staff, scientists and local communities are trying to understand the mechanism for its apparent decline: Type E botulism. Research indicates that invasive species may be increasing the occurrence and intensity of this naturally occurring toxin. Zebra and Quagga mussels, in combination with the Round Goby, have been linked to the recent botulism outbreaks (Getchell and Bowser 2006). Type E botulism may not be preventable, but a better understanding of how to recognize the conditions that lead to outbreaks and lessen the impacts is warranted, not only to protect the Great Black-backed Gull, but also other affected waterbirds, shorebirds and waterfowl across the Great Lakes region.

Nancy Seefelt

Monk Parakeet *(Myiopsitta monachus)*



Robert Epstein ©

It has been more than a century since wild parrots graced the skies of the southern United States. Since then importation and release, or escape, of many species from around the world has brought parrots back to some areas of the country. At least 76 species of parrots have been found flying free in Florida (Pranty 2005), but few are considered established breeding species. The tendency for extreme longevity in this family tends to complicate judgements of whether a species has an established, self-sustaining breeding population. The Monk Parakeet is native to the savannas in southern South America, also occurring near human habitations (Collar 1997, Forshaw 1978, Juniper and Parr 1998). It is the only communally nesting species of parrot (Collar 1997, Forshaw 1978, Juniper and Parr 1998), and their unique large stick nests are very conspicuous and easy to find. They are widely kept as cage birds and have become established as an exotic breeding species in many areas outside their natural range. Raffaele et al. (1998) provided a summary of the status of the Monk Parakeet in the Caribbean. It is expanding its range on Puerto Rico while the feral population on Grand Cayman remains stable. Guadeloupe has only one nest site remaining and there is a single record from St. Croix, Virgin Islands. The population in the Bahamas is apparently extirpated.

The Monk Parakeet is more cold-tolerant than many other parrots commonly kept as pets due to its temperate distribution in South America. Other species are also found flying free in Michigan from time to time, including Budgerigar, Cockatiel, Lovebirds, African Gray Parrot, and even some large macaws, none of which can survive our winters. The Monk Parakeet has established breeding colonies in urban parks and suburbs primarily in subtropical locales within the United States, especially Florida (Pranty 2005) and Texas (Rappole and Blacklock 1994).

Moskoff (2003) suggests that one factor correlating with the distribution of the Monk Parakeet in temperate regions of the U.S. is that established colonies tend to be in areas where quarantine stations formerly operated. Breeding in the northeastern U.S. is localized, with slightly expanding populations limited mainly to New York City (Andrle and Carroll 1988, McGowan and Corwin 2008) and Chicago, Illinois (Hyman and Pruett-Jones 1995, Kleen et al. 2004). Of 3,015 individuals counted on Christmas Bird Counts in 2001-2002, most were in Florida with 908 in Connecticut and lesser numbers in Rhode Island, Illinois, New Jersey, New York, Oregon, and Texas (Moskoff 2003a, Pranty and Garrett 2003). The Chicago population was counted at slightly more than 100 birds on the 1999-2000 Christmas Bird Count (Moskoff 2003b).

There were a few records of birds present in Indiana during their Atlas period (1985-1990) but no nests were found (Castrale et al. 1998). Successful breeding was in the form of a single nest in Hammond, Indiana in 2005 (Brock 2006). The few Michigan nesting records from 1970 to 1987 (Payne 1983, Adams 1991) did not result in the species becoming established in the state. The Monk Parakeet was included in MBBA I on the basis of a single confirmed nest in Oakland County in the summer of 1983, and sight records from St. Clair County in August 1985 and Oakland County in November 1987 (Adams 1991). There was only a single

sight record of Monk Parakeet during the MBBA II atlas period: a bird at a feeder in Hamtramck, Wayne County. Kathy Smith reported that this bird was "present for weeks" prior to 25 November 2006 (Dombroski 2007). There were no reports during the inter-Atlas period (1989-2000). It is likely that escaped/released individuals have been present during this time, but no nests, which are quite noticeable, were reported.

Initial fears that this species may become an agricultural pest in the U.S. have not been realized as it has not become widely established beyond urban centers mainly in Florida, Texas, New York, and Illinois. Control methods in South America, as well as in the U.S., have been largely ineffective (Spreyer and Brucher 1998). Within the U.S., extermination or recapture efforts have sometimes led to public opposition (Moskoff 2003b).

Allen T. Chartier

Barn Owl *(Tyto alba)*

Status: *State Endangered; Casual (MBRC)*



Caleb Putnam ©

The monkey-faced Barn Owl has the dubious distinction of being one of Michigan's few presumed extirpated breeding bird species. Formerly an uncommon to rare breeder in the southern LP, the species was last documented nesting in the early 1980s and has since been only infrequently encountered. This species is one of the most widely distributed of all land birds, being found on six continents and comprising approximately 28 to 35 subspecies (Marti et al. 2005). In the Americas, it is found from southern British Columbia east to New England and south to Tierra del Fuego. Michigan lies at the northern extreme of its distribution, where at least some individuals are migratory but occasional overwintering is observed.

Prior to European settlement, the Barn Owl was likely very rare in Michigan due to the relatively small amount of forest-free habitat (Lerg 1984). Following the intense logging of the late 19th and early 20th centuries, the species experienced a drastic increase, peaking in the 1940s and then declining precipitously thereafter (Lerg 1984). Remnant nesting pairs lingered in Monroe County until 1982 (Lerg 1984) or 1983 (Lerg 1991).

Since then, there have been but ten accepted reports for the state (MBRC 2009, Putnam 2010, Putnam in prep.); all were single birds. Three of these reports occurred during MBBA II. Two one-day wonders at Tawas Point State Park, Iosco County, were clearly migrants and may have been the same individual. The third, present for two days in July 2002 in Washtenaw County, yielded possible breeding evidence. This compares to one breeding confirmation and five non-breeding season observations during MBBA I. After the MBBA II period, a single Barn Owl was observed in and near a barn on 7 September 2009 in Penn Township, Cass County and several dropped feathers were retrieved (MBRC 2010, Putnam 2010). Still, it seems likely that the period between the two atlases witnessed the conclusion of this species' regular breeding in the state.

Historically, breeding activity occurred primarily from March to June, with occasional records into October during times of high microtine abundance. The species shows a marked preference for human-made nest structures, in which a clutch of 3-11 eggs is laid. Eggs are incubated for about 30-34 days and the young are brooded an additional 52-56 days (Ehrlich et al. 1988).

The Barn Owl is functionally, if not actually, extinct in Michigan. Widespread declines since the mid-20th century are reported from across the U.S. (Peterjohn and Rice 1991, Marti et al. 2005), though traditional survey data (such as those given by the Breeding Bird Survey) are lacking or non-significant owing to poor detection of nocturnal, secretive species such as the Barn Owl.

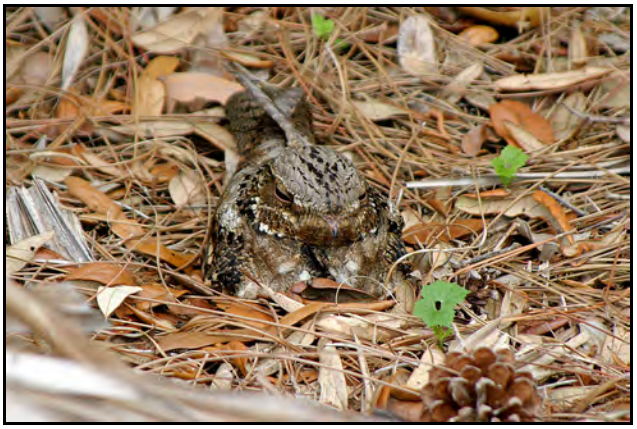
Many factors are believed to limit the Barn Owl's continued existence in Michigan. Habitat loss due to conversion of permanent grasslands to agricultural row crops and urban development reduces microtine abundance and thus removes the owl (Lerg 1984). The species is subject to poor survivorship during harsh winters due to both cold temperatures and starvation (Lerg 1984). Mortality due to Great Horned Owl predation and automobile collisions serve as additional threats and disturbance of known roosts by birding enthusiasts can be a problem. Breeding success may also be limited by a lack of suitable nesting and roosting cavities in many areas.

The first priority of future work is to locate any remaining individuals in the state. Lerg (1984) solicited observations through a media campaign during 1977-1979 but no new individuals were located. Unfortunately, systematic surveying for this species may be similarly ineffective, due to the large amount of potential habitat and secretive nature

of the bird. The erection of nest boxes in suitable habitats would be a good start to assuring that any remaining individuals have sufficient access to nest sites and roosts, and continued education of farmers and swift follow-up of all reports should be undertaken. Ultimately, however, the lack of large tracts of permanent grassland is likely the primary culprit in this species' disappearance from the state and recovery efforts are likely to fail without correcting this problem first.

Caleb G. Putnam

Chuck-will's-widow
(Antrostomus carolinesis)
Status: *Casual (MBRC)*

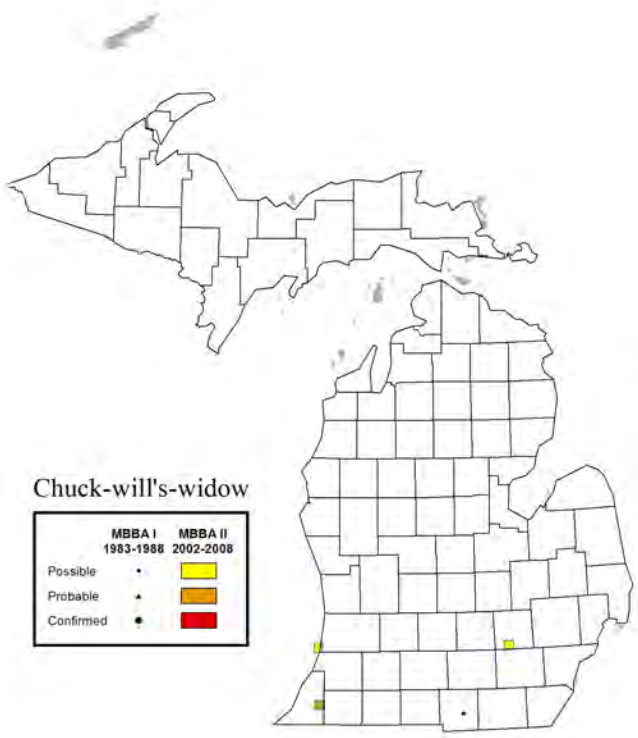


Maryle Barbe ©

The Chuck-will's-widow is essentially a southern species that is casual in Michigan, with more reports than confirmed records, which is unfortunate since audio recordings can be rather easy to obtain. The loud *"chuck-WIDA-WIDOW"* calls are easily heard at dusk and dawn when the birds are in the area during spring and summer, though as with other entirely nocturnal species they are not often seen. Cryptically colored, this species can be nearly impossible to see in the daytime as it blends in with the leaf litter.

The Chuck-will's-widow occurs primarily in the southeastern U.S., north to southern Ohio, southern Indiana, and southern Illinois, and has been expanding its range north and west (Straight and Cooper 2000). In Ohio, breeding is confined primarily to the three southernmost counties of Adams, Scioto, and Lawrence, in the unglaciated portion of the state. The center of abundance is in the Ohio Brush Creek Valley, Adams County, where 60+ singing males have been recorded; they are rare and local away from this area. Possible and probable breeding records north to Vinton and Montgomery counties have been recorded (Peterjohn and Rice 1991). The Indiana atlas documented breeding of Chuck-will's-widows from 34 blocks generally across the southernmost three tiers of counties, with the northernmost from southwestern Bartholomew County. Isolated breeding records from three additional blocks near Lake Michigan were also recorded but these locales have not been occupied since 1999 (Castrale et al. 1998, Brock 2006). The breeding distribution in Illinois is similar with a low density of scattered records from 32 blocks in the southernmost counties, north to Calhoun and Coles counties, and isolated records from the Chicago area in Cook County (Kleen et al. 2004). Breeding has been confirmed in Ontario only once, from Pt. Pelee National Park in 1977 where a considerable number of spring overshoot migrants (70+ through 2007) have also been recorded. Additional possible records have also been noted primarily from Rondeau Provincial Park and the Long Point area, as well as scattered records throughout southern Ontario (Cadman et al 2007).

The first confirmed Michigan record was of an individual in Richland Township, Kalamazoo County from 8 July to 18 August 1976 (Pinkowski 1976, Tessen 1976, Chu 1992). Inclusion of this species in MBBA I was presumably based on this pre-atlas first state record, but also apparently based on the reported presence at the same locale for the next six years (Adams 1991). Unfortunately, no documented evidence in the form of photos, audio recordings, or written documentation was submitted to the Michigan Bird Records Committee (MBRC) to allow the 1977-1982 reports to be included in their database of accepted records for the state.



Only nine confirmed records have been recognized by the MBRC since 1976, with the next being an individual found injured, which eventually died, at Whitefish Point on 18 October 2000, apparently a misoriented fall migrant. During the MBBA II period, an individual was documented on 4 May 2006 in Livingston County and seems likely to have

been a spring overshoot migrant. And each year between 2005 and 2010, a singing Chuck-will's-widow was documented (mainly with audio recordings, but also written documentation) from a single site where a local resident, Mr. Marvin Budd, discovered it near Little Indian Lake south of Berrien Springs, Berrien County. Arrival has typically been in early May, and it has been heard calling into mid-July most years. The presence of a singing bird through the summer period results in the breeding status of probable for this block in Berrien County. And one was banded on 16 May 2010 at Whitefish Point, another likely spring overshoot migrant (Reinoehl 2010). The preceding comprises all MBRC accepted records for the state to date (MBRC 2010).

Male Chuck-will's-widows arrive on their breeding grounds a few days ahead of females in late April in Iowa, Illinois, and New Jersey and soon begin singing loudly and persistently to defend territories and attract mates (Straight and Cooper 2000). Occupied habitat includes successional fields interspersed with sapling red cedars as well as second growth woodlands in Ohio (Peterjohn and Rice 1991); hilly, heavily forested areas adjacent to larger fields in southern Indiana (Castrale et al. 1998); and drier more open woodlands, including savannas, barrens-like areas, and forest edges in Illinois (Kleen et al. 2004). The Chuck-will's-widow, when present in Ontario, is almost entirely confined to the Carolinian region (Cadman et al. 2007). Straight and Cooper (2000) indicate that nesting begins within 7-10 days of the arrival of females, and the nest consists of nothing more than a scrape on bare ground or in leaf litter. Normally two eggs are laid and incubation lasts approximately 20 days, with young capable of flight at the age of 17 days and independent foraging at about 30 days. Due to the secretive nature of this species, no studies of breeding success have been conducted. Calling tends to cease in late July, making departure dates difficult to determine, but are estimated to be from mid-August in the north to early October in the south (Straight and Cooper 2000).

The Chuck-will's-widow tends to be poorly censused by the BBS, so population estimates and trends are difficult to ascertain. Partners in Flight estimates the North American population as 15 million. Increasing efforts to conduct nocturnal bird surveys similar to the BBS may shed some light on populations and trends in the future. In Michigan, the Chuck-will's-widow is a casual spring migrant and summer resident with gaps of many years with no records at all. As the species continues to expand its range northward and westward (Straight and Cooper 2000), Michigan records may increase, although given the pace of expansion noted in Ohio, Indiana, and Illinois (Peterjohn and Rice 1991, Castrale et al. 1998, Kleen et al. 2004) this could take many decades.

Partners in Flight lists the Chuck-will's-widow as a "moderate priority species" for conservation concern. Degradation of breeding and wintering habitat may be the most significant factors affecting this species, but little research or hard data exists to support this.

Allen T. Chartier

American Three-toed Woodpecker
(Picoides dorsalis)

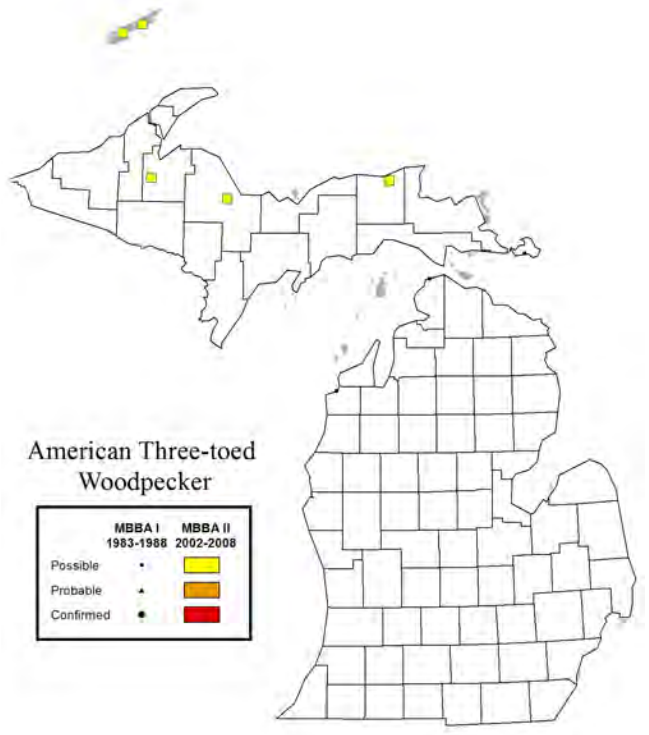
Like its more common relative the Black-backed Woodpecker, the American Three-toed Woodpecker is a resident of coniferous forests and is generally found in the boreal forest, but also in some southerly locations of the Rocky Mountains. Based on DNA evidence and differences in vocalizations, the American Ornithologists' Union (AOU) restored the separation of North American and Old World *Picoides tridactylus* subspecies into two distinct species. North American subspecies became recognized as *Picoides dorsalis* in 2003, while *Picoides tridactylus* now includes only European and Asian subspecies, as had been the case between 1914 and 1931 (AOU 1931, Banks et al. 2003, Ridgway 1914). Its heartland in North America is the boreal forest across Canada, but it extends down the Rockies as far south as Arizona and New Mexico. In the east, its range reaches south into the northern fringes of Minnesota, Michigan, New York, Vermont and Maine (Leonard 2001).

It specializes in foraging on beetles and larvae found on dead or dying conifers, especially spruce. It is well known for scaling the bark of trunks and branches of conifers to get at the insect prey. Unlike the Black-backed Woodpecker that often digs fairly deep into the trunk for wood boring insects, the Three-toed usually feeds on bark beetles and their larvae which are found just underneath the bark (Leonard 2001).

This species was first reported in Michigan in the Keweenaw Peninsula (Kneeland 1857). While there is one confirmed breeding record from Baraga County in 1953 (Payne 1983), sightings of the Three-toed are very rare and usually in the UP. The Michigan Bird Records Committee (MBRC) website lists only 34 accepted sightings of American Three-toed Woodpecker, with one record from Emmet County in 1986 being the only one for the LP (MBRC 2010). MBBA I reported a male and female American Three-toed sighting in Benzie County during July of 1988. Since that time, the MBRC has reviewed and rejected the sighting (Putnam 2008).

During the MBBA II period, three breeding season sightings were reported and accepted by the MBRC: a single male found in Baraga County on 14 July 2004; a single female near Negaunee, Marquette County on 30 June 2006; and a single individual on Isle Royale on 16 May 2008. Two additional records were accepted after the atlas period: a single female on Isle Royale on 23 May 2009; and a single

individual in Marquette County on 29 June 2009. (MBRC 2010, Putnam 2010). Michigan's results for American Three-toed Woodpecker fit neatly between the results reported by the recent atlas efforts in Wisconsin and Ontario. To the north, Ontario reported confirmed breeding for American Three-toed just north of Lake Superior (Cadman et al. 2007), while to our south and west, Wisconsin did not record the bird at all during breeding months during their atlas period (Cutright et al. 2006). Between atlas periods, breeding season records of American Three-toed Woodpecker accepted by the MBRC included one in August 1994 in Chippewa County, one in May 2000 in Keweenaw County, and one in May 2000 in Houghton County (Reinoehl 2000, MBRC 2010)



Like the Black-backed Woodpecker, the American Three-toed Woodpecker clearly makes occasional fall and winter invasions south into Michigan. Up to three were seen in November and December of 2006 in a small burn area at the tip of the Keweenaw Peninsula (Dombroski 2007, Murphy 2007, Putnam 2008). Modest efforts were made to relocate those birds in the summer of 2007, but without success. UP sightings during the breeding season between the atlas periods, several fall and winter sightings during the second atlas period, and the vast acreage of suitable nesting habitat for this bird in the UP make it seem likely that it may be a very rare breeder in upper Michigan, though nothing more than possible evidence was found.

Joseph A. Youngman

Western Kingbird *(Tyrannus verticalis)*



Darlene Friedman ©

The Western Kingbird, a confirmed breeder in Michigan, was not detected as even a possible breeder in MBBA II. The primary status of this species in Michigan is as a wanderer during migration. Breeding occurs from southern Canada south to northern Mexico; the eastern edge of the normal breeding range runs from western Minnesota south to eastern Texas. The Western Kingbird winters primarily in Central America; the small population wintering along the Gulf Coast and in Florida is a possible explanation for the individuals appearing in Michigan during migration periods (Gamble and Bergin 1996). Greatest population densities, according to Breeding Bird Survey data are found in the western edge of the Great Plains and in the central valley of California. The preferred habitat of the species is dry grasslands with scattered trees.

Even in states immediately to our west, the Western Kingbird is very scarce. During the Indiana Breeding Bird Atlas, a successful nest was found in 1993 (Castrale et al. 1998). Wisconsin's Breeding Bird Atlas had only five records for this species, and a single nest was discovered (Harriman 2006). Extreme southwestern Ontario is rather close to the normal breeding range of this species in southern Manitoba. One or two pairs of Western Kingbird nest in this region annually (Carpentier 2007).

In Michigan, MBBA I had three records, two in the central LP and one in the western UP. Two of these records were classified as possible breeding and one was a confirmed hybrid nesting of Western Kingbird with an Eastern Kingbird. The location of this nesting was southern Isabella County. This Western Kingbird, determined to be a female, was discovered in 1988 and returned to the same location in 1989 and 1990. The only other Michigan nestings were in Barry County in 1937 and Kalamazoo County in the early 1960s (McPeek 1994).

The hybrid breeding pair in Isabella County was discovered on 8 July and the young were forced to leave the nest prematurely on 14 July. This is consistent with egg dates in early June. This species often nests on manmade structures

(Gamble and Bergin 1996), as in the Isabella County nesting.

In Breeding Bird Survey data, the Western Kingbird population continent-wide has shown a significant increase of 0.6% per year between 1966 and 2007 (Sauer et al. 2008). However the small population closest to Michigan, in eastern Iowa and adjoining Wisconsin and Minnesota, shows a decline in BBS trend maps. This is perhaps not too surprising since this population had spread from the west only a century before (Roberts 1932).

In Michigan seasonal survey data, the number of individuals seen in the spring has averaged just over one per year for the last two decades, with no trend suggesting any change in this rate. The status of this species in Michigan is thus likely to remain as a scarce vagrant with very sporadic recent nesting attempts perhaps coming to an end. This species, increasing overall, is not on any watch list.

Jack Reinoehl

Loggerhead Shrike *(Lanius ludovicianus)*

Status: *State Endangered, Casual (MBRC)*



Robert Epstein ©

The sight of Michigan's only breeding species of raptorial songbird is sadly now an extremely rare occurrence. A bird of open areas, the Loggerhead Shrike likely moved northward into Michigan in the 1800s following extensive deforestation (Yosef 1996). Their prey consists largely of insects, but can also include small mammals and birds, and even reptiles and amphibians, which they frequently impale on thorns throughout their territory, earning them a colloquial name of "butcher bird."

Northeastern populations, usually classified as a separate subspecies (*L.l. migrans*), are entirely migratory. Sedentary populations are found across the southern U.S. north to Nevada, Arkansas, Tennessee, and Virginia. Migrant populations breed north in the Great Plains as far as central Alberta and southern Saskatchewan, and in the east sparsely into the Upper Midwest. The last nesting record in New England was in Vermont in 1978 (Yosef 1996).

Distribution

In Wisconsin, the breeding bird atlas (1995-2000) found Loggerhead Shrikes breeding at widely scattered locales throughout the state, in only 1.59% of the total number of quads surveyed (Bacon 2006). Indiana's atlas (1985-1990) documented a breeding concentration in the southernmost counties, consisting of only 5% of surveyed blocks (Whitehead 1998). The species was more common in Illinois (1986-1991), being found in 20.8% of blocks surveyed from throughout the state, but most commonly from the southern half (Kleen et al. 2004). In Ohio (1982-1987), only 1.4% of blocks surveyed held breeding Loggerhead Shrikes, mainly in the southwestern portion of the state (Peterjohn and Rice 1991). Ontario's Loggerhead Shrikes are concentrated in two localized areas of limestone, the Napanee and Carden Plains (Chabot 2007).

Barrows (1912) reported that the Loggerhead Shrike was somewhat scarce but probably occurring regularly in every Michigan county, particularly in open country where clumps of hawthorn (*Crataegus* spp.) were numerous. The many species of hawthorn found in Michigan occur throughout the state, but few species are widespread (Voss 1985). Wood (1951) considered the Loggerhead Shrike to be a summer resident in small numbers in the LP, rare in the north. By 1959, it was being described as uncommon in most of the LP and rare and local in the UP (Zimmerman and Van Tyne 1959). Sometime in the following 20 years, steep declines apparently occurred and Payne (1983) indicated that the Loggerhead Shrike was nearly extinct as a breeding species in Michigan.

During MBBA I, the few remaining Loggerhead Shrikes – only nine confirmed breeding pairs – were found mainly in counties adjacent to Lake Huron (Cheboygan, Alpena, Alcona, and Huron counties) and Lake Michigan from Manistee to Allegan counties, and mostly within 16 km of the lakeshore (Little 1991). The last consistently occupied site in Allegan County held two pairs from 1990-1993 (Evers 1991, Granlund 1992, Whaley 1993, Granlund and Whaley 1994) and a single pair in 1995 and 1996 (Reinoehl 1995, Reinoehl 1996, Kielb 1996, Kielb 1997). A pair was reported there in spring 1997 (Reinoehl 1997) but not that summer (Byrne 1998). By MBBA II, none of the locales occupied in MBBA I held nesting shrikes, though an unconfirmed report of a nest in Alpena County was received during the MBBA II period.

Breeding Biology

McPeek (1994) provides one of the few recent descriptions of a Loggerhead Shrike nest and its breeding habitat from Michigan. An Allegan County nest in 1987 was among pasture and mowed grass, surrounded by row crops and nearby orchards. The nest was five feet up in a cedar within a fencerow of spruce and cedar trees. Elsewhere in its range,

Unconfirmed Breeding

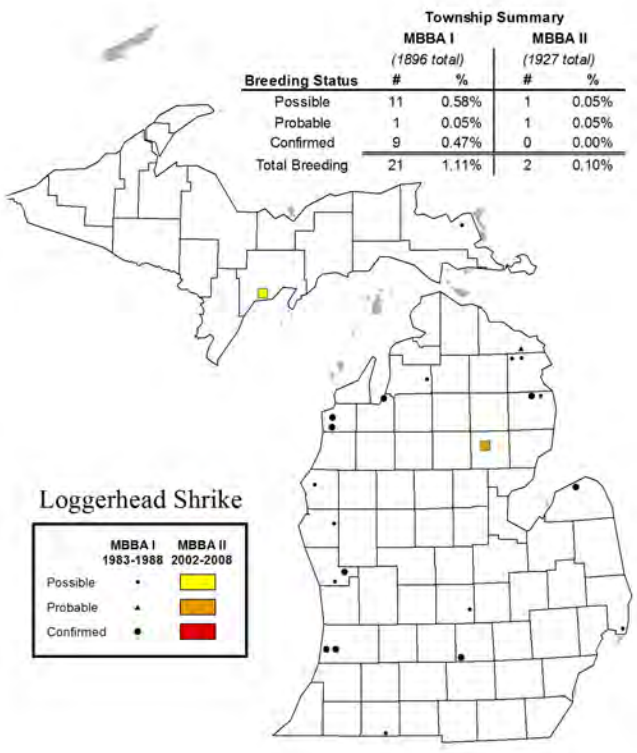
Yosef (1996) reports that the Loggerhead Shrike breeds in a variety of open shrublands, grasslands, and agricultural areas. Nests are usually well hidden below the crown of a dense, often thorny tree or shrub, ranging from 1-7 feet (0.8 – 2.3 m) above the ground. The number of eggs laid increases to the north and west, with an average of about five eggs in New York State. Incubation is a task left only to the female, while being fed by the male, and eggs hatch in about 16 days. Young fledge at about 16-20 days of age. Nest failures will often prompt renesting attempts, but in northern regions (i.e., Minnesota), second broods are attempted infrequently; only about 10% of the time (Brooks and Temple 1990).

Abundance and Population Trends

The Loggerhead Shrike is listed as endangered in Wisconsin, Indiana, Michigan, Ohio, and Ontario, and threatened in Illinois (Yosef 1996, Bacon 2006, Whitehead 1998, Peterjohn and Rice 1991, Chabot 2007). Midwest populations have shown statistically significant declines, with an annual rate of -8.4% per year from 1966-2000 (Sauer et al. 2008). In USFWS Region 3, from 1983-2007 the Loggerhead Shrike showed a statistically significant annual decline of –6.36% (Sauer et al. 2008). In 1991, the Ohio breeding population was estimated to be about 10-20 pairs, after declines from the 1930s to 1970; local breeding was noted in 77 counties in 1935 (Peterjohn and Rice 1991).

In MBBA I, twelve confirmed breeding records of nine remaining pairs were reported from 1983-1988 (Little 1991), which was a significant reduction after rapid declines in the 1960s and 1970s (Little 1987). The last stronghold of the species in the state, the Allegan State Game Area, Allegan County, was last occupied in 1996. Isolated breeding pairs present only in single seasons included a pair with two young in summer 1991 in Manistee County (Granlund 1992) and a pair that apparently raised two young in summer 1994 in Ogemaw County (Kielb 1995, Powell 1995). A pair that produced at least one young in Kalamazoo County in summer 2001 is apparently the most recent confirmed breeding record of Loggerhead Shrike in Michigan (Reinoehl 2001, Byrne 2002). A "pair" was noted as present on 17 May 2002, but not thereafter, in Ogemaw County (Reinoehl 2002). Single individuals were reported in summer from 5 June 1992 near Posen, Presque Isle County (Whaley 1993), 24 June – 13 July 1992 in northern Huron County (Whaley 1993), 11 July 1999 at Ewen, Ontonagon County (Byrne 2000), and 3-4 June 2001 in Monroe County (Byrne 2002).

By 2005, the Loggerhead Shrike had become less than annual in occurrence in Michigan, and was added to the state's Review List by the Michigan Bird Records Committee (Chu 2006); its status was changed from "regular" to "casual". Between 2005 and 2008, only two records were accepted by the MBRC, one on 24 September 2007 in Chippewa County (Dombroski 2008), and a single singing bird from 25 April to 3 May 2008 in Delta County (Reinoehl 2008).



No confirmed breeding records were verified during MBBA II, and the species may be on the verge of extirpation in Michigan, apparently following the pattern of other open country species, like the Greater Prairie-Chicken and the Barn Owl.

Conservation Needs

Barrows (1912) reported that the Loggerhead Shrike was often shot. While now a protected species, current threats may include loss of grassland and hedgerow habitat, agricultural pesticides in their feeding areas, and competition and other unknown threats on the wintering grounds in the southern U.S. (Yosef 1996). In the late 1980s, a Scotch pine along a road in Benzie County containing an active shrike nest was cut down by a local road commission when the road was widened (J. Little, pers. comm.). The Michigan Natural Features Inventory lists the Loggerhead Shrike as critically imperiled because of its extreme rarity (Lee 2001, MNFI 2007).

In Ontario, a National Recovery Plan for the Loggerhead Shrike was approved in 1993 that included annual nest monitoring efforts in core breeding areas. The species' association with limestone plains on the southern edge of the Precambrian Shield (Yosef 1996, Chabot 2007) has provided an opportunity to identify and protect consistently occupied breeding habitat there. The number of pairs declined from 55 in 1992 to only 18 in 1997. A captive breeding colony was established in 1997 and the population

rebounded to 40 pairs by 1999, but had declined again to 18 pairs by 2006 (Chabot 2007).

Loggerhead Shrikes are no longer found breeding consistently anywhere in Michigan, making designation of critical habitat or setting aside lands for conservation extremely challenging. Comprehensive conservation strategies throughout the Upper Midwest to preserve and expand grasslands, and other open habitats, may provide the chance for Loggerhead Shrikes to recolonize Michigan as a breeding species. Little (1991) recommended immediate protection and monitoring for any nests discovered, and this suggestion is even more important today.

Allen T. Chartier

Bell's Vireo *(Viero bellii)*

Status: *Casual (MBRC)*



Robert Epstein ©

The nasal "*cheedle-cheedle-chee? cheedle-cheedle-chew!*" song of the Bell's Vireo is not often heard in Michigan, and can be confused with the Warbling Vireo and even the House Finch. Birders with an appreciation for subtlety will find beauty in the Bell's Vireo plumage, but others will find the term "nondescript" an apt description of its plumage. Bell's Vireos are grayer above and whiter below in the west, becoming greener above and yellower below farther east (Kus et al. 2010). Their early successional old field habitat in the east is not often visited by birders.

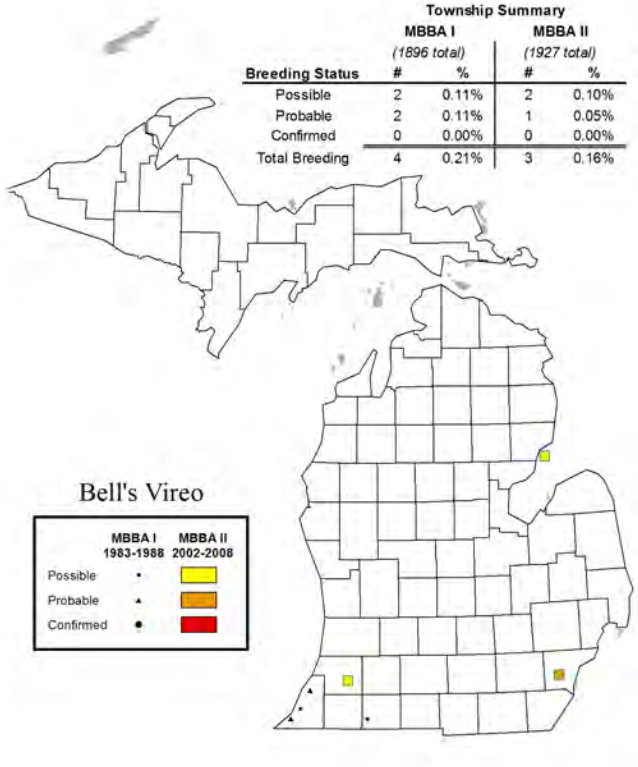
The Bell's Vireo breeds from coastal southern California, where there is a distinctive and endangered subspecies, and the southwestern U.S. to the central portions of the continent north to portions of the northern Great Plains and Upper Midwest. It winters on the Pacific coast of Mexico south to northwestern Nicaragua (Kus et al. 2010).

Illinois and western Indiana mark the northeastern extreme of the primary breeding range of the Bell's Vireo. In Wisconsin, breeding was noted primarily in the southern and western portions of the state, in 3.3% (37) of all blocks surveyed, mostly in shrub upland hardwood habitats (Cutright et al. 2006). The species was found breeding essentially throughout Illinois being detected in 14.1% (181) of all blocks surveyed (Kleen et al. 2004). Reclaimed strip mines in southwestern Indiana seem to be the center of abundance in that state, but Bell's Vireos were found in most western counties north to Lake Michigan, with scattered records in the state's interior (Keller 1998). The Ohio atlas (Peterjohn and Rice 1991) found breeding Bell's Vireos at only seven locations in the central and northwestern portions of the state.

The Bell's Vireo is a casual spring migrant and less frequently a summer visitor and very rare breeder in Michigan (Chartier and Ziarno 2004, MBRC 2009). The first record for the state was an 1885 specimen, though the collecting locale has been disputed (Van Tyne 1925, Swales and Wood 1925, Wood 1951). The species was not detected again until a specimen, originally misidentified as a Warbling Vireo, was collected in 1920 in Berrien County (Payne 1983, Wuepper 2001) and another in 1966 in Berrien County (Wuepper 2001), with a total of 42 accepted records through 2008 (MBRC 2009). Excepting one UP record in 1973 (Binford 2006) and one northern LP record from Tawas Point, Iosco County on 1 June 2002 (Murphy 2003, Byrne 2004), all reports are from the southern LP (MBRC 2009).

Township Summary

Breeding Status	MBBA I (1896 total) #	MBBA I (1896 total) %	MBBA II (1927 total) #	MBBA II (1927 total) %
Possible	2	0.11%	2	0.10%
Probable	2	0.11%	1	0.05%
Confirmed	0	0.00%	0	0.00%
Total Breeding	4	0.21%	3	0.16%



Unconfirmed Breeding

The Bell's Vireo has never been confirmed breeding in the state, but evidence of possible and probable breeding was obtained in both MBBA I and MBBA II, as well as summer observations between the two atlases. During MBBA I the five blocks where Bell's Vireos were detected (3 possible, 2 probable) were in two counties in the southwestern corner of the LP (Berrien and St. Joseph Counties). Following a summer record in 1994 in Berrien County there were no more sightings until an individual was reported for two days on 18-19 July 2000, also in Berrien County (MBRC 2009). In MBBA II, the three reports were more widely scattered. These included the previously noted individual in Iosco County that could easily have been a late spring migrant, and one in Paw Paw Township, Van Buren County on 3 August 2004 that could also have been a fall migrant (Chartier 2005, Chu 2006), both just single day observations. Only the report from Romulus, Wayne County provided any substantial breeding evidence, with a singing individual present from 27 June to 3 July 2005 (Byrne 2006, Putnam 2007) qualifying as a probable breeding record.

The Bell's Vireo prefers to nest in dense, low, shrubby vegetation that is typical of early successional stages of brush fields and riparian areas, which can often be found in old abandoned fields as well as abandoned strip mines (Kus et al. 2010, Keller 1998). Males defend individual territories and are monogamous in a given breeding season. Nests are built by both sexes in low, dense shrubbery and are the typical semi-pendulous form that is typical of all vireos. Normally three to four eggs are laid during May in the eastern U.S., and incubation lasts about 14 days. The young fledge at about 12 days of age, and are fed by their parents for about 20 days after fledging (Kus et al. 2010).

In the central U.S., Breeding Bird Survey data have shown statistically significant declines of about 3.5% per year from 1966 to 2007, though no significant change was detected in Illinois (Sauer et al. 2008, Kus et al. 2010). This suggests that fewer records from Michigan are likely in the future, with even fewer breeding attempts.

Bell's Vireos are parasitized by Brown-headed Cowbirds but have coevolved with them so generally aggressively attack female cowbirds near their nests (Kus et al. 2010). Their use of early successional habitats forces them to relocate breeding areas relatively frequently, thus habitat destruction combined with cowbird parasitism may be a factor in the species' decline (Kus et al. 2010). Threats on the wintering grounds are relatively unknown.

Allen T. Chartier

Bewick's Wren *(Thryomanes bewickii)*

Status: *Accidental (MBRC)*



Dave Herr, USDA ©

The Bewick's Wren, similar in plumage to the Carolina Wren and similar in demeanor to the House Wren, is now thought of mainly as a western species. The eastern population, once widespread, has now declined to the point of near extirpation. During the late 1800s and early 1900s the Bewick's Wren expanded its range northward, taking advantage of the more open habitats it prefers created by the extensive clearing of forests during the 1800s. But even at its peak abundance from 1900-1950 it was never common north of central Illinois, Indiana and Ohio (Castrale et al. 1998, Kleen et al. 2004, Peterjohn and Rice 1991, Peterjohn and Zimmerman 1989). Then, from around the 1920s to the 1970s, for reasons not clearly understood, precipitous population declines occurred. On Breeding Bird Surveys, Bewick's Wrens showed a 14.4% decline per year in the eastern population from 1966-1994, and it is currently considered endangered, threatened, or of Special Concern in every eastern state where it remains (Kennedy and White 1997). Breeding populations in eastern states range from a handful of pairs or less in Ohio and Indiana (Peterjohn and Rice 1991, Castrale et al. 1998) to perhaps a few dozen breeding pairs each in Kentucky and Tennessee (Kennedy and White 1997, Palmer-Ball 1996). The last nesting in Ohio was in 1995 (Harlan et al. 2008) and in Indiana in 1976 (Castrale et al. 1998). The last known nesting area in Illinois is at Siloam Springs State Park, Brown County, where nesting was noted in 2007 after being absent there for three years (Kleen et al. 2004, Bailey 2008). The Bewick's Wren is also declining in western states (Kennedy and White 1997).

Michigan records of the Bewick's Wren are confined mainly to the southern Lower Peninsula, and only two historic breeding records are described in the literature (Payne 1983, Wood 1951). The first nest was found in Grand Rapids in May 1894 (Barrows 1912). The nest was abandoned soon after it was finished, but was collected by

the observer, Leon J. Cole, and deposited at the University of Michigan Museum of Zoology (UMMZ, Specimen #40549). The second nest, also collected (UMMZ, Specimen #239195), was in Ann Arbor in 1922 and the pair successfully raised young which fledged in May (Wood 1951). In Ohio, Bewick's Wrens are known to fledge young in mid-June (Peterjohn and Zimmerman 1989). Interestingly, one specimen collected in Ann Arbor on 25 April 1928 (UMMZ, Specimen #59450) was showing enlarged testes, which is very suggestive of a breeding bird.

There is no other evidence of Bewick's Wren breeding in Michigan, past or present. The Bewick's Wren is now a vagrant to Michigan, mainly in spring, with only three confirmed records in the last 50 years (MBRC 2009) though several additional undocumented sight records exist. There were no breeding records during MBBA II, and only a single acceptable sight record during that period, one from Manistee County on 10 May 2008 (MBRC 2009), the northernmost record for the state.

Population declines of the eastern Bewick's Wren have been correlated especially with the expansion of the House Wren in the early 1900s, as well as competition with other species including House Sparrow, European Starling, Carolina Wren, and Song Sparrow (Kennedy and White 1997).

Allen T. Chartier

Rock Wren *(Salpinctes obsoletus)*

Status: *Casual (MBRC)*



Robert Epstein ©

The Rock Wren is resident in dry rocky areas of the desert southwest, and in badlands of the Great Plains (Lowther et al. 2000). The closest breeding Rock Wrens to Michigan are in the western Dakotas (National Geographic Society 2006, Sibley 2000) in habitats that are quite different from any found in Michigan. It is a rare vagrant outside this breeding range, with eight accepted records from Michigan between 1910 and 2008 (MBRC 2009). Of these, five are from fall, one is from winter, one is from spring, and one is from summer, a singing bird present 9 July – 4 August 1988 in Houghton County (MBRC 2009). Another summer record, one singing occasionally at Port Huron SGA, St. Clair Co. on 7 June 2009 was also recently accepted by the MBRC (A. Byrne pers. comm.). Adams (1991) listed additional records no longer considered valid based on insufficient evidence (MBRC 2009). Although this species was included in MBBA I, perhaps erroneously based on this single summer vagrant, it was listed as an "observed" bird with no breeding status (Adams 1991). Subsequently, this Michigan record was cited in a list of "possible" extralimital breeding records by Lowther et al. (2000), which is clearly in error.

No summer reports were received during the MBBA II period, nor during the inter-atlas period (1989-2000); thus, no breeding evidence for the species has been found in Michigan.

Allen T. Chartier

Worm-eating Warbler *(Helmitheros vermivora)*



Darlene Friedman ©

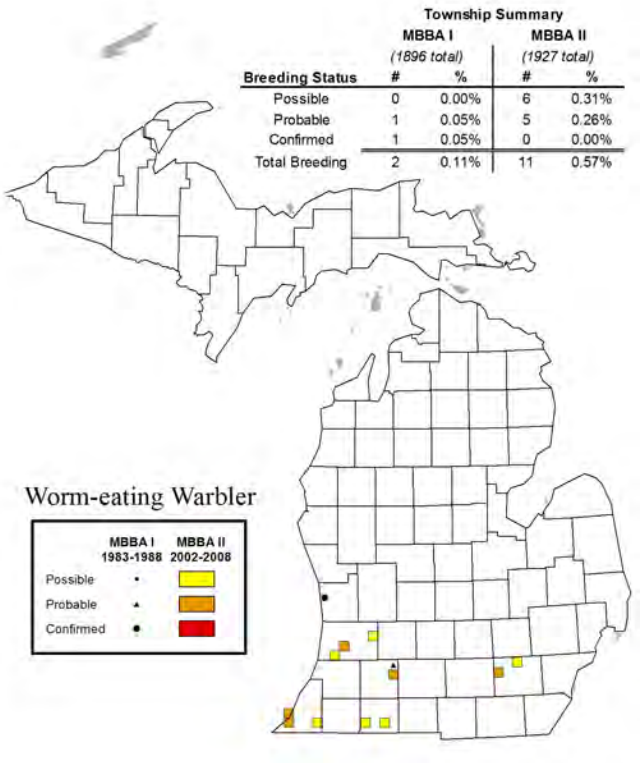
The Worm-eating Warbler's distribution is centered on the hilly areas of the east – the Appalachian foothills, the Ozarks, and the Cumberlands. This species winters in Central America and the Caribbean. Habitat requirements for this species depend less on the type of forest vegetation than "forest age and size, presence of hillsides, and occurrence of dense patches of scrub cover" (Hanners and Patton 1998). As expected, locations in Michigan where the Worm-eating Warbler has been found over an extended period of time in recent years are on steep hillsides: the sand dunes of Lake Michigan in Ottawa and Berrien Counties and the gully through which Swan Creek flows in the Allegan State Game Area. Observers in Michigan are more likely to encounter the Worm-eating Warbler as a spring vagrant than as a territorial individual. In either role it is quite easy to overlook since the song of this warbler – a long dry trill – does not differ much from some songs within

the normal range of variation of the Chipping Sparrow's song. Any such song coming from the interior of a sizable woodlot or an area where migrants concentrate should be investigated. Listen also for the distinctive double-noted buzzy flight call.

Distribution

The Worm-eating Warbler was detected much more frequently in MBBA II than in MBBA I but still was found in only 13 blocks in six counties. In these 13 records, this warbler was classified as probable in five and possible in the remaining eight. Most of these blocks were in the southwest but two were in Washtenaw County and one, the northernmost for MBBA II, was in Tuscola County. The increased number of sightings is consistent with findings from nearby states. In Ontario, this species is described as "a rare but increasing regular breeding resident in southern Ontario" (Heagy and Sutherland 2007). In Wisconsin, where the first nest was found in 1984, this warbler was found in 10 blocks with probable or confirmed status in seven (Cutright 2006).

In states to our south, the Worm-eating Warbler is rare in northern sections. In Indiana, it was found in only six blocks out of 400 in the northern two-thirds of the state (Bruner 1998). In the Unglaciated Plateau region of Ohio, the hilly southeastern part of the state, the Worm-eating Warbler was found in 39% of blocks surveyed, but in the remainder of the state, it was found in only eight of 552 blocks (Peterjohn and Rice 1991). There were no records from the Ohio atlas anywhere near Michigan. In the river valley state of Illinois, this warbler is rare throughout (Kleen et. al. 2004).



In Berrien County, this species was detected 18 out of 30 years between 1962 and 1991. There were a few April records but the average date of first detection was 13 May (Smith et. al. undated). Statewide, between 1999 and 2008, the Worm-eating Warbler was detected in an average of three counties each year in the spring survey; early dates varied between 6 April and 15 May. In a population of this species along Swan Creek in the Allegan State Game Area that was under close observation in the 1990s, a Worm-eating Warbler was seen carrying food to a nest on 11 June 1994. In 1996, a nest there contained three unfledged young on 16 July (Weeks 1997).

Breeding Biology

Hanners and Patton (1998) describe the breeding biology of Worm-eating Warbler in the core of its southern breeding range, where it nests in large tracts of woodlands on densely vegetated ravines and hillsides. Nests are placed on the ground often near a stream or wetland, and built by the female. Clutch size ranges from 3 to 6 eggs, which hatch after about 11-17 days. Young fledge at about 10 days of age.

Abundance and Population Trends

In Michigan the nesting population at any time is just a few pairs. In 1993, the population along Swan Creek in the Allegan State Game Area was estimated to exceed 10 individuals (Weeks 1997). This is one of the areas where probable nesting was detected during MBBA II. In BBS surveys, the population of the Worm-eating Warbler has increased during the 40 years of the survey, with the strongest increase in the Midwest region (Sauer et al. 2008).

Conservation Needs

In spite of the observed increase of the population near the Great Lakes, this species is on the Partners in Flight Watch List. Unlike most species on the list, the objective for the Worm-eating Warbler is to maintain or increase the population, suggesting that this warbler is faring better than most species on that list (Rich et. al. 2004). As the Worm-eating Warbler requires large blocks of forest for nesting, the primary threat to this species is degradation of habitat in its limited nesting and wintering ranges (Hanners and Patton 1998).

Jack Reinoehl

Unconfirmed Breeding

Kentucky Warbler *(Geothylpis formosa)*

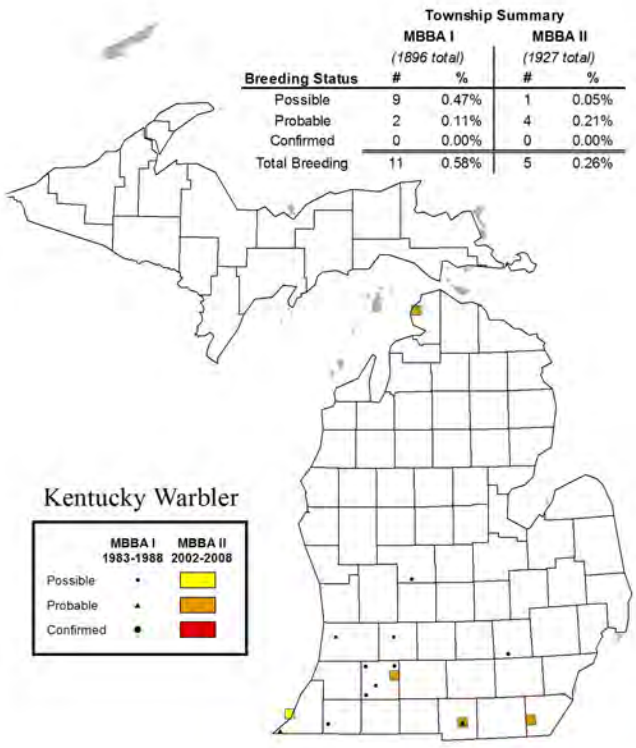


Darlene Friedman ©

Michigan is at the extreme northern edge of the Kentucky Warbler's breeding range. The number of Kentucky Warblers found in the state in any particular year is very small, and many of these are visiting the state briefly as a result of overflight during their northward migration. The primary breeding range of this species extends from the Gulf Coast north to central Indiana and northern Ohio. It is a characteristic species of the hardwood forests of the southeastern United States where it requires a "well-developed ground cover" for its ground nesting habits (McDonald 1998). In Michigan and Wisconsin, it seems to prefer small openings resulting from treefalls. The Kentucky Warbler winters from central Mexico south to northern South America. The unfamiliarity of this warbler to local observers and its preference for large blocks of forest (McDonald 1998) suggest that it could easily escape detection.

Distribution

The Kentucky Warbler distribution in Michigan is very localized and scattered, with reports during MBBA II from four counties in the southern two tiers of counties and a single exceptional report from Emmet County. During the period between the two state atlases, the author located singing males twice in the Gratiot-Saginaw State Game Area, which includes large areas of contiguous forest in the southern LP. It was not detected there for either atlas. The singing male in Emmet County was in an opening caused by windfall within extensive mature mixed deciduous woodland of beech, maple, ash and birch. The male was present through most of June into early July, but no female was detected (S. Stebbins, pers. comm.). Only one area in the state reported individuals in both atlases, Lost Nation State Game Area in Hillsdale County. In MBBA I, there were more reports throughout the state than in MBBA II but most of these were classified as possible instead of probable nesters. During MBBA II, probable nesting was recorded at the Fort Custer Military Training Center, Kalamazoo County. Three nests have been found in Michigan: in Jackson, Ottawa (McPeek 1994), and Hillsdale (Byrne 2000) counties.



Wisconsin has a larger population of the Kentucky Warbler than Michigan, but the species is very scarce in Ontario. In Wisconsin a significant population is found in the southwestern part of the state. There the Kentucky Warbler was detected in 24 U.S.G.S topographic quadrangles, and several of these hosted multiple territories. A breeding locality in Wisconsin was described as a "damp cutover with partial tree canopy and thick understory in a larger forested tract" (Cutright 2006). In Ontario, the number of reports decreased from nine in their first atlas to three in the second (McCracken 2007). Two of the three records were within a few miles of Lake Erie.

To the south of Michigan, this warbler is much more numerous. Illinois has a population in the northwest, contiguous with the Wisconsin population, but the species is much more frequent in the southern half of the state (Kleen et al. 2004). In Indiana, the Kentucky Warbler was found in only 2% of the blocks in the northern third of the state but in 74% of the blocks in the southern third (Bruner 1998). In Ohio, this species is rather thinly distributed in the northern two tiers of counties but was detected in several blocks close to Michigan's southeastern counties (Peterjohn and Rice 1991). BBS maps show populations of this species in southern parts of Ohio and Indiana are among the densest in the country (Sauer et al. 2008).

Breeding Biology

In Hillsdale County, the small population in Lost Nation State Game Area is exceptionally punctual, with first detection usually within a couple of days of 10 May. During the remainder of May, it is not unusual for other singing

males to appear in various locations in the game area. With the exception of the year 2000, it has seldom been the case that these potential pioneers would establish a territory where there had previously been none. On 13 June 1998, Adam Byrne and Kevin Thomas observed a nest with three young (Byrne 2000), suggesting that eggs are laid by late May in Michigan.

Abundance and Population Trends

The population of this species in the state is so small and irregular that it is not possible to draw conclusions of population abundance or trends in Michigan. However this warbler has been under observation for over 20 years in the Lost Nation State Game Area, and population patterns are of some interest. A resident Kentucky warbler was first noticed in the game area in 1987 and individuals were also found in 1988, 1991 and 1993 (pers. obs.). In 1996, in the same location as all previous territorial individuals, a bird appeared with a distinctive song. Judging from this particular song heard in consecutive years, this individual returned to that same territory until 1999.

In 2000, this pattern of intermittent breeding individuals was altered by a severe windstorm on 8 May, downing trees throughout the Lost Nation State Game Area. That year there were six males singing through the nesting season, many of these on territories near recently fallen trees; this number has not been equaled before or since (pers. obs.). The same observation was noted in Fort Custer Military Training Center in which 3 male and 2 female birds were found in 2004 after a selective timber harvest the previous fall leaving many downed trees. In 2006, 2007 and 2008 there were at least three individuals on territory each year in Lost Nation, but there were no Kentucky Warblers on territory there in 2009 or 2010.

Conservation Needs

According to BBS data, the Kentucky Warbler has been in decline nationwide since 1966 (Sauer et al. 2008). This decline is not uniform throughout its range, but the area of greatest decline is from the central parts of the Kentucky Warbler's range, which includes Arkansas and the Appalachian Mountains of Kentucky, Tennessee and West Virginia. This species is thus on the American Bird Conservancy watch list (ABC 2010). In the northern portion of its breeding range including New York, Pennsylvania, Northern Indiana and Northern Ohio, this species may suffer from habitat fragmentation and also from loss of dense understory due to overgrazing by deer (Rosenberg 2008).

Jack Reinoehl

Lark Sparrow *(Chrondestes grammacus)*

Status: *State Extirpated; Casual (MBRC)*



Elizabeth Rogers ©

The harlequin head pattern of chestnut, black, and white puts the Lark Sparrow in a class by itself among the sparrows. The beautiful song, comparable to Old World larks but sadly rarely heard in Michigan these days, is where the bird gets its name. It is widespread through much of the western U.S. north to southern Manitoba, inhabiting a variety of open habitats including shrub-steppe, piñon-juniper edges, park-like open woodlands, grasslands and savannas, roadsides, farmlands, and pastures (Martin and Parrish 2000).

Lark Sparrows were found breeding in 28 Quads (2.5% of total surveyed) in western and central Wisconsin with the majority from open upland grasslands and shrub and savanna habitats (Cutright et al. 2006), and is listed as a Species of Special Concern (Mueller and Kowalchuk 2009). In Illinois, it is considered an uncommon migrant and local summer resident with breeding records from 170 blocks (13.2% of total surveyed) virtually throughout the state (Kleen et al. 2004). The Indiana atlas found Lark Sparrows breeding in 26 blocks (2.0% of total surveyed) mainly along the western edge of the state (Castrale et al. 1998). The Ohio atlas found that breeding Lark Sparrows were confined to four main areas in six counties and 11 blocks (0.7% of total surveyed). In the northwest, at the Oak Openings-Maumee State Forest in Lucas and Fulton Counties, there is a relatively stable population estimated to be no more than 5-10 pairs, which inhabits sparsely vegetated fields on sandy beach ridges (Peterjohn and Rice 1991). Auglaize County in west-central Ohio held a small number of Lark Sparrows and in southwestern Ohio, remnant populations that were larger historically were detected in Adams and Hamilton Counties (Peterjohn and Rice 1991).

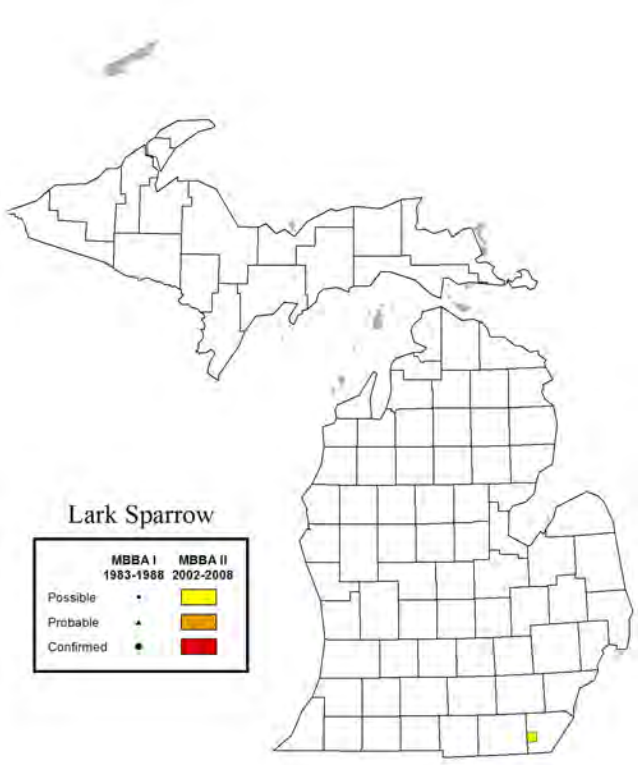
The Lark Sparrow was included in MBBA I based on historical Michigan breeding records. It was thought to have expanded its range into southern Michigan in the late 1800s, following the opening of forests by logging prior to that time. The Lark Sparrow was considered "not uncommon" though local as a breeding species in the southeastern LP

north to St. Clair County, as well as in Kalamazoo and Kent Counties in the southwest (Barrows 1912). Wood (1951) describes a similar breeding status and distribution, and notes that nests with eggs have been discovered between late May and mid-June. By 1959, Zimmerman and Van Tyne (1959) considered the Lark Sparrow to be a very rare and local summer resident in the southern two tiers of counties, and noted breeding was then limited to Kalamazoo, Jackson, Livingston, and Washtenaw Counties, with the last being in Kalamazoo County in 1952. Payne (1983) considered the Lark Sparrow to be a "scarce casual transient" with no remaining breeding populations.

Since 1970 there have been 82 accepted records of Lark Sparrow from Michigan, with 66 (80%) being since 1990, 45 (55%) since 2000, and 10 records in 2008 alone (MBRC 2009), suggesting a pattern of increasing records. A significant proportion of records since 1990 (58%) have been from the Upper Peninsula where there is no history of breeding. Most of these have been in spring (53%), from 23 April to 28 May, and in fall from 21 August to 3 November. It seems possible that these all represent spring overshooting migrants, and misoriented fall migrants from the nearest breeding area in southwestern Wisconsin. Two of the three June records from the UP were from early in the month and likely were late spring migrants. Records from the LP are primarily from the southernmost counties, and mostly in spring.

There were no breeding records of Lark Sparrow in MBBA I, and in MBBA II only one possible breeding record was noted. One individual was found singing in an open area being managed as oak-savanna at the Petersburg SGA, Monroe County from 6-22 May 2008. Another individual was found near Wakefield, Gogebic County on 16 June 2008, but was visiting a feeder so does not meet the habitat aspect of the atlas definition for possible breeding (Reinoehl 2008, Dombroski 2009, MBRC 2009).

The Lark Sparrow nests on the ground or low in a shrub, building a cup nest of grasses, stems, bark, and other vegetation. Typically 3-6 eggs are laid and are incubated for about 11-12 days, with the young fledging at about 11-12 days of age (Martin and Parrish 2000). Population trends in the Upper Midwest (FWS Region 3) show slight declines between 1966 and 2007 (Sauer et al. 2008). The Lark Sparrow is a local breeder throughout the region, with generally small populations in Ohio, Indiana, and Wisconsin. Partners in Flight (PIF) gives population estimates for Illinois (8000), Indiana (1300), and Wisconsin (800), but with a low "credibility index" (PIF 2008).



Management of open land to restore oak-savanna habitat for other species such as Red-headed Woodpecker and Orchard Oriole, will provide habitat for Lark Sparrows as well, especially in the southeastern and southwestern portions of Michigan's LP. Open areas in the western UP may also be eventually colonized by dispersing individuals from the Wisconsin breeding population.

Allen T. Chartier

Unconfirmed Breeding

Pine Grosbeak *(Pinicola enucleator)*



Allen T. Chartier ©

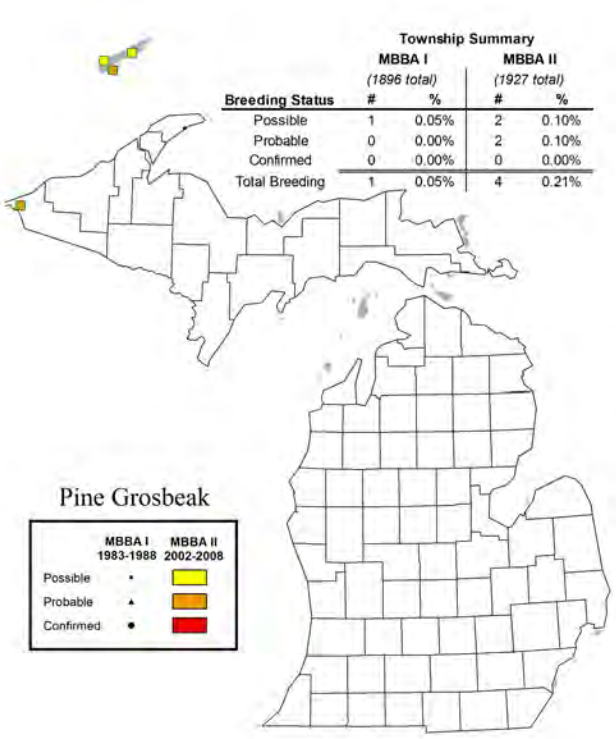
The Pine Grosbeak is a fairly common winter resident throughout the Upper Peninsula in variable numbers from year to year, but uncommonly irrupts into the northern Lower Peninsula, and very rarely to the southern Lower Peninsula. They arrive as early as mid-October to mid-November, and return back north by the end of March with a few stragglers some years into May (Granlund 1994).

The Pine Grosbeak is a Holarctic species that breeds in open coniferous forests from central Alaska across northern Canada east to Newfoundland, and locally south in coastal Alaska and in the Rocky Mountains from northern Alberta south to Idaho and locally south to New Mexico and Arizona (Adkisson 1999). In Ontario, they breed most frequently in the Hudson Bay Lowlands and adjacent taiga, but there are breeding records all around the north shore of Lake Superior (Peck and Coady 2007). The only breeding record from Wisconsin is from 1940 (Cutright 2006), and there is still only a single confirmed breeding record from Michigan, a female with nearly grown young from Isle Royale in 1965 (Adams 1991).

The only evidence of possible breeding during MBBA I was a female observed in a spruce bog in Keweenaw County in 1986 (Adams 1991). During MBBA II, Isle Royale provided summer records, with singing males found on 21 June and 11 July 2005, and two pair noted on 9 July 2007 (A. Egan, pers. comm.). The only other summer record was a pair, providing a "probable" breeding record for the atlas, noted in Gogebic County on 24 June 2008 (M. Schaut, pers. comm.).

The secretive nature of the Pine Grosbeak, and the remote and difficult conditions of its boreal forest breeding habitat, makes them very difficult to detect during the breeding season. In the second Ontario Breeding Bird Atlas, despite being located in 80 blocks, only four blocks provided confirmed breeding, three with fledged young and only one providing the first actual nest ever found in the province (Peck and Coady 2007).

Almost nothing is known of the populations or trends of the Pine Grosbeak, and consequently any potential threats are equally unknown. It may be affected by increasing deforestation within the Canadian boreal forest, including clearcutting, and perhaps by the retreating of these forests related to climate change (Adkisson 1999).



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