

DEVELOPMENT OF A CITIZEN-SCIENCE PROGRAM IN MICHIGAN TO FURTHER
COORDINATED BIRD MONITORING IN THE UPPER MIDWEST

FINAL REPORT



Submitted to:

Steve Lewis
U.S. Fish and Wildlife Service
Division of Migratory Birds
1 Federal Drive
Fort Snelling, MN 55111

Prepared by:

Michael J. Monfils
David L. Cuthrell
Michigan Natural Features Inventory
Michigan State University Extension
P.O. Box 30444
Lansing, MI 48909-7944

MNFI Report Number 2013-1

January 31, 2013



TABLE OF CONTENTS

Introduction.....	1
Methods.....	1
Marsh Birds.....	1
Nightjars.....	2
Owls	3
Results and Discussion	3
Progress toward Objectives.....	3
Summary of Survey Results.....	7
Future Plans	12
Marsh Bird Survey	12
Nightjar Survey.....	12
Owl Survey	12
Acknowledgments.....	13
Literature Cited	13

INTRODUCTION

The need to improve monitoring of bird species not adequately surveyed by the North American Breeding Bird Survey (BBS), such as marsh and nocturnal birds, is well recognized (Bart et al. 2004, Rich et al. 2004). We need improved survey data to better estimate and track populations over time and inform conservation planning, implementation, and assessment. The U.S. Fish and Wildlife Service (USFWS) identified the monitoring of under-represented species, including marsh and nocturnal birds, as a priority for the upper Midwest. Although survey data are often lacking, several under-surveyed species appear to be declining, including King Rail (*Rallus elegans*), Whip-poor-will (*Caprimulgus vociferus*), and Common Nighthawk (*Chordeiles minor*) (Cooper 2008, Poulin et al. 1996, Cink 2002, North American Bird Conservation Initiative 2009). Yellow Rail (*Coturnicops noveboracensis*) and King Rail are focal species of the waterbird habitat conservation strategy for the Upper Mississippi River and Great Lakes Region Joint Venture (hereafter Joint Venture; Soulliere et al. 2007). Potter et al. (2007) identified Whip-poor-will as a focal species for landbird habitat conservation in the Joint Venture and noted the BBS may not adequately assess Whip-poor-will populations. Several marsh bird, nightjar, and owl species have been identified as species of greatest conservation need in state wildlife action plans within the region (D. J. Case and Associates 2005, Eagle et al. 2005, Illinois Department of Natural Resources [DNR] 2005, Wisconsin DNR 2005, Ohio DNR 2006).

Standardized survey protocols have been developed for marsh birds (Conway 2009), nightjars (Hunt 2007, U.S. Nightjar Survey Network 2009), and owls (Takats et al. 2001), but implementation has been sporadic due to lack of funding, personnel constraints, and differing priorities among agencies and organizations. Marsh bird monitoring has not been implemented on a national basis, but pilot studies are ongoing in several states, including Wisconsin and Ohio. Nocturnal bird surveys have been underway for several years in some states and provinces, including Minnesota, Wisconsin, and Illinois, while other Midwestern states conducted or plan to conduct surveys in support of breeding bird atlas projects (Monfils 2006, Barton 2007, A. Boone, Ohio Division of Wildlife, personal communication). Long-term, coordinated surveys for priority species are needed in the upper Midwest to assist the conservation of birds at the regional scale. With support from the USFWS, the Michigan Bird Conservation Initiative (MiBCI) began volunteer-based marsh and nocturnal bird programs in 2010 that complement ongoing state and national programs in the region.

METHODS

Marsh Birds

The sample frame used for the Michigan Marsh Bird Survey was developed by USFWS staff according to the recommendations of Johnson et al. (2009). Primary sample units (PSUs) and survey point locations (i.e., secondary sample units [SSUs]) were selected randomly within emergent wetlands using generalized random tessellation stratification (GRTS). Survey points (SSUs) were at least 400 m apart. Johnson et al. (2009) described the sample design framework being used for the national marsh bird survey in detail.

We conducted marsh bird surveys using methods described by Conway (2009). A complete round of surveys consisted of three visits to each point. In southern Michigan, surveys were

conducted during the following three periods (Figure 1): May 1-14, May 15-31, and June 1-15. Northern Michigan surveys began later, occurring during May 15-31, June 1-14, and June 15-30. Marsh birds were surveyed during the morning (0.5 hr before to three hr after sunrise) or evening (two hr before to 0.5 hr after sunset). We conducted 10-min point counts consisting of a five-min passive period followed by one-min broadcast periods for primary target species. At southern Michigan sites, we broadcasted calls of American Bittern (*Botaurus lentiginosus*), Least Bittern (*Ixobrychus exilis*), King Rail (*Rallus elegans*), Virginia Rail (*Rallus limicola*), and Sora (*Porzana carolina*). Calls of American Bittern, Least Bittern, Yellow Rail (*Coturnicops noveboracensis*), Virginia Rail, and Sora were broadcasted at northern Michigan points. We recorded the minute during which individual birds were detected and estimated the distance to each marsh bird when first observed.

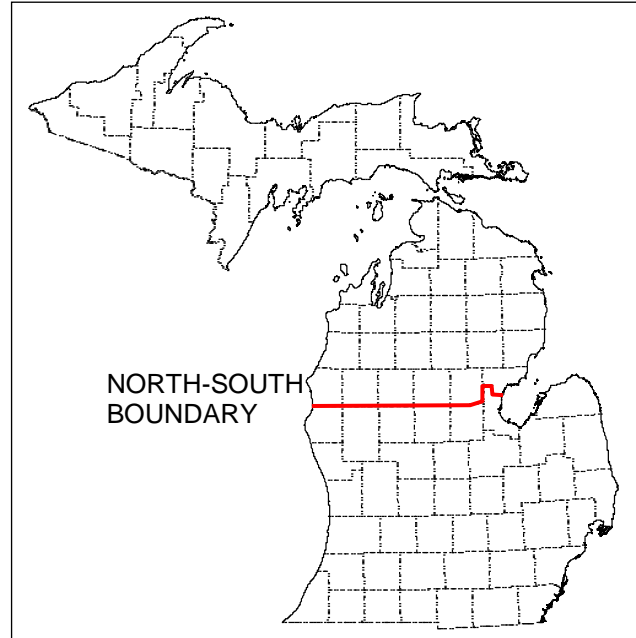


Figure 1. Map showing the boundary used to separate southern and northern Michigan marsh bird surveys and owl surveys.

Nightjars

We used a nightjar survey methodology consistent with those of similar efforts in the upper Midwest (e.g., Wisconsin, Illinois) and other regions of the U.S. (Hunt 2007, U.S. Nightjar Survey Network 2009). We conducted surveys along existing BBS routes and situated ten survey stations at one-mile intervals along each route. While other nightjar surveys require only one survey per season (Hunt 2007, R. Brady, Wisconsin DNR, personal communication, U.S. Nightjar Survey Network 2009), in 2010 and again in 2012 we asked volunteers to survey routes twice during the breeding season. In 2011 volunteers were required to conduct surveys during one period during June 11-20. An early season period (May 14-22) was optional. Both surveys were scheduled to coincide with favorable moon phases. Having two survey periods permits the estimation of detection probabilities, increases the likelihood of detecting target species, and accommodates potentially different breeding phenologies of the target species. Surveys were done during nights with at least 50% moon illumination above the horizon and low ($\leq 50\%$) cloud cover (Hunt 2007), which are conditions during which Whip-poor-wills are known to increase activity (Wilson and Watts 2006). We visited each station for six minutes between 30 min after sunset and 15 min before sunrise. We recorded the number of nightjars observed independently during each minute of the survey to allow estimation of detection and occupancy probabilities (Mackenzie et al. 2006). Volunteers were encouraged to take notes on owls and other night birds encountered during nightjar surveys, which is consistent with the protocol being used in Wisconsin (R. Brady, Wisconsin DNR, personal communication).

Owls

We used an owl survey methodology consistent with those of similar efforts in the upper Midwest (e.g., Minnesota, Wisconsin, and Illinois). We conducted surveys along existing BBS routes and situated ten survey stations at one-mile intervals along each route. While other owl surveys require only one survey per season (R. Brady, Wisconsin DNR, personal communication), we asked volunteers to survey routes twice during the breeding season. Two survey periods allows estimation of detection probabilities, increases the likelihood of detecting target species, and accommodates different breeding phenologies of the owl species. In southern Michigan (Figure 1), surveys were conducted during the following two periods: March 15-22 and April 1-8. Northern Michigan surveys began later and occurred during March 23-31 and April 9-16. We visited each station for six minutes between 30 minutes after sunset and 30 minutes before sunrise. We recorded the number of owls observed independently during each minute of the survey to allow estimation of detection and occupancy probabilities. Volunteers were encouraged to take notes on other bird species observed during owl surveys, such as nightjars and Woodcock, consistent with the protocol being used in Minnesota and Wisconsin (R. Brady, Wisconsin DNR, personal communication).

RESULTS AND DISCUSSION

Progress toward Objectives

Below we provide details on accomplishments toward our stated project objectives (in italics). We met or exceeded all of our project objectives.

1. *Initiate a pilot marsh bird survey in Michigan that would provide data for national-level analysis of marsh bird populations.*
 - a. *Coordinate with federal and regional partners working to implement continental marsh bird pilot surveys.*
 - b. *Prepare training (i.e., protocols) and support (e.g., maps) materials needed for surveys and make them available on the MiBCI website.*
 - c. *Recruit and train a minimum of 10 volunteers to conduct marsh bird surveys.*
 - d. *Conduct surveys on a minimum of 10 primary sample units using volunteers, which includes the collection, quality assurance review, and submission of data to the national database.*

We worked closely with national, regional, and state partners to coordinate the Michigan Marsh Bird Survey with ongoing efforts within the region and nation. We had numerous communications in 2012 with members of the Midwest Marsh Bird Working Group, and M. Monfils helped facilitate a meeting on marsh bird monitoring during the August 2012 Midwest Bird Conservation and Monitoring Workshop. The meeting was entitled “*Collaborative Conservation and Monitoring of Midwest Secretive Marshbirds*” and the goal was to develop a framework for a regional secretive marsh bird monitoring program with shared objectives. It was a productive meeting and we made great progress in developing objectives for the program. We will continue working with regional partners to refine regional monitoring objectives and move forward with the development of a regional marsh bird monitoring program.

We again offered our training workshop for volunteers during the MiBCI Michigan Bird Conservation Workshop in March 2012, which attracted approximately 20 attendees. Our goal in 2012 was to survey all 15 of the PSUs developed during the first two years of the project. We assigned volunteers to all 15 PSUs in 2012 and received data for 14 of them; only one volunteer was unable to complete surveys as assigned. We compiled and reviewed the 2012 data and entered it into a spreadsheet compatible with the National Marsh Bird Database.

In fall of 2010, we began developing a plan to expand Michigan's program beyond the pilot phase. We received funding in 2011 from the USFWS Webless Migratory Game Bird program and Great Lakes Fish and Wildlife Restoration Act to help expand our survey over the next three years. Our goal is to gradually expand the Michigan Marsh Bird survey to approximately 45 PSUs. We are focusing the increased survey effort on lands likely to support greater densities of marsh birds than other sites, such as state wildlife areas and national wildlife refuges. Sample units are being divided between impounded wetlands with water level control and nearby wetlands lacking water management infrastructure, which will help us assess marsh bird use of wetlands managed primarily for waterfowl compared to unmanaged wetlands. We worked with Mark Seamans and Joint Venture science staff to develop a sample frame of 60 new PSUs and associated secondary sample units. We conducted the required initial in-office GIS evaluation of 43 of the 60 new PSUs. On-site ground truthing of secondary sample units was conducted on 30 PSUs, resulting in 9 removed due to habitat and/or access issues, 14 surveyed during at least one visit, and 7 prepared for surveys in 2013. With the addition of new PSUs for the expanded survey, we completed surveys on a total of 28 PSUs in 2012.

2. *Develop and implement a Michigan nightbird survey that informs large-scale conservation efforts.*
 - a. *Coordinate with the Midwest Nightbird Monitoring Partnership to ensure the use of standardized protocols that further regional and national monitoring efforts.*
 - b. *Prepare training (i.e., protocols) and support (e.g., maps) materials needed for surveys and make them available on the MiBCI website.*
 - c. *Recruit and train a minimum of 15 volunteers to conduct nocturnal bird surveys.*
 - d. *Conduct surveys on a minimum of 15 survey routes using volunteers, which includes the collection, quality assurance review, and submission of data to regional and/or national databases.*

We continued coordination with the Midwest Nightbird Monitoring Partnership in implementing the Michigan Owl Survey and Michigan Nightjar Survey. We had numerous communications in 2012 with members of the Midwest Nocturnal Bird Working Group. Michael Monfils also helped develop and facilitate a meeting on nocturnal bird monitoring during the August 2012 Midwest Bird Conservation and Monitoring Workshop. The meeting was entitled "*Developing the Midwest Nocturnal Bird Monitoring Program*" and was successful in helping to identify and prioritize regional monitoring needs and objectives.

We again provided owl and nightjar survey training workshops for volunteers during the 2012 MiBCI Michigan Bird Conservation Workshop. Approximately 25 people attended nightjar survey training and 20 individuals participated in the owl survey workshop. We assigned volunteers to 50 nightjar and 45 owl survey routes in 2012. Volunteers completed surveys on 21

nightjar and 17 owl survey routes in 2012. All data submitted by volunteers were reviewed and entered into spreadsheets compatible with regional and national efforts. Our 2010-2011 data sets, complete with latitude and longitude coordinates, were provided to T.J. Benson, Illinois Natural History Survey, for further data analysis. We will continue to work with regional partners to make our data available on the Midwest Avian Knowledge Network.

3) *Evaluate usefulness of program materials and the potential for continued participation in future bird monitoring using a brief survey submitted to volunteers.*

We conducted brief online surveys of bird monitoring program volunteers in 2010 and 2011 to examine the usefulness of program materials (e.g., protocol documents, data forms), training workshops, and websites, identify ways to improve the surveys, evaluate the likelihood of continued participation in these programs, gauge interest in possible future surveys, and evaluate the experience level of our volunteers. All of the marsh bird respondents ranked our protocol document as “useful” or “very useful” and 87% or more of the respondents found the data forms, web site, training workshop, maps and aerial photos, and survey point coordinates “useful” or “very useful” (Table 1). Less than half of the respondents were able to conduct all three marsh bird surveys in a given year. “Not enough time” and “bad weather” were the reasons most often identified for not completing surveys. All of the marsh bird respondents agreed or strongly agreed that the support provided by the survey coordinator was adequate. Eighty two percent of the marsh bird respondents indicated it was “likely” or “definite” that they would continue participating in the program.

The majority of the nightjar and owl survey respondents rated our survey and training materials as “useful” or “very useful,” but only half of the owl respondents and about three-quarters of our nightjar respondents felt the training workshops were useful (Table 1). Because nightbird surveys are less complicated than marsh bird surveys, training workshops are probably of less value to nightjar and owl survey volunteers. Just over half of the nightbird survey respondents were able to complete surveys within the appropriate survey window. The majority of the respondents cited “not enough time” and “bad weather” as reasons for not completing their surveys. All of the nightbird survey respondents “agreed” or “strongly agreed” that the survey coordinators provided them adequate assistance. Ninety six percent of nightjar and 91% of the owl volunteer respondents ranked the likelihood of continued participation in surveys as “likely” or “definite.”

We need to continue to stress the value of completing all surveys with volunteers. We also need to emphasize the importance of volunteers communicating with the coordinators if they are unable to complete their surveys, so that other volunteers can be identified to cover their assigned route. We observed no strong interest in any of the volunteers for additional training workshops to meet their needs. Our surveys indicate that many of our volunteers are currently or have been involved with other bird survey programs and they represent a range of experience levels. We need to ensure that our program materials and workshops are suited to both novice and well-experienced individuals.

Table 1. Summary of survey respondents' ratings of MiBCI survey and training materials in 2010-2011. The number of respondents is listed in parentheses.

Survey Materials	Not Useful	Somewhat Useful	Useful	Very Useful
Marsh Bird Survey				
Protocol Document	0.0% (0)	0.0% (0)	45.5% (5)	54.5% (6)
Data Forms	0.0% (0)	9.1% (1)	36.4% (4)	54.5% (6)
Survey Web Site	0.0% (0)	12.5% (1)	87.5% (7)	0.0% (0)
MiBCI-OC Training Workshop	0.0% (0)	12.5% (1)	37.5% (3)	50.0% (4)
Site Maps and Aerial Photos	0.0% (0)	9.1% (1)	9.1% (1)	81.8% (9)
Latitude-Longitude Coordinates	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (4)
Nightjar Survey				
Protocol Document	0.0% (0)	4.0% (1)	44.0% (11)	52.0% (13)
Data Forms	0.0% (0)	0.0% (0)	44.0% (11)	56.0% (14)
Survey Web Site	0.0% (0)	18.2% (4)	63.6% (14)	18.2% (4)
MiBCI-OC Training Workshop	5.9% (1)	17.6% (3)	35.3% (6)	41.2% (7)
Route Maps and Aerial Photos	0.0% (0)	16.0% (4)	36.0% (9)	48.0% (12)
Owl Survey				
Protocol Document	0.0% (0)	0.0% (0)	20.0% (2)	80.0% (8)
Data Forms	0.0% (0)	0.0% (0)	33.3% (3)	66.7% (6)
Survey Web Site	0.0% (0)	40.0% (4)	40.0% (4)	20.0% (2)
MiBCI-OC Training Workshop	33.3% (2)	16.7% (1)	16.7% (1)	33.3% (2)
Route Maps and Aerial Photos	10.0% (1)	10.0% (1)	50.0% (5)	30.0% (3)

4) *Assist regional partners in the development of a regional database for bird monitoring data.*

We have been coordinating with partners within the region and at the national level to ensure we are collecting and compiling data in a manner consistent with other state, regional, and national efforts. Marsh bird data have been entered into a spreadsheet compatible with the National Marsh Bird Database. We compiled nightjar survey data using the same spreadsheet format used by Wisconsin and northeastern states, which will facilitate later merging of data sets. We entered our owl survey data into a database consistent with that being used by the Western Great Lakes Owl Survey (i.e., Minnesota and Wisconsin). The Midwest Nightbird Monitoring Partnership has been discussing how to handle nocturnal bird data at the regional level. We will continue discussions with regional partners and Katie Koch to determine how best to make the nightbird data available on the Midwest Avian Knowledge Network. Michigan nightjar and owl survey data were provided to the Illinois Natural History Survey for use in ongoing regional occupancy and detection probability analyses.

Summary of Survey Results

Marsh Birds – Volunteers and seasonal MNFI staff completed marsh bird surveys on 28 PSUs in 2012, of which 12 were surveyed during all three periods, 12 surveyed in two periods, and four surveyed in only one period. A total of 350 point counts was conducted compared to 166 in 2011, and 132 in 2010. Across all years, we documented nine primary and eight secondary target species during surveys. With additional survey effort in 2012, we recorded more detections of all species except Forster's Tern and Yellow-headed Blackbird compared to previous years (Table 2). Although the number of observations increased for nearly all species in 2012, the proportion of points with each species detected was generally similar to previous years. Yellow Rail was recorded for the first time in 2012. American Bittern and Pied-billed Grebe (*Podilymbus podiceps*) were the most often detected primary species across all three years, followed by Virginia Rail, Wilson's Snipe (*Gallinago delicata*), and Sora. The greatest proportion of points in a given season with a primary species present was 0.15 for Pied-billed Grebe and American Bittern in 2011 (Table 2). All other primary species were documented at less than 10% of the survey points in a given year.

Swamp Sparrow (*Melospiza georgiana*) was the most common secondary species observed across all three years of the survey. Sandhill Crane (*Grus canadensis*) was the second most common secondary species recorded, followed by Marsh Wren (*Cistothorus palustris*) and Sedge Wren (*Cistothorus platensis*). Swamp Sparrow was the secondary species documented at the greatest proportion of points every year (high of 0.52 in 2012). Sandhill Crane was typically detected at about one quarter of the points annually and Sedge and Marsh Wrens were usually recorded at about 10-20% of the points in a given year. All other secondary species were detected at less than 10% of the points on an annual basis.

Nightjars – A total of 50 routes were assigned to volunteers in 2012 and we received completed data sheets for 21 routes (period one) and 14 routes (period 2) for a total of 350 point counts (Table 3). Over the three-year period volunteers conducted a total of 1,200 point counts for nightjars throughout Michigan. The 2011 survey efforts were hampered by unusually wet weather during the June sampling period, which is likely the main reason we received fewer data sheets than anticipated. In addition, we had fewer early period routes conducted (7 versus 25), as this was an optional sampling period that year. A total of 19 volunteers completed nightjar surveys and submitted data forms for 27 nightjar routes in 2010 (Table 3).

There was only a single observation of Chuck-will's-widow (*Antrostomus carolinensis*) from a southern Michigan route during the first survey in 2010 and no reports in 2011 or 2012; therefore, it was not included in the summary table. The 2012 detection rates for Whip-poor-will (3.76 birds/route in survey period 1 and 4.43 birds/route in survey period 2) were similar to our 2011 rates and greater than detection rates of 2010 (Table 3). On those routes with Whip-poor-will detected, we observed an average of 9.87 birds/route during sampling period one of 2012, which was the greatest rate recorded throughout the three-year period. As with 2010 and 2011, all of the Whip-poor-will observations in 2012 occurred in northern Michigan. These data will provide Michigan with a baseline dataset for monitoring this species into the future.

Table 2. Number of individuals observed and proportion of points with at least one detection (in parentheses) by year, survey period, and species during marsh bird surveys conducted in Michigan in 2010-2012.

	2010				2011				2012			
	Survey 1 (n = 40)	Survey 2 (n = 44)	Survey 3 (n = 48)	Total (n = 132)	Survey 1 (n = 54)	Survey 2 (n = 63)	Survey 3 (n = 49)	Total (n = 166)	Survey 1 (n = 87)	Survey 2 (n = 119)	Survey 3 (n = 144)	Total (n = 350)
Pied-billed Grebe ¹	0 (0.00)	18 (0.27)	5 (0.10)	23 (0.13)	11 (0.15)	14 (0.13)	14 (0.18)	39 (0.15)	22 (0.12)	5 (0.03)	22 (0.06)	49 (0.06)
American Bittern ¹	0 (0.00)	12 (0.16)	11 (0.10)	23 (0.09)	16 (0.15)	19 (0.16)	14 (0.14)	49 (0.15)	32 (0.21)	18 (0.10)	11 (0.07)	61 (0.11)
Least Bittern ¹	---	---	---	---	0 (0.00)	1 (0.02)	1 (0.02)	2 (0.01)	1 (0.01)	1 (0.01)	2 (0.01)	4 (0.01)
Yellow Rail ¹	---	---	---	---	---	---	---	---	0 (0.00)	2 (0.01)	1 (0.01)	3 (0.01)
Virginia Rail ¹	1 (0.03)	8 (0.14)	2 (0.02)	11 (0.06)	8 (0.09)	5 (0.06)	5 (0.08)	18 (0.08)	15 (0.10)	7 (0.06)	13 (0.04)	35 (0.06)
Sora ¹	1 (0.03)	4 (0.07)	0 (0.00)	5 (0.03)	2 (0.04)	1 (0.02)	1 (0.02)	4 (0.02)	11 (0.12)	8 (0.04)	0 (0.00)	19 (0.04)
Common Moorhen ¹	---	---	---	---	2 (0.04)	5 (0.03)	2 (0.02)	9 (0.03)	8 (0.05)	3 (0.03)	2 (0.01)	13 (0.03)
American Coot ¹	---	---	---	---	2 (0.02)	0 (0.00)	1 (0.02)	3 (0.01)	21 (0.06)	0 (0.00)	1 (0.01)	22 (0.02)
Wilson's Snipe ¹	1 (0.03)	1 (0.02)	3 (0.06)	5 (0.04)	4 (0.07)	0 (0.00)	0 (0.00)	4 (0.02)	5 (0.05)	6 (0.03)	14 (0.08)	25 (0.05)
Sandhill Crane ²	22 (0.33)	16 (0.27)	9 (0.13)	47 (0.23)	33 (0.30)	38 (0.27)	20 (0.20)	91 (0.26)	45 (0.30)	26 (0.19)	59 (0.18)	130 (0.21)
Black Tern ²	0 (0.00)	8 (0.07)	5 (0.06)	13 (0.05)	0 (0.00)	1 (0.02)	2 (0.04)	3 (0.02)	1 (0.01)	4 (0.01)	5 (0.01)	10 (0.01)
Forster's Tern ²	0 (0.00)	2 (0.05)	3 (0.04)	5 (0.03)	1 (0.02)	2 (0.03)	0 (0.00)	3 (0.02)	5 (0.02)	1 (0.01)	4 (0.02)	10 (0.02)
Sedge Wren ²	16 (0.20)	13 (0.18)	12 (0.15)	41 (0.17)	8 (0.11)	12 (0.06)	13 (0.10)	33 (0.09)	17 (0.17)	20 (0.14)	39 (0.21)	76 (0.18)
Marsh Wren ²	0 (0.00)	24 (0.11)	39 (0.15)	63 (0.09)	7 (0.07)	21 (0.11)	27 (0.20)	55 (0.13)	28 (0.07)	36 (0.08)	26 (0.07)	90 (0.07)
Le Conte's Sparrow ²	---	---	---	---	---	---	---	---	2 (0.02)	1 (0.01)	4 (0.02)	7 (0.02)
Swamp Sparrow ²	32 (0.48)	36 (0.39)	33 (0.33)	101 (0.39)	43 (0.43)	45 (0.35)	39 (0.39)	127 (0.39)	122 (0.54)	107 (0.48)	151 (0.54)	380 (0.52)
Yellow-hd. Blackbird ²	---	---	---	---	0 (0.00)	2 (0.02)	0 (0.00)	2 (0.01)	---	---	---	---

¹Primary target species. ²Secondary target species.

Table 3. Summary of results for the Michigan Nightjar Survey 2010-2012.

	Whip-poor-will Survey 1	Whip-poor-will Survey 2	Common Nighthawk Survey 1	Common Nighthawk Survey 2
2010	May 20-June 4	June 19-July 4		
# of routes surveyed	25	24	25	24
# of birds detected	69	51	25	8
# of birds/route	2.76	2.08	1.00	0.33
# of routes w/ target	9	7	12	6
# of birds/route w/ target	7.67	7.29	2.08	0.75
# of routes with 0 birds	16	17	13	18
# of routes with 1-5 birds	4	2	11	6
# of routes with 6-10 birds	3	4	1	0
# of routes with > 10 birds	2	2	0	0
2011	May 14-22	June 11-20		
# of routes surveyed	7	29	7	29
# of birds detected	27	121	9	11
# of birds/route	3.86	4.17	1.29	0.38
# of routes w/ target	4	13	3	5
# of birds/route w/ target	6.75	9.31	3.00	2.20
# of routes with 0 birds	3	16	4	24
# of routes with 1-5 birds	2	3	3	5
# of routes with 6-10 birds	1	6	0	0
# of routes with > 10 birds	1	5	0	0
2012	May 28-June 11	June 27-July 8		
# of routes surveyed	21	14	21	14
# of birds detected	79	62	16	15
# of birds/route	3.76	4.43	0.76	1.07
# of routes w/ target	8	10	5	3
# of birds/route w/ target	9.87	6.20	3.20	5.00
# of routes with 0 birds	13	4	16	11
# of routes with 1-5 birds	2	5	4	2
# of routes with 6-10 birds	3	3	1	0
# of routes with > 10 birds	3	2	0	1

Common Nighthawk detection rates decreased between the first and second survey periods in 2010 and 2011, whereas they increased slightly from the first to second survey in 2012. The drop in detection rates between the first and second periods in 2010 and 2011 may be explained by earlier period one survey dates compared to 2012, possibly resulting in more birds per route as birds were still migrating northward. Additional years of survey will help clarify migration as well as distributional questions for this species. In Michigan, as is the case in other states, flat, gravel rooftops in towns and cities can provide nesting habitat for Common Nighthawks. We will continue to discuss with our partner states a strategy to survey these areas to better document distributions and population levels for this species.

Owls – During 2012 a total of 45 routes were assigned to volunteers, and we received completed data sheets for 17 routes. We had 14 routes that were run during both sampling periods, one that was surveyed only during the first sampling period, and 2 that were only run during the second sampling period. The most commonly encountered owl species during 2012 was the Barred Owl (*Strix varia*; Table 4), with a total of 33 individuals observed, followed by Northern Saw-whet (*Aegolius acadicus*; 20 individuals), Long-eared Owl (*Asio otus*; 6 individuals), Great-horned Owl (*Bubo virginianus*; 6 individuals), and Eastern Screech Owl (*Megascops asio*; 2). Long-eared Owl was recorded for the first time on the survey in 2012.

A total of 47 routes were assigned to volunteers during our initial 2011 season and we received completed data sheets for 33 routes. We had 23 routes that were run during both sampling periods and 10 that were run only during the second sampling period (Table 4). The most commonly encountered owl species was the Barred Owl, with a total of 39 individuals observed in 2011, followed by Great-horned Owl (13), Northern Saw-whet (10), and Eastern Screech Owl (7). As we continue to develop a larger volunteer base and more routes are run, the data gathered will provide Michigan, and the Midwest region, with a baseline dataset for monitoring these species into the future. We will continue to discuss with our partner states a strategy to survey areas to better document distributions and population levels for owls.

Table 4. Summary of results for the Michigan Owl Survey 2011-12.

	First Period					Second Period				
	LEOW	GHOW	BDOW	NSWO	EASO	LEOW	GHOW	BDOW	NSWO	EASO
2011										
# of routes surveyed	23	23	23	23	23	32	32	32	32	32
# of birds detected	0	19	19	4	4	0	8	20	6	3
# of birds/route	0	0.22	0.83	0.17	0.17	0	0.25	0.63	0.19	0.09
# of routes w/target	0	4	11	4	3	0	7	9	4	3
# of birds/route w/ target	0	1.25	1.72	1.00	1.33	0	1.14	2.22	1.50	1.00
# of routes with 0 birds	0	19	12	19	20	0	25	23	28	29
# of routes with 1-5 birds	0	4	10	4	3	0	7	8	4	3
# of routes with 6-10 birds	0	0	0	0	0	0	0	1	0	0
2012										
# of routes surveyed	15	15	15	15	15	16	16	16	16	16
# of birds detected	3	1	21	6	2	3	3	12	14	0
# of birds/route	0.20	0.07	1.40	0.40	0.13	0.19	0.19	0.75	0.87	0
# of routes w/target	3	1	7	21	2	3	3	7	6	0
# of birds/route w/ target	1.00	1.00	3.00	3.00	1.00	1.00	1.00	1.71	2.33	0
# of routes with 0 birds	13	14	8	12	13	13	13	9	10	16
# of routes with 1-5 birds	3	1	5	2	2	3	3	7	6	0
# of routes with 6-10 birds	0	0	2	0	0	0	0	0	0	0

FUTURE PLANS

Marsh Bird Survey

We have obtained additional funding to expand the marsh bird survey, which will continue over the next two years. In 2012, we added 14 new PSUs to the survey and we hope to add approximately 16 additional PSUs over the next two years, bringing the total number of PSUs to about 45. As new PSUs are added, we will increase efforts to recruit and train new volunteers. We will continue to work closely with state, regional, and national partners, as well as the Midwest Marsh Bird Working Group, to ensure that the survey is addressing needs at all spatial scales.

Nightjar Survey

In 2013, we will continue to work with volunteers to survey the routes that have been consistently covered during 2010-2012. As time allows, we will continue to recruit volunteers to cover routes where survey gaps remain, will continue discussions and coordination with the Midwest Nightbird Monitoring Partnership about potential changes to sample design (e.g., stratify sample effort based on habitat), and will also work with the Midwest Nightbird Partnership to develop a consistent means of managing data for nocturnal birds on the Midwest node of the Avian Knowledge Network.

Owl Survey

We will remain active in the Midwest Nightbird Monitoring Partnership and continue discussions about refining objectives for a regional owl survey and associated potential changes to sample design (e.g., stratify sample effort based on habitat). Based on earlier work in Michigan (Monfils 2006), there needs to be some discussion on using call playback surveys on these routes to better assess population levels for these secretive birds. We will also work with the Midwest Nightbird Partnership to develop a consistent means of managing data for nocturnal birds on the Midwest node of the Avian Knowledge Network. In addition, at the annual MiBCI meeting in spring 2013, we will ask for additional volunteers to help coordinate these surveys, as the funding for this particular project has come to an end.

Program Funding and Coordination

The funding required to implement Michigan's marsh bird and nightbird programs will be lower than initially needed, now that we have functioning, active surveys; however, some monetary support will be required for their continued operation, especially as objectives, and potentially sample designs and survey methodologies, continue to evolve at the regional level. Long-term monitoring programs are inherently difficult to fund, so we are actively communicating with state, regional, and national partners to explore possible options to obtain financial support to continue these surveys. To that end, we have submitted proposals to the Michigan Department of Natural Resources (MDNR), Wildlife Division in recent years to continue avian monitoring programs that address state and regional priorities. Although these proposals have not been approved, we will continue communicating with MDNR and searching for funds to continue these important surveys. We plan to discuss the availability of MiBCI funds to offset the costs of survey coordination with the initiative's leadership. We will also explore the potential for MNFI to provide some in-kind staff time to help coordinate the programs.

In addition to searching for funding, we are investigating other options to continue survey coordination. We are exploring opportunities for other individuals or organizations to assist with survey coordination. For example, a particular organization may be interested in coordinating a specific program (e.g., nightjar survey) or assisting with some aspect of multiple surveys (e.g., volunteer recruitment and retention). Michigan Audubon has plans to develop and manage a Michigan portal of eBird, which would present substantial opportunities for volunteer recruitment and potentially reduce costs associated with data entry and management. The nightjar and owl surveys could be well suited for data entry via eBird, allowing easy transfer of data into the Midwest Avian Data Center. Having volunteers enter their data via the Michigan portal would reduce the time and costs required to coordinate the nightjar and owl surveys. We look forward to working with MiBCI member organizations and other state and regional partners to continue these important citizen-science programs.

ACKNOWLEDGMENTS

We thank the many volunteers who conducted bird surveys in 2010-2012. The USFWS provided funding for this survey through the Upper Midwest Migratory Bird Conservation Program and Upper Mississippi River and Great Lakes Region Joint Venture. Several individuals, agencies, and organizations were integral to starting and implementing this program. We thank the following individuals for their assistance: Karen Cleveland (MDNR), Tom Funke (Michigan Audubon Society), Katie Koch (USFWS), Sarah Redding (Kalamazoo Nature Center), Mark Seamans (USFWS), and Richard Wolinski (Michigan Department of Transportation). Special thanks to Katie Koch and Christie Deloria-Sheffield (USFWS) for their assistance with ground truthing of marsh bird routes in the western Upper Peninsula. Ryan Brady (Wisconsin Department of Natural Resources) provided ample advice and allowed us to use the Wisconsin marsh bird and nightjar instructions and data forms.

LITERATURE CITED

- Bart, J., K. P. Burnham, E. H. Dunn, C. M. Francis, C. J. Ralph. 2004. Goals and strategies for estimating trends in landbird abundance. *Journal of Wildlife Management* 68:611-626.
- Barton, B. J. 2007. Whip-poor-will and Common Nighthawk surveys in support of the Michigan Breeding Bird Atlas II: 2007 final report. Report 2007-17, Michigan Natural Features Inventory, Lansing, USA.
- Brady, R. 2009. Wisconsin Nightjar Survey, 2009 Annual Report. Unpublished document for the Wisconsin Bird Conservation Initiative.
< <http://wiatri.net/projects/birdroutes/Docs/NightjarSummary2009.pdf>>. Accessed 20 September 2010.
- Cink, C. L. 2002. Whip-poor-will (*Caprimulgus vociferus*). Account 620 in A. Poole and F. Gill, editors. *The birds of North America*. The Birds of North America, Philadelphia, Pennsylvania, USA.

Conway, C. J. 2009. Standardized North American marsh bird monitoring protocols. U.S. Geological Survey Wildlife Research Report 2009-02, Arizona Cooperative Fish and Wildlife Research Unit, Tucson, Arizona, USA.

Cooper, T. R. 2008. King Rail conservation plan, version 1. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota, USA.

D. J. Case and Associates. 2005. Indiana comprehensive wildlife strategy. D. J. Case and Associates, Mishawaka, Indiana, USA.

Eagle, A. C., E. M. Hay-Chmielewski, K. T. Cleveland, A. L. Derosier, M. E. Herbert, and R. A. Rustem, editors. 2005. Michigan's wildlife action plan. Michigan Department of Natural Resources, Lansing, USA. <<http://www.michigan.gov/dnrwildlifeactionplan>>. Accessed 13 February 2009.

Hunt, P. D. 2007. Northeast nightjar survey: 2007 summary. New Hampshire Audubon, Concord, USA.

Illinois Department of Natural Resources. 2005. The Illinois comprehensive wildlife conservation plan and strategy. Illinois Department of Natural Resources, Springfield, USA.

Johnson, D. H., J. P. Gibbs, M. Herzog, S. Lor, N. D. Niemuth, C. A. Ribic, M. Seamans, T. L. Shaffer, W. G. Shriver, S. V. Stehman, and W. L. Thompson. 2009. A sampling design framework for monitoring secretive marshbirds. *Waterbirds* 32:203-362.

MacKenzie, D. I., J. D. Nichols, J. A. Royle, K. H. Pollock, L. L. Bailey, J. E. Hines. 2006. Occupancy estimation and modeling: inferring patterns and dynamics of species occurrence. Academic Press, Burlington, Massachusetts, USA.

Monfils, M. J. 2006. Woodland owl surveys in support of the Michigan Breeding Bird Atlas II: year 3. Report 2006-19, Michigan Natural Features Inventory, Lansing, USA.

North American Bird Conservation Initiative, U.S. Committee. 2009. The state of the birds, United States of America, 2009. U.S. Department of Interior, Washington, DC, USA.

Ohio Department of Natural Resources. 2006. Ohio comprehensive wildlife conservation strategy. Ohio Department of Natural Resources, Division of Wildlife, Columbus, USA.
Potter, B. A., G. J. Soulliere, D. N. Ewert, M. G. Knutson, W. E. Thogmartin, J. S. Castrale, and M. J. Roell. 2007. Upper Mississippi River and Great Lakes Region Joint Venture landbird habitat conservation strategy. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota, USA.

Poulin, R. G., S. D. Grindal, and R. M. Brigham. 1996. Common Nighthawk (*Chordeiles minor*). Account 213 in A. Poole and F. Gill, editors. The birds of North America. The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, D.C., USA.

Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Inigoelias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, and T. C. Will. 2004. Partners in Flight North American land-bird conservation plan. Cornell Laboratory of Ornithology, Ithaca, New York, USA.

Soulliere, G. J., B. A. Potter, D. J. Holm, D. A. Granfors, M. J. Monfils, S. J. Lewis, and W. E. Thogmartin. 2007. Upper Mississippi River and Great Lakes Region Joint Venture Waterbird Habitat Conservation Strategy. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota, USA.

Takats, D. L., C. M. Francis, G. L. Holroyd, J. R. Duncan, K. M. Mazur, R. J. Cannings, W. Harris, and D. Holt. 2001. Guidelines for nocturnal owl monitoring in North America. Beaverhill Bird Observatory and Bird Studies Canada, Edmonton, Alberta.

U.S. Nightjar Survey Network. 2009. United States Nightjar Survey Network website. Center for Conservation Biology, The College of William and Mary, Williamsburg, Virginia, USA. <<http://www.ccb-wm.org/nightjars.htm>> Accessed April 14, 2009.

Wilson, M. D., B. D. Watts. 2006. The effect of moonlight on detection of Whip-poor-wills: implications for long-term monitoring strategies. *Journal of Field Ornithology* 77:207-211.

Wisconsin Department of Natural Resources. 2005. Wisconsin strategy for species of greatest conservation need. Wisconsin Department of Natural Resources, Madison, USA.