

**MIDWEST LANDBIRD
MIGRATION MONITORING NETWORK**

STRATEGIC ACTION PLAN: 2015-2019



A regional network committed to informed bird conservation decisions through enhanced coordination and exchange of monitoring information.

February 2015

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More than 20 participants of the MLMMN workshop at the Midwest Bird Conservation and Monitoring Workshop in early August 2014 contributed to the decision matrix exercise used to identify priority research and monitoring needs for the Midwest.

Dedication

This plan is dedicated in memory of **Noel Cutright** who provided vision for this Network and strategic action plan. Though he did not see it come to fruition, his energy and commitment to landbird conservation are embodied in this document and the future activities and products to be born from it.



Learn about the Midwest Landbird Migration Monitoring Network

To join or learn more about the Midwest Landbird Migration Monitoring Network, please visit <http://midwestbirdmonitoring.ning.com/group/mwlandbirdmigration>

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Contents

Executive Summary	iii
Chapter 1: Foundation of the Strategic Planning Process	1
Chapter 2: Research and Monitoring Needs to Address Regional Landbird Migratory Ecology Questions	11
Chapter 3: Promote Conservation of Stopover and Airspace Habitat for Migratory Landbirds	18
Chapter 4: Towards a Sustainable Network of Collaborators and Conservation Information Delivery	24
Chapter 5: Strategic Action Plan Implementation	27

Executive Summary

Conservation strategies aimed at the protection of migratory birds are incomplete without including migratory bird flyway and stopover habitat preservation. The Midwest includes areas, such as the Great Lakes, that are heavily used by migrating landbirds. Migratory landbird 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. Efforts to better coordinate migration monitoring and stopover conservation activities have taken place for select species and states but have been lacking for landbirds at the regional level.



In 2011, a technical working group of the Midwest Coordinated Bird Monitoring Partnership was organized to begin developing broad goals for a Midwest Landbird Migration Monitoring Network (MLMMN). Network members focused on refinement of these goals for the MLMMN to serve as the foundation for development of this strategic action plan.

- Determine locations and site characteristics of landbird stopover habitat such that landbirds migrating through the Upper Midwest and Great Lakes region gain rather than lose resources necessary for optimal reproductive success and annual survival.
- Understand migratory movements through the region in order to effectively address conservation challenges posed by proposed wind farms, communication towers, and other developmental migratory obstacles.
- Share information and protocols so that migration data are available to address current and potential future questions at multiple spatial and temporal scales.

Beginning in January 2014, the Western Great Lakes Bird and Bat Observatory hired a coordinator to help the MLMMN develop a concise, clear strategic action plan. The plan identifies priority migration information needs and details an organized network of monitoring and research capacity that can be mobilized to address these needs, both at regional and local levels. The results of a year-long strategic planning effort led by the MLMMN Steering Committee are presented in this document.

Chapter 1 provides background and foundation for the plan. This includes the MLMMN's vision and mission statements and identifies the plan's three strategic areas of focus: 1) research & monitoring, 2) conservation, and 3) sustaining collaboration. Chapters 2-4 are developed around these three strategic areas. Each of these chapters is organized via an interlocking set of goals, objectives, strategies, and actions. Chapter 5 begins to layout an implementation plan, including a timeline for the next five years and strategies that will be the focus of the MLMMN Steering Committee.

We welcome the participation of a broad array of academic, agency, tribal and non-governmental partners in the implementation of this Strategic Action Plan within the eight-state Midwest Region (Figure 1).



Figure 1. Geographic region of focus for the MLMMN Strategic Action Plan.

Chapter 1: Foundation of the Strategic Planning

Process

Background

For migratory bird species, migration periods likely influence and affect overall species survivorship (Sillert and Holmes 2002, Newton 2006, Drake et al. 2014). Apparent mortality rates for a migrating warbler were at least 15 times higher during migration compared to that in stationary periods with more than 85% of apparent adult mortality occurring during migration (Sillert and Holmes 2002). Many factors influence survival during the alternating stoppage and active flight of migratory movement. Stopover sites provide essential food resources during a part of the annual life-cycle when many species suffer relatively high mortality. The quality and quantity of these sites that are available for migrants to obtain food and cover for rest are particularly limiting (Tankersley 2004, Buler and Moore 2011). Surprisingly little attention has been devoted to protecting the stopover habitat needed to support this part of the annual life-cycle (Ewert et al. 2012).



While relatively little conservation effort focuses on stopover and staging areas, even less attention has been paid to the aerial environment through which migrants travel during migration periods. Migratory bird use of airspace is also subjected to anthropogenic impacts with potential consequences to migratory movement and survival (Peterson et al. in press). These anthropogenic sources of landbird mortality include collisions with communication towers, wind turbines, buildings (especially windows), power lines, vehicles, and aircraft in addition to issues related to stopover habitat quality such as predation by free-roaming cats, pollution, poisoning, and invasive pathogens (Loss et al. 2012).

Over 90% of the nearly five billion landbirds¹ that breed in the northern boreal and northern prairie regions of North America will migrate (Rich et al. 2004, Wells and Blancher 2011). Many of these species are unique to these ecosystems and are experiencing population declines (Rich et al. 2004, Sauer et al. 2014). Due to the centralized location of the Midwest region, this area is heavily used by migrating birds. For instance, during fall migration periods, the movement direction of many landbirds is southeast, a route that results in a large proportion of species funneling

¹Landbirds are defined here as those species having principally terrestrial life cycles (Rich et al. 2004; see this reference for a list of taxa).

through the Midwest, thus emphasizing the importance of this region (Figure 2; Faaborg et al. 2010, Leppold and Mulvihill 2011).

Conservation strategies aimed at the protection of migratory birds are incomplete without the identification and preservation of priority migratory bird flyway areas and stopover habitat (Petit 2000, Mehlman et al. 2005). However, significant information gaps persist, especially during the migratory period. Many management and spatial usage questions remain unanswered, thus diminishing our ability to apply appropriate conservation actions most effectively. Identifying and filling these gaps is an essential component of landbird conservation within the eight-state Midwest region and a goal of the Midwest Coordinated Bird Monitoring Partnership.



Figure 2. The Great Lakes and Upper Mississippi River region is important to continental landbird migration. Large numbers of boreal breeding landbirds funnel through this region during fall and spring migration periods. Fall migratory movements shown here. (Anna Peterson, unpublished).

History of the Midwest Landbird Migration Monitoring Network (MLMMN)

Since 2009, the Midwest Coordinated Bird Monitoring Partnership (<http://midwestbirdmonitoring.ning.com>) has served as a regional network committed to informed bird conservation decisions through enhanced coordination and exchange of monitoring information. The Partnership is united to help biologists, biometricians, data managers, wildlife administrators, and citizen scientists achieve five overarching goals. These goals correspond to those contained in *Opportunities for Improving Avian Monitoring* (U.S. North American Bird Conservation Initiative Monitoring Subcommittee 2007).

- 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 (e.g., Midwest Avian Data Center).



In 2011, a technical working group was organized to begin developing broad goals for a Midwest Landbird Migration Monitoring Network (MLMMN). At the 2012 Midwest Bird Conservation and Monitoring Workshop, the MLMMN convened a one-day meeting to further identify high priority conservation needs that can be addressed through a well-coordinated landbird migration monitoring network and to brainstorm strategies for

meeting these needs. Five presentations were delivered on topics ranging from conservation across the full annual cycle to current knowledge about migration ecology, a comparison of techniques and methods for monitoring landbird migration, and understanding migratory movements relative to anthropogenic threats.

Workshop participants then focused on refinement of broad goals for the MLMMN. These goals serve as the foundation for development of this strategic plan.

- Determine locations and site characteristics of stopover habitat such that landbirds migrating through the Upper Midwest and Great Lakes region gain rather than lose resources that enhance reproductive success and annual survival.
- Understand migratory movements through the region to address conservation challenges posed by proposed wind farms, communication towers, and other potential anthropogenic migratory obstacles effectively.
- Share information and protocols so migration data are available to address current and potential future questions at multiple spatial and temporal scales.

Beginning in January 2014, the Western Great Lakes Bird and Bat Observatory hired a coordinator with funds from US Fish & Wildlife Service Region 3 (Migratory Bird Conservation grant program, CFDA Number: 15.647) to help the working group develop a concise, clear Strategic Action Plan to identify priority migration needs and detail an organized network of monitoring and research capacity that can be mobilized to address these needs, both at regional and local levels. The results of a year-long strategic planning effort are presented in this document.

Desired Role and Function of the MLMMN

Dozens of landbird migration monitoring programs are currently operational throughout the Midwest Region. Monitoring can and should play an essential role in bird conservation planning, guiding design and evaluation of on-the-ground activities to inform adaptive management. Datasets on landbird migration are widely scattered and in different forms (i.e., hand-written data sheets, Excel spreadsheets, well-organized databases), making organization and use of these data for decision making very difficult. Efforts to better coordinate migration monitoring and stopover conservation activities have taken place for select species and states (e.g., Wisconsin Stopover Initiative, Great Lakes Commission Pelagic Bird Monitoring, Hawk Migration Association of North America), and understanding landbird migration has received greater research attention in recent years (e.g., Upper Mississippi River and Great Lakes Region Joint Venture, The Nature Conservancy's Stopover Model). We recognize the need to further our collective



understanding of bird migration corridors and stopover concentrations, particularly along Great Lakes coastlines and inland riverways. Many conservation opportunities, including informed renewable energy development, will be contingent on well-coordinated and inter-connected bird monitoring programs and sound data management. The MLMMN's role is to facilitate collaboration, coordination, and communication among these bird monitoring programs and members in the region.

Given the number of existing and proposed bird monitoring programs, improvements are needed in effectiveness, scope, utility, coordination, and efficiency of these programs. Too often monitoring programs have been conducted opportunistically, sometimes focusing on the wrong species in the wrong places, using poorly defined objectives with varying survey methods, and yielding data that are unlikely to influence management actions (Lindenmayer and Likens 2010). One recent example provided by Small-Lorenz et al. (2013) in which migratory species may well be under-considered involves climate change vulnerability assessments (with other recent work, including that described by Ewert et al. 2014). Leaving migrating birds out of such assessments could lead to missed opportunities to take conservation action at the right times and places for those species most likely to be vulnerable to the effects of climate change.

Among the features needed for an effective MLMMN that will be aligned with management and conservation priorities are: 1) basing monitoring on clearly stated, priority scientific questions that are periodically reviewed and modified for continued relevance; 2) using conceptual modeling as a tool to guide ongoing research and conservation efforts; 3) building and sustaining partnerships; 4) having strong, dedicated, and focused leadership; 5) accessing long-term funding to sustain the network and its projects; 6) examining and integrating data frequently; 7) enhancing outreach by publishing and reporting results; and 8) maintaining data integrity (Lindenmayer and Likens 2010). The Northeast Bird Monitoring Handbook (Lambert et al. 2009) can serve as a useful reference to develop a comprehensive monitoring strategy in the Midwest.

A Case for Landbird Migration Monitoring Networks

Coordinated bird monitoring that focuses on avian migration is very important when considering migratory bird conservation. Existing migration monitoring efforts include the [Northeast Regional Migration Monitoring Network](#), [The Migratory Connectivity Project](#), [the Landbird Monitoring Network of the Americas](#), and the [Canadian Migration Monitoring Network](#) (McCracken et al. 2012), which has produced a manual with options and recommendations for field methods that monitor population changes of small landbirds during migration (Hussell and Ralph 2005). Some of these migration monitoring networks have existed for decades and provide different models of structure and coordination that can aid in the development of the MLMMN.

During February-April 2014, the MLMMN Coordinator interviewed coordinators for other migratory landbird networks in North America, including Rebecca Holberton for the Northeast Regional Migration Monitoring Network (NRMMN), Jon McCracken with input from the Steering Committee for the Canadian Migration Monitoring Network (CMMN), John Alexander with input from Linda Long and C. J. Ralph for the Landbird Monitoring Network of the Americas, and Dave DeSante for the Monitoring Avian Productivity and Survivorship program. Each network differed in stated goals, organizational structure, coordination, function, communication, and staffing. Several issues were recommended for the MLMMN to consider in development as a working group.

- *Science-focus and Monitoring Standards:* Monitoring should be directed to answer important regional questions. Standardized survey protocols, data entry, and data management practices are critical to address regional scientific questions and will raise the bar for some monitoring partners.
- *Diverse membership:* Involve a diverse mix of members, including those from academia, agencies, NGOs, and industry.
- *Adaptive Framework:* Listen and respond to members; let members drive the projects and adjust the working group's focus as needed.
- *Formal Structure (Coordinator and/or Steering Committee):* A formal organizational structure is important for network sustainability. There are different models that appear to be effective in sustaining network progress.
- *Funding:* Most networks identified funding, especially reliable long-term funding sources, as an important need for maintaining monitoring stations, adding staff, meeting/workshop expenses, or other needs. Emphasize the power of the network when pursuing funding.
- *Staffing:* Common identified needs included full-time staff positions; multiple networks indicated needing a network coordinator and/or data analyst.
- *Network Communication:* The interviewed networks communicate in different ways and methods depended on immediate needs. Not all networks have a newsletter but all thought this was a desirable means of keeping members up-to-date on network activities. Also, annual or biannual face-to-face meetings were important for maintaining personal relationships, collaborations and information transfer.

The strategic focus and goals of each network differed. The CMMN is focused on coordinated monitoring of its member bird observatories. The NRMMN is focused on applied research to answer both individual University researcher questions and partner management needs. The MLMMN proposes to adopt components from both of these models including providing research direction to Midwestern bird observatories and facilitating collaboration between researchers to address regional research and conservation questions.

Foundation of the MLMMN Strategic Action Plan

Vision: Provide scientifically sound information to guide conservation and management decisions in the US Fish and Wildlife Service’s Midwest Region that enhance the passage of landbirds during migration within the context of full life cycle conservation.

Mission: Coordinate efforts of monitoring stations, research programs, and stakeholders as part of a sustainable network focused on conservation efforts needed to sustain migration of landbirds through the Midwest.

Geographic Focus: Midwest and Great Lakes Region of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

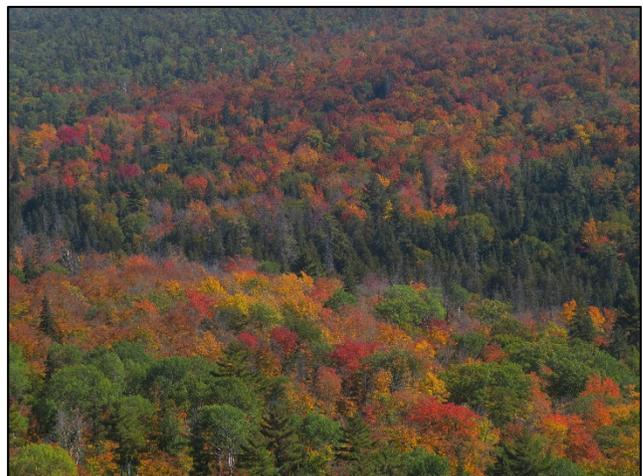
Audience: We target bird monitoring practitioners, researchers, and organizations that gather, synthesize, and provide information on landbird migration, especially ecology and distribution, for use by organizations, government agencies, tribes, diverse landowners, and private institutions that make decisions about land management, development, land acquisition, and conservation planning and policy.

Core Values:

1. Respect: we value being good listeners and being open to new perspectives.
2. Scientific integrity: we value sound research practices and communication of information that maintains the integrity of the science.
3. Collaboration: we value and recognize that our strategic actions depend on participants sharing ideas and information in a positive, collaborative atmosphere to meet collective objectives.
4. Stewardship: we value our role as stewards for migrating birds and their ecosystems.

Strategic Areas of Focus:

1. Research & Monitoring
2. Conservation
3. Sustaining Collaboration



Strategic Goals and Associated Objectives, Strategies, and Actions

The core three chapters (2-4) of this plan follow this hierarchical structure: Goals-Objectives-Strategies-Actions.

Goal: A goal is defined as a broad aim toward which your efforts are directed. It tells you where you are going rather than how you will get there.

Objective: Objectives are closely tied to goals. An objective is a specific and measurable milestone that must be achieved in order to reach a goal.

Strategy: A strategy is a plan of action designed to achieve an objective. Strategies tell you how you're going to get there, the overall direction you are going to take.

Action: This is a tactic or a specific action step required to deliver on a strategy. Tactics are what you do, and for every strategy, there are a number of tactics that can be listed.



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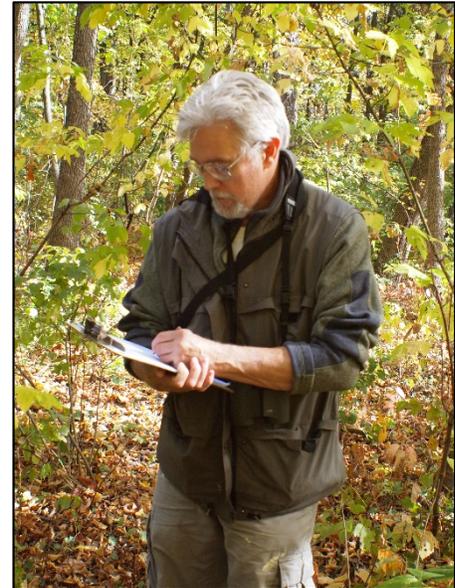
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Chapter 2: Research and Monitoring Needs to Address Regional Landbird Migratory Ecology Questions

Research and monitoring activities are needed to understand migration ecology, spatial usage, and demographic characteristics of migratory landbirds in the Midwest. Many researchers and monitoring groups across the region are conducting activities to better understand the ecology and population attributes of migratory landbirds. The MLMMN can provide opportunities and guidance toward coordinated activities to answer regionally important questions regarding migratory landbirds. To do so will require respecting and maintaining autonomy of individual partner activities in conjunction with promoting those activities needed to address regional questions.

Target Audience: *Researchers, monitoring stations, and other information gathering stakeholders*



Prioritization of Research & Monitoring Needs for Landbird Migrants

Process for Prioritization

Goal 2 (see below) states that we will identify and prioritize information gaps that, if filled, will lead to more effective implementation of conservation for migrating landbirds in the Midwest. The plan steering committee felt that we needed to make immediate progress toward this goal in order to inform the strategic planning process. The Midwest Bird Conservation and Monitoring Workshop in early August 2014 provided an opportunity to have a Network session focused on prioritization of regional research needs. The steering committee identified seven conservation issues relevant to landbird migration in the region and a lengthy list of research topics related to each issue. We created a decision matrix activity for session participants to complete. This activity is a head-to-head comparison of each research topic that results in an individual ranking of research topics within each conservation issue. An additional opportunity was given to workshop participants and past plan contributors to complete these matrices after the workshop. The scores among the completed matrices were compiled by conservation issue, totaled by research topic within each issue, and sorted by total score to establish a rank order of topics for each issue. The top ranked research topics from each conservation issue were extracted and compiled below.

Research & Monitoring Priorities in the Midwest

High Priority (not in ranked order)

- Identify airspace that is heavily used by migrating landbirds in space and time.
- Describe landscape-scale characteristics influencing landbird migration and stopover during different migratory periods.
- Describe site-scale characteristics influencing landbird migration and stopover during different migratory periods.
- Determine how patch characteristics affect fitness and survival of landbird migrants.
- Compare the relative and additive population impacts of different sources of mortality (such as from anthropogenic structures, cats, and pesticides) during the migratory period, particularly for high conservation priority landbird species.
- Quantify the effects of land-use and environmental change (including climate) on food supply, vegetation phenology, and physiological condition of landbird migrants in different landscapes, with particular attention to potential mismatches.

Medium Priority (not in ranked order)

- Identify priority areas for airspace conservation for landbird migrants.
- Prioritize stopover habitat (sites for conservation versus restoration) for landbird migrants.
- Identify use and relative importance of isolated inland habitat patches versus habitat patch complexes for landbird migrants.
- Evaluate the importance of plant species for landbird migrant species during different migratory periods.
- Establish protocols to measure abundance, distribution, and migration chronology for landbird migrants at strategic stopover locations.
- Identify where trans-Midwest landbird migrants come from and go to and methods for addressing migratory connectivity.



Implementation of Research & Monitoring Priorities

The following goals, objectives, strategies, and actions should be developed within the context of these priorities. For example, creation of standardized monitoring protocols should be developed to inform identified research and monitoring priority needs.

Goal 1. Sustain and maintain landbird monitoring data from activities that provide information necessary and useful for strategic regional conservation decisions.

Objective 1.1. Create a standardized Great Lakes/Upper Mississippi River Migration Monitoring Protocol.

Strategy 1.1.1. Convene a working group or workshop to establish a standardized migration monitoring protocol for the Great Lakes/Upper Mississippi River region.



Action 1.1.1a. Compile and review existing stopover and airspace monitoring protocols and efforts to develop a standardized, hierarchical landbird migration monitoring protocol (e.g., Mark Shieldcastle's protocol, Wisconsin Stopover Initiative workshop notes in fall 2013, Canadian Migration Monitoring Network Protocol, Hawk Migration Association of North America's raptor and non-raptor monitoring protocols).

Action 1.1.1b. Use the Northeast Bird Monitoring Handbook to guide selection of a standardized, hierarchical landbird migration monitoring protocol.

Action 1.1.1c. Pilot test the protocol at several sites throughout the Midwest region before finalizing recommendations. Careful accounting can establish expectations for monitoring costs and provide guidelines for budgeting.

Strategy 1.1.2. Create a supplemental monitoring protocol that includes newer technologies (radar, acoustics, etc.) and that has some flexibility. For example, crew size and funding may limit some monitoring methods so there needs to be consideration for those interested in contributing regardless of project size, funding or scope.

Action 1.1.2a. Identify existing monitoring protocols that could be combined and shared. Nancy Seefelt would be willing to share her current protocol for acoustics monitoring.

Strategy 1.1.3. Identify a standardized monitoring protocol that would clarify the threat posed by windows.

Action 1.1.3a. Review previous publications on bird-window/bird-wind turbine collision interactions to identify protocols used in these studies. If possible, select a previously used protocol to facilitate inter-study comparisons (e.g., Ecological Research as Education Network's bird-window collision study protocol). Consider citizen science approaches as appropriate (e.g., review and incorporate protocols developed by existing Citizen Science programs such as Chicago Bird Collision Monitors).

Objective 1.2. Implement a standardized Great Lakes/Upper Mississippi River Migration Monitoring Protocol.

Strategy 1.2.1. Provide training materials and opportunities to participating bird observatories and other monitoring stations.

Action 1.2.1a. Make protocols and training materials available on the Working Group website(s).

Action 1.2.1b. Organize a workshop to bring monitoring station operators and those conducting monitoring to learn protocol, data management procedures, etc. Follow-up training should be provided on a regular schedule (perhaps every 2-4 years).

Objective 1.3. Maintain and disseminate network data to the Midwest Avian Data Center.

Strategy 1.3.1. Establish the Midwest Avian Data Center (MWADC) as the standard data management system for participants in the Midwest Landbird Monitoring Network.

Action 1.3.1a. Conduct training workshops and webinars to familiarize users with the MWADC (different users include people who want to manage, share, access, analyze, and develop decision support tools with landbird migration monitoring data).

Action 1.3.1b. Identify any necessary enhancements to the MWADC user interface to accommodate data collected under standardized protocols (including QA/QC) for the Midwest Landbird Migration Monitoring Network (e.g., banding data, acoustic monitoring data).

Action 1.3.1c. Identify desired data outputs (summaries, visualizations, model outputs) to facilitate site-level reporting and summaries, regional analyses, and other conservation planning and management activities.

Action 1.3.1d. Provide and advertise an easy, time-effective method (series of steps) to upload (enter) pre-existing datasets to the MWADC. Maybe include a tutorial on how to share data.

Action 1.3.1e. Promote development of a bulk data upload tool for the MWADC. In the interim, obtain funding to make bulk data uploads possible for partners, especially those with large databases.

Action 1.3.1f. Work with the USGS Bird Banding Lab to make Midwest banding data accessible through the MWADC or to be its own node in the Avian Knowledge Network.

Objective 1.4. Promote development of better monitoring technology and methods (e.g., improving radar technology and analytical methods within the rotor swept zone for wind turbines) and be aware of current limitations in the technology.

Strategy 1.4.1. Prepare catalog of monitoring techniques and measures of fitness used in studies of avian migration.

Action 1.4.1a. Identify researchers actively using each monitoring technique and ask one researcher for each monitoring technique to prepare a synopsis of the benefits and limitations of each technique and provide recommendations how to most efficiently apply each technique to improve application to migration conservation. First check progress of current analysis of pros and cons of monitoring technologies being conducted by Kevin Heist (postdoc, USGS) to monitor bird and bat airspace use; supplement/edit where necessary with researcher input.

Action 1.4.1b. Identify parameters of fitness (or surrogates that are positively related with fitness) to the migratory period that can be used an evaluation metric in conjunction with other monitoring techniques. Define what is considered to be "increased fitness".

Objective 1.5. Evaluate the costs-benefits of co-monitoring migrating landbirds and bats to meet other objectives and strategies in this plan (see Strategy 3.2.3).

Strategy 1.5.1. Select a group of monitoring techniques, based on results of Strategy 1.4.1, and a review of the bat literature, for cost-benefit analysis.

Action 1.5.1a. Calculate cost of selected monitoring techniques for review. Use this analysis to identify which monitoring techniques are most likely to be effective.

Goal 2. Identify and prioritize information gaps that, if filled, will lead to more effective implementation of conservation for migrating landbirds in the Midwest.

Objective 2.1. Develop a priority list of information gaps.

Strategy 2.1.1 Ensure sufficient review of literature (primary and gray) and consultation with experts is completed such that information gaps are clearly identified and, if answered, will reduce known threats to migrating landbirds through the Midwest, especially for Partners in Flight (PIF) and Joint Venture (JV) species of conservation concern. One or more regional workshops could be incorporated into this process for each of the following actions.

Action 2.1.1a. Compile and summarize previously identified information gaps on stopover sites and connectivity interactions from published and unpublished sources relevant to Midwest landbirds. Reference each source with a set of key words (e.g., landbird migration, research priorities, conservation).

Action 2.1.1b. Compile and summarize the literature on bird-structure collisions with an emphasis on research conducted at sites in the Midwestern United States. From this summary, identify (a) our current understanding of the magnitude, species-specific vulnerability, driving factors, and

spatiotemporal variation in collision mortality, and (b) treatments that reduce collision risk. First contact Dr. Scott Loss about status of regional data and analyses.



Action 2.1.1c. Compile and summarize previously identified information gaps on air space use from published and unpublished sources relevant to Midwest landbirds. Reference each source with a set of key words (e.g., land bird migration, research priorities, conservation).

Action 2.1.1d. Identify and request experts to review list of information gaps for completeness and clarity.

Strategy 2.1.2. Prioritize order in which information gaps are addressed through peer-review and then review this product or have group review and finalize prioritization.

Action 2.1.2a. Evaluate and prioritize summarized list of information gaps. Prioritize from highest to lowest where highest priority information gaps are those where, by filling the information gaps, there will be the highest contribution to increased fitness to the largest number of individuals of species of highest conservation concern as defined by PIF and JV.

Objective 2.2. Maintain a registry of regional and small-scale monitoring and research projects, their leaders, and their contact information.

Strategy 2.2.1. Consult with project leaders to encourage data contributions to the Network.

Action 2.2.1a. Schedule presentations at ornithology or conservation biology conferences to introduce the network and the data center to reach new researchers/collaborators.

Action 2.2.1b. Organize a symposium or associated meeting at a regional conference or workshop, perhaps at the 2016 Stopover Symposium, to share and exchange information among project leaders.



Chapter 3: Promote Conservation of Stopover and Airspace Habitat for Migratory Landbirds

Acquisition of knowledge should inform conservation activities at the regional to local scales to achieve positive effects on migratory landbird populations. Conservation activities cannot wait for all research and monitoring questions to be fully answered, and thus an



adaptive conservation strategy should be employed as conservation implementation is underway. As new information becomes available, conservation activities can be modified to more effectively address the needs of migratory landbirds.

Target Audience: Information users and conservation implementers

Goal 3. Identify and promote conservation of landbird stopover habitat that maximizes survival and reproductive success of migrants in the context of their full annual cycles.

Objective 3.1. For top-ranked (need to define) PIF/JV species, identify where and when limiting factor(s) drive population decline or prevent recovery for Midwest populations.

Strategy 3.1.1. Synthesize existing information on stopover ecology, connectivity, and carry-over effects for these species and specifically for populations of these species where this information exists to identify demographic bottlenecks.

Action 3.1.1a. Produce stopover-specific species accounts that include this information, including research priorities.

Strategy 3.1.2. Encourage/fund research to fill information gaps with an emphasis on stopover sites where specific locations are thought to limit populations.

Action 3.1.2a. Identify and compile a list of relevant funding opportunities (including due dates and web links), and make this widely available to Network participants (via <http://midwestbirdmonitoring.ning.com/> or other means).

Action 3.1.2b. Contact prospective funders and encourage them to incorporate unmet information needs in future requests for proposals.

Strategy 3.1.3. Identify 3-D geographic areas for conservation that incorporate both stopover and airspace habitats that increase survival and reproductive success of migrants. We need to minimize situations where we create, enhance, or preserve stopover habitat if we have dangerous airspace (e.g., wind facilities or communication towers) nearby or along the anticipated route between stopover locations.

Objective 3.2. Use data gathered on stopover use by the monitoring network to identify areas of high conservation priority.

Strategy 3.2.1. Use network data to identify focal areas of high stopover use and to model characteristics of such high use areas to enhance prediction of areas most likely to be used as stopover sites, even if not currently known to be significant stopover sites.

Action 3.2.1a. Prioritize sites predicted to be of high stopover value for restoration and conservation.

Strategy 3.2.2. Synchronize landbird conservation with non-landbird conservation plans and monitoring efforts (shorebirds, waders/waterbirds, etc.) for species that share habitats and/or airspace over water.

Action 3.2.2a. Work with Joint Ventures, Landscape Conservation Cooperatives, and State Wildlife Action Plan Coordinators to identify where areas of high conservation priority to migrating landbirds overlap with other species groups (i.e., shorebirds, waders/waterbirds, butterflies, and fish).

Action 3.2.2b. Update TNC's Great Lakes Stopover Web Portal as new or refined information about priority landbird stopover habitat becomes available.

Action 3.2.2c. Share results of combined habitat prioritization activities (Action 3.2.2a) with organizations that fund habitat restoration or acquisition (e.g., NAWCA, GLRI, Neotropical Migratory Bird Act, TNC, land trusts).

Strategy 3.2.3. Support protection of migrating bat corridors and stopover habitat, particularly in areas where birds are also known to migrate.

Action 3.3.3a. Create focal area maps depicting overlap of high stopover habitat use and priority conservation areas for conservation for both migratory bird and bats.

Action 3.3.3b. Deliver focal area maps to conservation partners to aid in prioritizing areas for land protection and habitat management/restoration.

Objective 3.3. Protect and restore stopover habitat within priority conservation areas.

Strategy 3.3.1. Engage private landowners to protect, restore, and enhance stopover habitat.

Action 3.3.1a. Establish agreements via conservation easements with land trusts (or other means) for high-value stopover sites not otherwise protected.

Action 3.3.1b. Develop management and restoration guidelines to help private landowners improve stopover habitat long-term.

Action 3.3.1c. Deliver information on stopover habitat management to private landowners through special workshops (e.g., Grosbeaks Galore: Birds on Your Landscape Workshop) held locally or at existing landowner events (e.g., WI Woodland Owners Association conferences, garden expos, etc.).

Goal 4. Identify and conserve Midwest airspace that minimizes risks/hazards to migrant landbirds as they move throughout the region.

Objective 4.1. Minimize placement of structures that kill or injure birds in known and modeled concentration areas, including stopover habitat, and mitigate the severity of Strategy 4.1.1. Encourage/fund research to identify altitude of migrants at known or modeled concentration areas, including stopover areas that overlap with potential wind turbine or other construction sites, where the structure (e.g., buildings, especially multi-story buildings) could result in significant migrant mortality.



Action 4.1.1a. Compile existing information from literature and local experts on concentrated bird movements near areas with current or proposed airspace construction.

Action 4.1.1b. Provide decision makers and other stakeholders with information regarding best practices for structure siting and design in or near concentration areas of airspace including stopover habitat.

Strategy 4.1.2. Collaborate with wind energy producers and regulators to develop RFPs and funds for research and to avoid migration "hotspots".

Action 4.1.2a. Work with the Great Lakes Commission to develop and promote a follow-up event to the Great Lakes Pelagic Bird Stakeholder Engagement Workshop in 2014 (glc.org/projects/energy/wind).

Action 4.1.2b. Use relationships that already exist or network with wind professionals from agencies and NGOs to identify funding opportunities.

Strategy 4.1.3. Provide guidance to legislative and regulatory bodies that leads to greater transparency in pre- and post-construction bird and bat studies to fully inform decision process on large or commercial-scale wind power development projects.

Action 4.1.3a. Recommend that each proposed large or commercial-scale wind power development project conduct individual pre-and post-surveys rather than refer to regional data.

Action 4.1.3b. Recommend transparency in study design and analysis as well as results to allow regulatory bodies and stakeholders to assess validity of results.

Action 4.1.3c. Recommend that all survey data and metadata be made available at the appropriate data sharing level in the Midwest Avian Data Center.

Objective 4.2. Assess relative risks/hazards, along with an associated overview of potential corrective actions to reduce those risks.

Strategy 4.2.1. Compile information on current risk assessments addressing impacts (mortality and other potential impacts) of anthropogenic structures on target bird species or groups and identify gaps in knowledge.

Action 4.2.1a. Contact Dr. Scott Loss and the USFWS Migratory Bird Program to obtain and distribute information (via the website or communication tools) on current risk assessments of anthropogenic structures on target bird species or groups.

Objective 4.3. Reduce migrating landbird collisions with communication towers, building windows, power lines, and other anthropogenic structures such as vehicles.

Strategy 4.3.1. Promote adoption of FCC tower lighting guidelines that minimize bird collision mortality rates.

Action 4.3.1a. Promote adoption of these guidelines for towers not regulated by FCC on public lands.

Action 4.3.1b. Conduct outreach and education on these guidelines for state and local environmental review personnel (e.g., Public Service Commissions, state natural resource review teams, local zoning boards) through sessions or information booths at appropriate conferences and meetings.

Strategy 4.3.2. Work with owners/managers of commercial and multi-family buildings containing significant glass area to reduce migrant mortality by participating in lights-out programs, using bird-friendly glass (or glass treatments) and including bird-friendly glass as part of a certification program (e.g., LEED).

Action 4.3.2a. Support and expand the following initiatives throughout the Midwest region: American Bird Conservancy's Bird and Collisions Campaign, Lights Out Programs, Urban Bird Treaties and Urban Refuge Partnerships, statewide Bird City programs, and Audubon's Bird-Friendly Communities program.

Strategy 4.3.3. Work with designers and builders of homes and with glass companies to promote use of bird-friendly glass in construction and replacement windows.

Action 4.3.3a. Facilitate collaboration among window designers and companies to design and promote glass that fills multiple functions such as being bird-friendly, promoting privacy, and reducing energy costs.

Strategy 4.3.4. Promote products and methods for reducing collisions with window glass in residential homes.

Action 4.3.4a. Develop fact sheets/handouts or distribute existing handouts through MLMMN partners.

Action 4.3.4b. Create an online listing of alternative glass products and manufacturers/suppliers. (e.g., walkerglass.com/products/bird-friendly-glass). Collaborate with Green Building Alliance on products and service providers: <https://www.go-gba.org/resources/green-building-methods/bird-friendly-design/>

Strategy 4.3.5. Promote adoption of Avian Power Line Interaction Committee guidelines (www.aplic.org/Collisions.php) to reduce avian mortality due to power lines, particularly raptors.

Action 4.3.5a. Summarize existing power line-collision literature for recommendations relating to landbirds.

Action 4.3.5b. Conduct outreach and education on these guidelines for power utilities, state and local environmental review personnel, and land managers charged with managing habitat near power lines.



Chapter 4: Towards a Sustainable Network of Collaborators and Conservation Information Delivery

Continued progress toward meeting other strategic goals in this plan requires regular and ongoing coordination. The coordination needs of the MLMMN are too great of a



responsibility to be undertaken by individual members of the MLMMN. A dedicated coordinator is needed to achieve the goals of this plan and for tracking accomplishments of the MLMMN. Sustaining collaboration within the MLMMN and with other similar networks will be instrumental to the success of implementing this plan.

Target Audience: *Midwest Landbird Migration Monitoring Network*

Goal 5. Sustain a network of collaborators to support conservation of landbirds during migration.

Objective 5.1. Improve mechanisms for Network collaboration.

Strategy 5.1.1. Improve Network website to provide more information and functions.

Action 5.1.1a. Develop a list of goals and functions for the new website and determine if the Ning website can meet those or if it should just link directly with a new website.

Strategy 5.1.2. Promote regular meeting opportunities for Network members to develop collaborative ideas.

Action 5.1.2a. Meet in-person at the Midwest Bird Conservation and Monitoring workshops.

Action 5.1.2b. Meet annually via conference call or webinar to discuss collaborative ideas and progress on collaborative projects.

Action 5.1.2c. Hold a quarterly webinar series (or some other frequency) to showcase work and interesting findings from Midwest Landbird Migration

Monitoring Network participants. This could include invited talks from other experts who can address new techniques or ways to use data that could be incorporated by MLMMN members.

Goal 6. Sustain delivery of data and information products that support planning and implementation of conservation for migrating landbirds.

Objective 6.1. Work with conservation implementers to identify research, monitoring, and conservation needs as part of an adaptive framework for Goals 1 and 2.

Objective 6.2. Provide information to conservation implementers to enhance conservation delivery for migrating landbirds.

Strategy 6.2.1. Deliver communication tools and methods to aid conservation partners.

Action 6.2.1a. Identify and develop effective communication tools and methods to aid conservation partners (e.g., production of white papers, fact sheets, and frequently asked questions) that provide information on various aspects of migratory bird habitat conservation/restoration. This could be addressed during a workshop (e.g., 2016 State of Stopover Symposium), other meeting, or series of conference calls.³

Action 6.2.1b. Promote new communication tools and methods developed in Action 6.2.1a.

Action 6.2.1c. Provide conservation delivery practitioners with information on workshop presentations available on existing websites (e.g. WI Stopover Initiative, Bird City WI).

Objective 6.3. Build data synthesis capacity.

Strategy 6.3.1. Promote usage of Midwest Avian Data Center to increase data available for synthesis.

Action 6.3.1a. Promote benefits (archiving data, synthesizing data, and collaborative projects) of using the Midwest Avian Data Center to researchers.

Strategy 6.3.2. Identify and provide data outputs (visualizations, summaries, model outputs) that are most useful for conservation delivery practitioners.

Action 6.3.2a. Incorporate a discussion of needed data outputs at relevant conservation meetings (e.g., at the next Great Lakes Commission Pelagic and Nearshore Bird Monitoring Workshop, 2016 State of Stopover Workshop, Joint Venture Science meetings, or during a MLMMN web meeting).

Goal 7. Sustain coordination and leadership for the working group to achieve other goals and monitors progress toward goals.

Objective 7.1. Secure funding and resources necessary for coordination and successful implementation of the strategic action plan.

Strategy 7.1.1. Acquire resources to maintain long-term sustainability of MLMMN members and monitoring/research programs supporting implementation of the strategic action plan.

Action 7.1.1a. Use a conservation business planning approach to develop a brief scope of work for the activities listed in this plan so we have "shovel-ready" proposals to submit to relevant funding sources.

Action 7.1.1b. Build a list of relevant funding sources to seek assistance from (e.g., NFWF, USFWS, Foundations, Endowments) and include timeline of when funding requests are made and available.

Action 7.1.1c. Work with agencies, organizations, and foundations with grant programs to incorporate priority monitoring, research, and conservation projects, as identified by this strategic plan and the MLMMN, into their Requests for Proposals.

Strategy 7.1.2. Develop the necessary coordination and oversight capacity to ensure the plan is implemented according to schedule.

Action 7.1.2a. Determine whether a dedicated staff-person (full-time, half-time), alternating working group chair position, or other model is the most appropriate structure to ensure coordination and oversight.

Action 7.1.2b. Seek necessary commitments or funding resources to support the coordination and oversight role for this network.



Chapter 5: Strategic Action Plan Implementation

Prioritization of strategies for each strategic goal

Over the next five years, the MLMMN Steering Committee members felt it was important to promote strategies and actions toward accomplishing each of the seven strategic goals of the strategic action plan. The members each completed a decision matrix, like that used to prioritize research and monitoring needs, to compare strategies head-to-head. The top ranked strategies for each goal were divided into high and medium priority implementation categories (Table 1).

The Steering Committee proceeded to identify which of these strategies should be implemented in the first two years of implementation (i.e., 2015-2016), in years 3-5 of implementation, or during all five years (Table 1). Members also identified the strategies, based on selection by the majority of members, for which the Steering Committee can play an important leadership role (Table 1).



Next steps for implementation

Step 1: Develop a more detailed implementation timeline for the next two years based on available resources.

Table 1 begins to outline the implementation priorities for the MLMMN over the next two years. The actions associated with these strategies should be prioritized and incorporated into a two-year timeline.

Step 2: Identify partners who are currently taking or can take leadership roles to implement strategies and actions over the next two years.

The MLMMN Steering Committee has identified the strategies for which it can undertake a leadership role in Table 1. The other strategies will require leadership by partners with the MLMMN. In some cases, partners may be currently undertaking these roles. The MLMMN

can provide a central hub for communication among partners and tracking of partner activities toward accomplishing strategic action plan goals.

Step 3: Identify funding needed to implement strategies and actions.

Implementation of many of the activities within the strategic action plan will require funding for coordination, meetings/events, travel for participants, consulting services, and potentially other costs based on top priority actions. Proposals to fund these activities have been developed and submitted since December 2014.



Table 1. Strategy implementation timeline and focus of MLMMN Steering Committee.

	Implementation Period		Leadership Role
	2015-2016	2017-2019	
Goal 1. Sustain and maintain landbird monitoring data from activities that provide information necessary and useful for strategic regional conservation decisions.			
High Priority Strategies			
Strategy 1.1.1. Convene a working group or workshop to establish a standardized migration monitoring protocol for the Great Lakes/Upper Mississippi River region.	X		MLMMN SC
Strategy 1.3.1. Midwest Avian Data Center will be the standard data management system for participants in the Midwest Landbird Monitoring Network.	X	X	MLMMN SC
Medium Priority Strategies			
Strategy 1.1.2. Create a supplemental monitoring protocol that includes newer technologies (radar, acoustics, etc.) and that has some flexibility.	X	X	
Strategy 1.4.1. Prepare catalog of monitoring techniques and measures of fitness used in studies of avian migration.	X	X	
Goal 2. Identify and prioritize information gaps that, if filled, will lead to more effective implementation of conservation for migrating landbirds in the Midwest.			
High Priority Strategies			
Strategy 2.1.1. Ensure sufficient review of literature and consultation with experts completed that information gaps are clearly identified and, if answered, will reduce known threats to migrating landbirds through the Midwest.	X		
Strategy 2.1.2. Prioritize order in which information gaps are addressed through peer-review and then review this product or have group review and finalize prioritization.	X	X	MLMMN SC
Goal 3. Identify and promote conservation of landbird stopover habitat that maximizes survival and reproductive success of migrants in the context of their full annual cycles.			
High Priority Strategies			
Strategy 3.1.2. Encourage/fund research to fill information gaps with an emphasis on stopover sites where stopover sites are thought to limit populations.	X	X	MLMMN SC
Strategy 3.1.3. Identify 3-D geographic areas for conservation that incorporate both stopover and airspace habitats that increase survival and reproductive success of migrants. We need to avoid the situation where we create, enhance, or preserve stopover habitat if we have dangerous airspace (e.g., wind facilities or communication towers) nearby or along the anticipated route between stopover locations.		X	

Table 1. Strategy implementation timeline and focus of MLMMN Steering Committee (continued).

Strategy 3.2.1. Use network data to identify focal areas of high stopover use and to model characteristics of such high use areas to enhance prediction of areas most likely to be used as stopover sites, even if not currently significant stopover sites.		X	MLMMN SC
Goal 4. Identify and conserve Midwest airspace that minimizes risks/hazards to migrant landbirds as they move throughout the region.			
High Priority Strategies			
Strategy 4.3.1. Promote adoption of FCC tower lighting guidelines that minimize bird collision mortality rates.	X	X	
Strategy 4.3.2. Work with owners/managers of commercial and multi-family buildings containing significant glass area to reduce migrant mortality by participating in lights-out programs, using bird-friendly glass (or glass treatments) and including bird friendly glass as part of a certification program (e.g., LEED).	X	X	
Strategy 4.3.3. Work with designers and builders of homes and glass companies to promote use of bird friendly glass in construction and replacement windows.	X	X	
Strategy 4.3.4. Promote products and methods for reducing collisions with window glass in residential homes.	X	X	
Medium Priority Strategies			
Strategy 4.1.1. Encourage/fund research to identify altitude of migrants at known or modeled concentration including stopover areas that overlap with potential wind turbine or other construction sites where the structure (e.g., buildings, especially multi-story buildings) could result in significant migrant mortality.	X	X	
Strategy 4.2.1. Compile information on current risk assessments addressing impacts (mortality and other potential impacts) of anthropogenic structures on target bird species or groups, identify gaps in knowledge.	X	X	
Goal 5. Sustain a network of collaborators to support conservation of landbirds during migration.			
High Priority Strategies			
Strategy 5.1.1. Improve Network website to provide more information and functions.	X	X	MLMMN SC
Strategy 5.1.2. Promote regular meeting opportunities for Network members to develop collaborative ideas.	X	X	MLMMN SC
Goal 6. Sustain delivery of data and information products that support planning and implementation of conservation for migrating landbirds.			
High Priority Strategies			
Strategy 6.3.1. Promote usage of Midwest Avian Data Center to increase data available for synthesis.	X	X	MLMMN SC
Medium Priority Strategies			
Strategy 6.2.1. Deliver communication tools and methods to aid conservation partners.	X	X	MLMMN SC

Table 1. Strategy implementation timeline and focus of MLMMN Steering Committee (continued).

Strategy 6.3.2. Identify and provide data outputs (visualizations, summaries, model outputs) that are most useful for conservation delivery practitioners.	X	X	MLMMN SC
Goal 7. Sustain coordination and leadership for the working group to achieve other goals and monitors progress toward goals.			
High Priority Strategies			
Strategy 7.1.1. Acquire resources to maintain long-term sustainability of MLMMN members and monitoring/research programs supporting implementation of the strategic action plan.	X	X	MLMMN SC
Strategy 7.1.2. Develop the necessary coordination and oversight capacity to ensure the plan is implemented according to schedule.	X	X	MLMMN SC

