

INTEGRATED WATERBIRD *Management & Monitoring*

A continental landscape where non-breeding waterbirds have the right habitat, in the right place, at the right time.



Hooded Merganser. Doris Rafaeli

Program Summary 2015-2017

In the fall of 2015, Integrated Waterbird Management and Monitoring (IWMM) transitioned from a pilot project with limited geographic scope to full-scale implementation of a waterbird management and monitoring program accessible to partners from across the U.S. Marking this transition were several important milestones that serve as measures of IWMM's growth, change and contributions to waterbird conservation. This Program Summary reviews significant IWMM developments for the period between fall 2015 and fall 2017, and describes tools (both currently available and on the horizon) created for wetland managers working to conserve waterbirds and their habitat during the nonbreeding season.

National Protocol Framework for the Inventory and Monitoring of Nonbreeding Waterbirds and their Habitats

The implementation of a nationally approved monitoring protocol framework for nonbreeding waterbirds and their habitats was a turning point for IWMM. A primary objective that had been years in the making, the IWMM National Protocol Framework was adopted by the National Inventory and Monitoring Branch of the USFWS Natural Resource Program Center on January 22, 2015, signifying approval for use at national wildlife refuges across the country. This protocol was the result of a multi-stakeholder collaboration involving participation from National Wildlife Refuges (NWR), States, other federal agencies, NGOs and private landowners during the pilot phase. In addition, the pilot phase encompassed years of field testing, multiple revisions to methods based on participant feedback, and a formal validation study to test habitat metrics. During the last year of the pilot phase, the protocol framework underwent a rigorous peer-review process by several USFWS Zone Biologists and numerous external reviewers. The final product is a recognized framework for non-breeding waterbird monitoring that can be utilized by not only the NWR System but also other land managers interested in monitoring nonbreeding waterbirds. The 2015-2016 field season was the first year participants collected data under the nationally approved protocol, and standardized monitoring for nonbreeding waterbirds officially got underway.



National Protocol Framework for the Inventory and Monitoring of Nonbreeding Waterbirds and their Habitats

An Integrated Waterbird Management and Monitoring Initiative (IWMM) Approach



Version 1.0

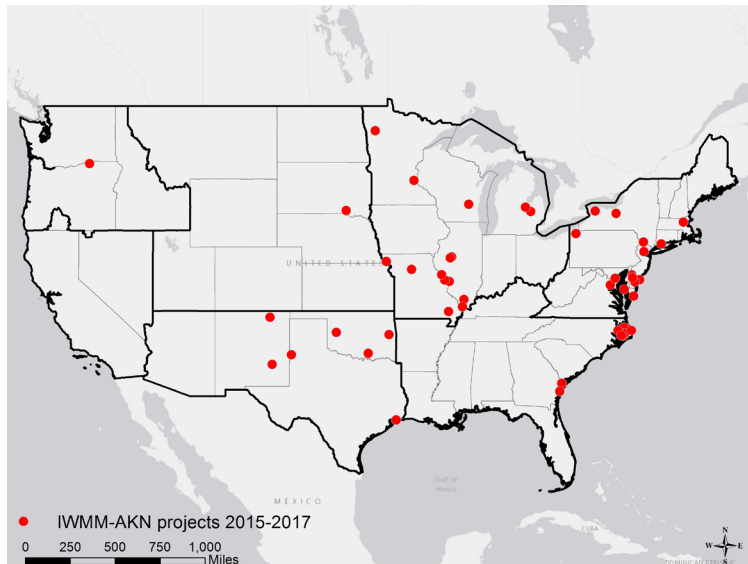
January 2015

Data Management and Reporting Tools: The IWMM – AKN Partnership

During the pilot phase of the project, IWMM staff provided participants with a distributed Access database for data entry and storage. However, the creation of a centralized online database was another key objective of IWMM in direct support of the national protocol and IWMM's wide-ranging efforts to advance waterbird conservation. To that end, IWMM contracted with Point Blue Conservation Science to build an online data management system as a node of the Avian Knowledge Network (AKN). An IWMM-AKN partnership was chosen because the AKN provides a common platform for different organizations to store, share and access data, improving awareness and use at multiple scales. As a node of the AKN, the IWMM online database supports managers and partnerships by enabling users to organize scientific data for analyses, maintain their data on a secure site, and share data and technology.

In the world of waterbird monitoring and data management, the IWMM-AKN node is unique in a few important ways. It not only facilitates local level monitoring and data management, it also enables managers to simultaneously track three kinds of information necessary for informing waterbird management decisions, including bird survey and unit conditions data, vegetation survey data, and management actions data. The data platform also goes a step beyond traditional databases with the inclusion of report generation capabilities. Reports are available for bird and vegetation surveys, unit conditions, bird use days with migration curve plots, and seed production indices for units. Together with information tracked on management actions, managers can use these reports to evaluate how waterbirds and the habitat they rely on are responding to the management actions implemented at their sites.

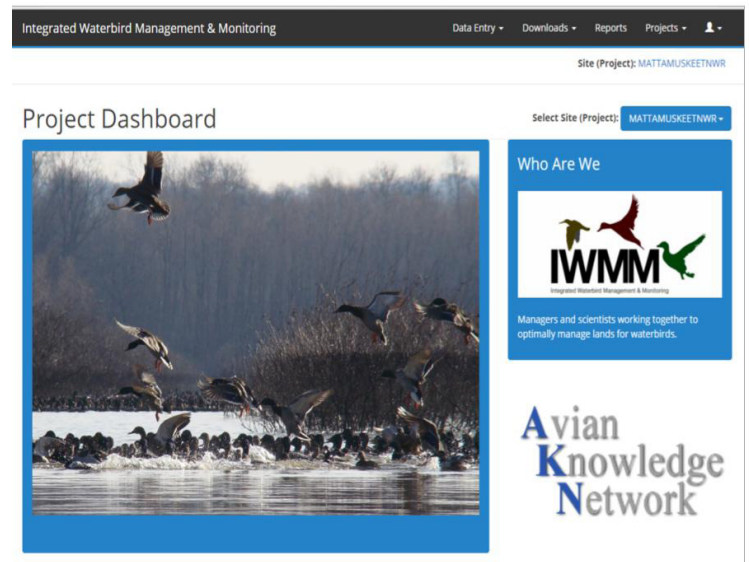
The online database was officially released and available for project setup and data entry to all IWMM participants in December 2015. All projects that participated in the pilot phase and had entered data in the distributed Access database were migrated over to the IWMM database. The database download features and reporting tools were released the following year, in October 2016. Through the partnership with the AKN, IWMM has realized a major milestone forward in its efforts to advance conservation of nonbreeding waterbirds.



Map showing location of IWMM projects that entered data between 2015 and 2017.

Formal Decision Support

In addition to the informal decision support tools described above, IWMM also has developed more formal decision support to help managers at local and flyway scales. For managers making local decisions where multiple wetlands and competing waterbird objectives are targeted, IWMM completed two case studies utilizing a decision analysis approach. Locations for the two case studies included Mattamuskeet NWR in coastal North Carolina, and Clarence Cannon NWR in eastern Missouri, where managers were challenged with a similar decision problem: Specifically, how best to manage and coordinate actions across multiple wetland units for focal guilds of waterbirds with different seasonal use and habitat requirements? The analyses identified combinations of management actions, or portfolios, which could be taken across units to inform and balance habitat delivery given refuge waterbird objectives and funding constraints. Alternative management approaches applied at the unit scale were evaluated and IWMM bird and vegetation survey data were incorporated to predict outcomes of individual portfolios. Through long-term monitoring, these predicted outcomes will be evaluated and used to improve the models.



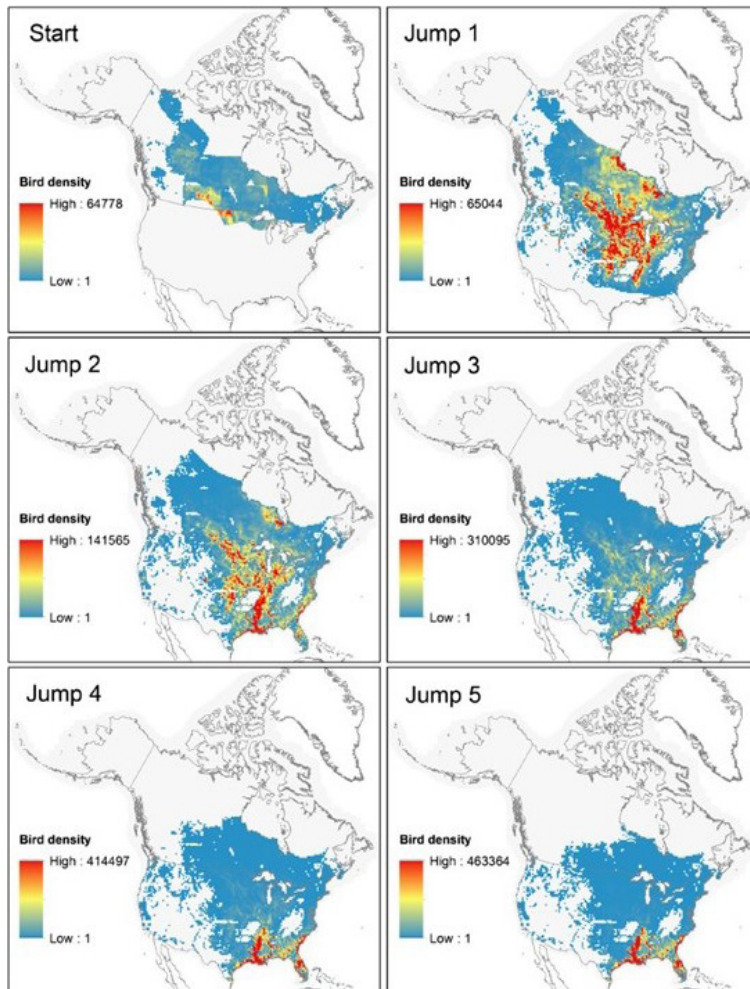
IWMM database entry site on the AKN portal.

IWMM Participant Base and Geographic Expansion

Since the creation of the IWMM-AKN node, 49 projects have entered data and utilized the other features of the database. During the pilot phase there were more projects participating because IWMM provided field technicians and other resources to collect data. It's important to note that current projects (those that entered data in the database during the non-breeding period from August 1, 2016 to May 30, 2017) provide their own staff, volunteers and other resources to collect and enter monitoring data. Currently, 46 projects are collecting data and using our database. Participants include national wildlife refuges, states and other federal agencies.

The geographic area initially targeted the Mississippi and Atlantic Flyways. However, with the approval of the National Protocol framework and development of the IWMM-AKN database, IWMM has now expanded into the Central and Pacific flyways, and includes participants in the Mountain-Prairie, Pacific and Southwest USFWS Regions as well.

At the landscape scale, managers face a different set of decision problems. As migratory waterbirds travel back and forth between wintering and breeding destinations, stopping at multiple locations along the way, their habitat needs are ever changing. As a result, managers must not only consider the right habitat, but also try to provide it at the right times and in the right places. To inform decisions at this scale, data are required on locations and specific timing of habitat use; however monitoring efforts for nonbreeding waterbirds have not been coordinated to the extent necessary to obtain this level of information. To address this problem, staff at IWMM built a generalizable avian movement model (GAME) based on literature coefficients for mallards to simulate waterbird migration at a landscape scale. Being able to visualize migration helps managers determine where and when birds may need to stop and refuel as they move across the continent and manage accordingly. The GAME model was built using data for mallards but can be parametrized for other waterbird guilds as well. Currently, the model is being used to evaluate the importance of refuge lands in the Northeast and Southeast to waterfowl objectives contained in the North American Waterfowl Management Plan.



Simulated fall waterfowl migration.



Avocets. USFWS

Publications, Reports and Resources

Another important goal of IWMM is to ensure a rigorous peer-review process for all of its projects. To that end, IWMM is developing a significant body of peer-reviewed papers that have been published in scientific journals and as technical reports by the US Geological Survey. Publications document: the local and larger scale decision support projects described above; the results of IWMM's first habitat validation study; an analysis that evaluated the ability of habitat-related variables measured by IWMM's protocol to predict local dabbling duck abundance during migration; and an approach to measuring the contribution of IWMM management units to migratory waterbird conservation efforts. Publications include:

- Lonsdorf, E.V., Thogmartin, W.E., Jacobi, S., Aagaard, K., Coppen, J., Davis, A., Fox, T., Heglund, P., Johnson, R., Jones, T., Kenow, K., Lyons, J.E., Luke, K., Still, S., and Tavernia, B. (2016) A generalizable energetics-based model of avian migration to facilitate continental-scale waterbird conservation. *Ecological Applications* 26(4): 1136-1153. <https://doi.org/10.1890/14-1947>.
- Aagaard, K., Crimmins, S.M., Thogmartin, W.E., Tavernia, B., and Lyons, J.E. 2015. Evaluating predictions of local dabbling duck abundance during migration: managing the spectrum of conditions faced by migrants. *Wildfowl* 65:100-120.
- Tavernia, B.G., Lyons, J.E., Loges, B.W., Wilson, A., Collazo, J.A., and Runge, M.C. 2016. An evaluation of rapid methods for monitoring vegetation characteristics of wetland bird habitat. *Wetlands Ecology and Management* 24: 495-505. <https://doi.org/10.1007/s11273-015-9476-5>.
- Aagaard, K.A., Lyons, J.E., and Thogmartin, W.E. 2017. Quantifying the relative contribution of an ecological reserve to conservation objectives. *Global Ecology and Conservation* 9:142-147. <http://dx.doi.org/10.1016/j.gecco.2017.01.002>
- Loges, B.W., Lyons, J.E., and Tavernia, B.G. 2017. Balancing Habitat Delivery for Breeding Marsh Birds and Nonbreeding Waterfowl: An Integrated Waterbird Management and Monitoring Approach at Clarence Cannon National Wildlife Refuge, Missouri. U.S. Department of the Interior / U.S. Geological Survey, Open-File Report 2017-1051, 28 p., <https://doi.org/10.3133/ofr20171051>.
- Tavernia, B.G., Stanton, J.D., and Lyons, J.E. 2017. Integrated wetland management for waterfowl and shorebirds at Mattamuskeet National Wildlife Refuge, North Carolina: U.S. Geological Survey Open-File Report 2017-1052, 43p., <https://doi.org/10.3133/ofr20171052>.

For each of these publications, we produced two-page, easy-to-read summaries highlighting why the work is important to land managers and how it is serving waterbird conservation.

In addition to publications, staff at IWMM have also prepared two technical reports. These include:

- Aagaard, K., Lyons, J.E., Loges, B.W., Thogmartin, W.E. 2016. Technical Report for IWMM Pilot Data, 2010-2014.
- Loges, B.W. 2017. Waterbird Migration Summary for the Fall of 2016 Through Spring 2017 Season and Comparisons of Management Costs for Two Rivers National Wildlife Refuge, Illinois.

All publications, reports and summaries are available at <http://iwmmprogram.org/resources/>.

The IWMM Program Website

An important communications goal for IWMM was to transition from a Ning site that functioned mostly as a forum for IWMM participants, to a more fully developed website that contains all things IWMM. The IWMM website was launched in summer 2015. This website includes a quarterly e-newsletter that provides announcements, updates, and blogs for the IWMM community. In addition, detailed information on the history of the program, its protocols and data management system, and the science behind its monitoring and decision support is available on the site. Links to training, protocols, data sheets and other IWMM documents are also provided. Lastly, users are able to submit technical questions directly on the website.



Reddish Egret. Jim Gray

Looking Ahead

IWMM has several tools anticipated to be available in 2018. To help participants in the field, IWMM is currently beta-testing a mobile application that is expected to be a significant time saver. End-users will be able to enter data for their surveys directly in the field and then upload these data back at the office. IWMM is also developing guidance for those projects with a large number of units where a sampling scheme may be beneficial and help projects collect all three kinds of monitoring data needed to inform local management (bird survey, vegetation survey, management actions). Last, several projects are also planned to further support decision making and include: utilizing IWMM data to help managers decide where best to provide hunting access; addressing information needs to evaluate wetland management objectives contained within refuge habitat management plans; summarizing IWMM pilot data to demonstrate the conservation value of individual units; and providing reports that utilize all three aspects of the IWMM protocol, and increase our understanding of how management affects bird use and habitat response in management units. As these products become available, notices will be sent out via the IWMM newsletter and other channels to keep the IWMM community informed. Stay tuned!

For additional information, visit
iwmmprogram.org
or contact John Stanton,
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