

Coordinated Conservation and Monitoring of Secretive Marsh Birds in the Midwest – 2012 Workshop Review and Recommendations

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ABSTRACT

Effective conservation planning and habitat management for secretive marsh birds is challenging compared to most bird groups. Information regarding abundance, distribution, population trends, habitat relationships, and management needs for these species is limited. Systematic and coordinated marsh bird monitoring has been recognized as a high priority in regional conservation plans and documents describing national information needs. Midwest wildlife organizations recently began addressing identified information gaps. Following a pilot population survey during 2008-12 and associated assessment, Midwest bird conservation partners organized a workshop to discuss implementing an operational marsh bird monitoring program focused on population-level management and conservation needs. In addition to sharing recent findings from the pilot effort, participants reviewed results from a regional survey of marsh bird stakeholder-priorities as well as the relationship between monitoring and effective management. Workshop participants also discussed the foundational steps commonly used to successfully integrate bird conservation and monitoring, with emphasis on “establishing a clear purpose.” We provide workshop highlights, recommendations, and steps for moving forward with Midwest marsh bird monitoring and conservation.

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INTRODUCTION AND PURPOSE

Rails, bitterns, and grebes make up the bird group often referred to as “secretive marsh birds.” Information regarding abundance, distribution, population trends, habitat relationships, or management needs of these species is limited, in large part because of their inconspicuous nature. Some marsh birds (Sora, King Rail, Virginia Rail, Common Gallinule, and American Coot) are designated “webless migratory game birds” and are thus subject to federal- and state-regulated harvest (Seamans et al. 2011). The Upper Mississippi River and Great Lakes Region Joint Venture (UMRGLR JV) developed a habitat conservation strategy for waterbirds including secretive marsh birds (Soulliere et al. 2007; www.UpperMissGreatLakesJV.org). Authors of this document identified and prioritized research and monitoring needs for marsh bird habitat conservation in the region, and implementation of a secretive marsh bird monitoring program was a high priority. Need for systematic and coordinated marsh bird monitoring was further emphasized in the Upper Mississippi Valley / Great Lakes Waterbird Conservation Plan (Wires et al. 2010). In addition, documents that developed priority information needs for the hunted rails and snipe as well as for American Coot, Purple Gallinule, and Common Gallinule (formerly Common Moorhen) identified the implementation of a national marshbird monitoring program as a high priority (Case 2010, Case 2009).

Wildlife conservation agencies and organizations in the Midwest Region (IA, IL, IN, MI, MN, MO, OH and WI) have recently taken a leading role in addressing information gaps related to secretive marsh bird populations. In 2008, Wisconsin became the first state in the U.S. where biologists used a new standardized population survey protocol (Conway 2011) and sampling framework (Johnson et al. 2009) to determine marsh bird occurrence and to estimate population abundance. This pilot survey expanded between 2009 and 2012, when scientists in Iowa, Michigan, Missouri, and Ohio began using the same survey approach to collect data needed to generate population estimates. In addition, the U.S. Fish and Wildlife Service (FWS) Region 3 National Wildlife Refuge System Division of Biological Resources initiated a review of marsh bird population data collected at refuges since 2005. Finally, the Midwest Coordinated Bird Monitoring (CBM) Partnership was formed in early 2009, and conservation and monitoring of secretive marsh birds was also identified by the group as one of their highest priorities. The CBM partnership established an *ad hoc* Midwest Marsh Bird Monitoring Working Group to help coordinate and expand the pilot marsh bird survey.

Effective marsh bird conservation at regional and larger scales calls for a partnership to monitor populations in an integrated, decision-based framework. The pilot survey proved a viable technique for monitoring most marsh bird species, thus UMRGLR JV staff joined scientists from Wisconsin, Michigan, and the FWS Region 3 CBM Program to organize a workshop for moving marsh bird conservation and monitoring forward across the Midwest (see Appendix A for workshop agenda). The venue was used for sharing marsh bird monitoring information, discussing ways for better integrating survey efforts across political boundaries, and helping assure future marsh bird monitoring and management initiatives are linked (i.e., using population monitoring to measure management effect). Held in Milwaukee on 1 August 2012,

the workshop goal was to ***“Develop an initial secretive marsh bird monitoring program, with focus on shared objectives and recommendations for the Midwest Region.”***

Eighteen people participated in the workshop (Appendix B), which began with a summary of the National Marsh Bird Monitoring Workshop held December 2011, in Mobile, Alabama (USFWS 2012, Appendix C). Participants then reviewed the role of monitoring as an essential part of any wildlife conservation scheme. We discussed the explicit relationships between monitoring and management – planning, implementation, monitoring (e.g., habitat and populations), evaluation, and adapting and improving management based on monitoring outcomes. Results of a recent stakeholder survey implemented to quantify values that Midwest wildlife managers place on marsh bird monitoring data and associated products were also reviewed.

SUCCESSFUL CONSERVATION THROUGH MONITORING

Leading up to the workshop, the *ad hoc* Midwest Marsh Bird Monitoring Working Group (Appendix B) had largely focused on testing the pilot marsh bird survey across several states. Assessing the efficacy of the sampling design and protocols in the context of broad-scale surveillance monitoring was a primary concern, as well as the ability of conservation partners to implement the survey. Efforts of the Working Group and associated conservation agency staff contributed to the standardized North American marsh bird monitoring protocol (Conway 2011), flexible sampling design, and an initial data management system. Consequently, the USFWS Division of Migratory Birds and partners now seek to operationalize a marsh bird monitoring program focused on population level management and conservation needs. Any framework for marsh bird monitoring must be driven by the management or policy objectives of stakeholders. These objectives must be explicit to ensure a monitoring program is designed at the appropriate scale, scope, and intensity to address the objectives (USFWS 2012).

Because authors of *The Northeast Bird Monitoring Handbook* (Lambert et al. 2009) have so thoroughly developed and explained 10 foundational steps to successful bird conservation through improved monitoring, we framed much of our workshop discussion around the following 10 steps:

1. *Establish a clear purpose*
2. *Determine whether an existing program or protocol meets your needs*
3. *Assemble a team of collaborators with complementary interests and skills*
4. *Summarize the relationship of target populations to other ecosystem elements, processes and stressors (Build a conceptual model)*
5. *Develop a statistically robust approach to sampling and data analysis*
6. *Design and pilot standardized field protocols that minimize error and bias*
7. *Identify or develop a data management system*
8. *Implement the monitoring program*
9. *Present results in a format that supports sound management and conservation decisions*

10. *Evaluate and adjust management and monitoring to make better bird conservation decisions*

In order to develop an operational secretive marsh bird monitoring program with shared objectives, the workshop focused on steps 1-4, especially step 1, “establishing a clear purpose.” We provide workshop discussion highlights and recommendations for these steps below. In addition, advances have occurred in the Midwest region regarding steps 5-10, and aspects of each step were reviewed during the workshop. Using that information and post-workshop collaboration among workshop organizers, we developed a status update for steps 5-10 and provide recommendations when possible.

Monitoring Program Steps 1-4 (*workshop focus*)

1. Establish a clear purpose. Midwest marsh bird population (Wires et al. 2010) and habitat (Soulliere et al. 2007) conservation objectives have been established, but they are largely expert-based due to lack of sound population estimates and trend data. Moreover, conservation interests and associated monitoring needs of stakeholders had not been clearly articulated. Progress is occurring in establishing science-based population estimates for some states, and a recent survey of Midwest marsh bird conservation stakeholder priorities has been conducted (Kahler, unpublished data). By sharing results of a 2011 national marsh bird workshop and the 2012 stakeholder survey, as well as information from Midwest regional waterbird population and habitat conservation plans, the workshop participants were able to thoroughly discuss the purpose of monitoring and its relationship to management. (*Note: Complete results of the Midwest stakeholder survey of marsh bird monitoring priorities will be available in a separate UMRGLR JV technical report in early 2013*).

The Midwest marsh bird stakeholder survey proved extremely valuable. Results helped quantify perceptions of the Midwest marsh bird conservation community. Over 50 unique monitoring priorities for secretive marsh birds across the region were grouped into six broad monitoring objectives. Survey respondents ranked these objectives based on 1) how important they viewed the information gained in reaching a desired understanding of secretive marsh bird populations, 2) how likely a better understanding would lead to conservation actions directly benefiting secretive marsh birds, and 3) the scale at which the objective would be best assessed. Stakeholders ranked monitoring for “Species of Greatest Conservation Need” (SGCN) and Endangered and Threatened (E/T) species higher than for other marsh bird categories (hunted species only, non-game species only, and all species combined). Regardless of species group (i.e., all, non-game, hunted, species of concern, etc.), the monitoring objectives ranked highest by Midwest marsh bird stakeholders were 1) assessing population response to habitat restoration and 2) determining species distribution and population trends for the Midwest region. Respondents reported that assessing species distribution, population trends, and gaining a better understanding of species-habitat relationships and species life history requirements would best be assessed at the regional scale (Kahler, unpublished data).

Additional information regarding marsh bird survey protocol and framework, history, participant affiliation, and land ownership was also collected via the stakeholder survey. Using initial results from the stakeholder survey and experience gained during participation on the Midwest Marsh Bird Monitoring Working Group, workshop organizers developed a draft goal and objectives for a regional marsh bird monitoring program. These initial statements were reviewed and adjusted during the workshop, with participants agreeing on the following monitoring program goal: *Monitor Midwest secretive marsh bird populations, increase understanding of species habitat associations and response to conservation actions, and refine species population objectives and associated future monitoring efforts based on initial survey information.* Post workshop discussion among Midwest Marsh Bird Working Group members resulted in a broader Midwest marsh bird conservation goal, with objectives very similar to those developed at the workshop:

Goal -- Ensure long-term stability of secretive marsh bird populations in the Midwest region.

Objectives --

1) By 2014, develop a process for estimating breeding marsh bird population abundance and distribution using the national monitoring protocol and sampling design, with focus on key regions / scales (e.g., Bird Conservation Region 23, Mississippi Flyway) and species (e.g., SGCN, game species). Generate population estimates for a group of designated focal species and delineate distribution as a baseline for future population trend assessment.

2) By 2015, develop conceptual models of population dynamics and hypothesized influences (limiting factors) during the full life cycle for Midwest marsh bird focal species to inform conservation planning.

3) By 2015, analyze relationships between marsh bird abundance and fine- and large-scale landscape variables (e.g., vegetation structure and invasive species, wetland size and abundance, land use and cover-type composition, disturbance regime) to better understand habitat associations in breeding areas. This will require agreement regarding what habitat variables to measure while conducting marsh bird surveys.

4) By 2016, collaborate with conservation partners (e.g., JVs, Mississippi Flyway Council) to develop science-based population objectives and refine monitoring effort to meet emerging management information needs (i.e., stratified monitoring and related approaches will be used to address management hypotheses).

Workshop participants recommended we circulate these draft goal and objective statements to key marsh bird management and monitoring partners for review and further refinement. By 2013, the goal statement and objectives for a Midwest secretive marsh bird monitoring program will be finalized, but with anticipated adjustments as population and habitat information is improved. In addition, several research hypotheses serving the broader objectives above were identified during the workshop. For example, one immediate evaluation

interest included: *Can impoundment management for waterfowl (e.g., hemi marsh/moist soil units) be conducted in a manner that also provides value to secretive marsh birds?*

2. Determine whether an existing program or protocol meets your needs. Midwest organizations participating in large-scale monitoring are using the National Secretive Marsh Bird Monitoring Protocol (Conway 2011) and sampling design (Johnson et al. 2009). This approach is believed adequate for many Midwest secretive marsh bird species with the exception of uncommon rails (Yellow, Black, and King Rails) and perhaps Least Bittern (Tozer et al. 2006). These species likely require a modified survey design to achieve effective monitoring (e.g., Jobin et al. 2011). The appropriate survey protocol for each species can be determined through time to better meet partner needs, especially when new population objectives are established (i.e., conservation objectives drive monitoring protocol).

3. Assemble a team of collaborators with complementary interests and skills. An informal Midwest Marsh Bird Monitoring Working Group has met periodically since 2010, and marsh bird monitoring is typically a focus of discussion for the UMRGLR JV Waterbird Committee, which includes wildlife agency and NGO scientists.

Workshop participants recommended the *ad hoc* Midwest Marsh Bird Monitoring Working Group become a formal entity (the “Midwest Marsh Bird Working Group”), with regular interaction, the assignment of a group chair-person, and potential melding or close collaboration with the UMRGLR JV Waterbird Committee. The Working Group must focus on refining, prioritizing, and achieving identified marsh bird conservation / monitoring objectives. Workshop participant Jean Favara offered to join the 23 member Working Group (Appendix B) and Greg Soulliere offered to serve as chair for one year, through summer 2013. Inviting a member of the Mississippi Flyway Council Technical Section’s Webless Game Bird Committee to participate on the working group was also recommended in order to better integrate with harvest managers and address Mississippi Flyway Council concerns regarding marsh bird monitoring. Mark Seamans offered to continue assisting the working group, providing a national perspective.

4. Summarize the relationship of target populations to other ecosystem elements, processes, and stressors. General life history information is available for marsh bird species in various sources including the Birds of North America website, the UMRGLR JV Waterbird Habitat Conservation Strategy (Soulliere et al. 2007), and the Migratory Shore and Upland Game Bird Management in North America book (Tacha and Braun 1994). In addition, some biological models have been developed by the UMRGLR JV and others to quantify habitat needs and target conservation effort.

Workshop participants recommended using improved understanding of Midwest marsh bird populations to develop conceptual models of population dynamics and hypothesized influences (limiting factors) for focal species during the full annual cycle to inform conservation planning. The target date for completing this effort is 2016, as stated in program objective 2 above.

Monitoring Program Steps 5-10 (*associated workshop discussion*)

5. Develop a statistically robust approach to sampling and data analysis. A secretive marsh bird survey protocol (Conway 2011) and sampling design (Johnson et al. 2009) have been developed and implemented since 2009 on a pilot basis in Michigan, Missouri, Ohio, and Wisconsin. Marsh bird surveys have also been conducted in Illinois for several years using a framework and protocol similar but not identical to these other regional efforts. The pilot study revealed 1) a general-omnibus style survey design (like the Breeding Bird Survey) in emergent marsh communities is valuable for estimating abundance of species such as Sora, Virginia Rail, and American Bittern; 2) a general survey design is not useful for estimating the abundance of rare species such as the Black, King, and Yellow Rails and Least Bittern, thus is unlikely to effectively inform habitat management decisions; and 3) use of stratification within a general design would allow for tailoring monitoring to test ecological or management hypotheses (USFWS 2012).

Data analyses are being conducted by multiple marsh bird conservation partners, with completed and on-going assessments of species-habitat relationships using data collected in Iowa, Michigan, and Ohio. USFWS scientists (Mark Seamans) have analyzed some WI data. The Midwest Marsh Bird Working Group needs to clarify roles and responsibilities for data analysis at various scales (e.g., JV Science Office = Midwest region, state agency staff = state and smaller scales). Likewise, the Working Group must coordinate development of management hypotheses and determine the stratified monitoring and related approaches to address these management hypotheses.

6. Design and pilot standardized field protocols that minimize error and bias. The Conway (2011) protocol has been accepted as the standard for most species; however, Yellow Rail, Black Rail, and Least Bittern may not be adequately represented with this approach. In addition, due to the low density of King Rails in much of the Midwest region, the level of sampling effort typically used may be inadequate to develop meaningful abundance and distribution estimates for developing management decision-support tools. The Midwest Marsh Bird Working Group should explore alternative survey protocols for these species. Moreover, use of surrogate species population monitoring may be a viable alternative, requiring future correlative assessment between Yellow Rail, Black Rail, or Least Bittern presence/absence with the occurrence of other species.

7. Identify or develop a data management system. U.S. Geological Survey (USGS) staff members at Patuxent Wildlife Research Center have developed and currently maintain the National Marsh Bird Population Database, with a remote, web-based data entry capability (Seamans et al. 2011). This location may provide a coordinated repository for marsh bird monitoring data; however, a formalized process for data transfer from state and NGO programs does not currently exist. The Midwest Avian Data Center (MWADC), a regional node to the Avian Knowledge Network, may serve as a regional avian data management and decision support system. MWADC can help aggregate data from the National Marsh Bird Population

Database with other marsh bird occurrence records from throughout the region to support marsh bird conservation planning and evaluation.

The MWADC seeks to access the National Marsh Bird Population Database. Currently, most marsh bird monitoring efforts are sending survey data to the national database at Patuxent, most often in Excel spreadsheet format, where someone there must load them into the database. Perhaps a formal agreement between MWADC and staff at Patuxent could make the data available to Midwest users through the MWADC platform. Additional discussion is required regarding whether programs submit survey data directly to the national database or to a data collator. The collator could compile all partner data, cross walk it to national database standards, and submit it on behalf of the region. Timing and submission guidelines must also be determined, with collaboration from the Midwest Marsh Bird Working Group.

8. Implement the monitoring program. Several states within the Midwest region are already implementing marsh bird surveys using the Conway (2011) protocol and the Johnson et al. (2009) sampling framework. This framework is flexible and allows for more intensive surveys within pre-determined strata such as areas with management treatments, public vs. private ownerships, state boundaries or bird conservation regions. However, more coordination is needed to increase the value of partner efforts, especially as remaining states begin surveys and/or changes are made to survey protocols or sampling designs to better address management questions. The ability of conservation agencies and organizations to fund a new long-term survey also remains a concern. While “start-up” grants have been available to state agencies and organizations joining the regional survey effort, funding for a long-term operational survey may be limited. A coordinated regional-scale approach to monitoring and evaluation and use of trained citizen scientists (volunteers) can help mitigate costs while retaining value; potential partners able to train and coordinate volunteers must be identified.

9. Present results in a format that supports sound management and conservation decisions. Regional scale data analysis and communication of monitoring results has not been achieved. After initial population abundance and distribution assessments are completed at state and regional scales, the Midwest Marsh Bird Working Group should determine what products will be most used by managers and decision-makers to improve marsh bird conservation. Discussion with these and other stakeholders is required to assure monitoring data and associated information is of greatest value.

Initially, results might be presented in a population status report with process, shortcomings, and survey issues in need of improvement identified. Sharing GIS data may be challenging due to organization policy, especially those associated with rare and endangered species. Additional discussion is needed regarding use and applicability of spatial data among partners. Analyses at the PSU (i.e., primary sample unit or “route”) scale may be most relevant to managers, tracking secretive marsh bird relative abundance or occupancy across years and presenting data as a spatial product. The relationship between population change and land cover or other similar habitat changes may also be compared using spatial data within PSUs.

10. Evaluate and adjust management and monitoring to make better bird conservation decisions. Explicit connections between conservation actions and a marsh bird monitoring effort must be articulated before this step can occur. While specific management/restoration actions to be evaluated will likely have regional differences, there remains an overarching theme to use monitoring approaches to address management hypothesis testing. As these connections are developed, we will periodically revisit our biological models and assumptions, adapt management actions as needed, and adjust monitoring efforts if critical information is lacking.

MOVING FORWARD

Formalizing the Midwest Marsh Bird Working Group was a key step to moving marsh bird conservation forward in the region. A subgroup of members has committed to 1) complete the analysis of data collected during the 2012 survey of Midwest marsh bird stakeholders to quantify priorities related to monitoring, 2) compare these findings with national marsh bird program priorities (USFWS 2012), 3) develop research hypotheses to inform priority information needs while increasing the value of monitoring at larger scales, 4) propose adjustments to state-level sampling schemes to address hypotheses, and 5) generate a draft list of focal marsh bird species (“surrogate species”) representative of distinctive marsh bird habitat types and species guilds. The subgroup has committed to developing draft research hypothesis to share with the full Working Group by late November 2012. Hypotheses will be prioritized by the end of 2012 so that survey protocol may be adjusted as needed for spring 2013. Discussion of longer-term marsh bird conservation goals may take place at the December 2012 meeting of the UMRGL JV Science Team, as there is significant overlap between Midwest Marsh Bird Working Group and members of the JV Waterbird Committee.

ACKNOWLEDGEMENTS

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Appendix A. Agenda for Collaborative Conservation and Monitoring of Midwest Secretive Marsh Birds Workshop, Milwaukee 2012.



Midwest Bird Conservation and Monitoring Workshop

AUGUST 1, 2012

Hilton Milwaukee City Center, Milwaukee, Wisconsin

Collaborative Conservation and Monitoring of

Midwest Secretive Marsh Birds

Killbourn Room

Goal: Develop an initial secretive marsh bird monitoring program, with focus on shared objectives and recommendations for the Midwest Region (FWS Region 3).

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|------------------|---|
| 8:30 – 9:00 AM | Introductions and overview (Greg Soulliere and Tom Cooper)

<i>Workshop format, 2011 national workshop review, Midwest and National initiatives and support</i> |
| 9:00 – 9:30 AM | Midwest marsh bird conservation partner survey (Ben Kahler)

<i>Results of recent questionnaire survey by UMRGLR JV -- monitoring priorities of Midwest marsh bird conservation partners</i> |
| 9:30 – 10 AM | Refining marsh bird monitoring objectives (Mike Monfils and Ben Kahler)

<i>Developing regional monitoring objectives linked with national marshbird conservation</i> |
| 10:15 – 10:30 AM | BREAK |
| 10:30 – 11:45 AM | Steps to successful monitoring (Group – Greg, Tom, Mike, and Ben)

<i>Review and discuss key steps still needed to develop a Midwest monitoring program (see page 2, from Northeast Bird Monitoring Handbook)</i> |
| 11:45 AM – Noon | Recommendations for Midwest marsh bird monitoring (Greg Soulliere) |

Appendix B: Midwest secretive marsh bird monitoring workshop participants (Milwaukee 2012) and other key marsh bird monitoring stakeholders. Members of the Midwest Marsh Bird Monitoring Working Group are shaded.

Name	Affiliation	Email Address
<i>August 2012 marsh bird workshop attendees</i>		
Nick Anich	Wisconsin DNR	nicholas.anich@wisconsin.gov
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<i>Working group members unable to attend workshop</i>		
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Appendix C. Management and conservation of secretive marshbirds: brief update for the flyways, July 2012 meetings.



Management and Conservation of Secretive Marshbirds

Brief Update for Flyways – July 2012

Background

Compared to other birds little is known about the ecology and population status of secretive marshbirds (rails, bitterns, common and purple gallinule, Wilson's snipe, limpkin, and American coot). Emergent marsh habitat has declined precipitously over time and what remains is typically managed for something other than marshbird conservation. In addition, many of these species are hunted in the U.S. Two national workshops (in 1998 and 2006) laid the groundwork for activities to improve our understanding of the status and ecology of these species. Over the past year, the U.S. Fish and Wildlife Service (FWS) and its partners (e.g., USGS, States, and Academia) worked to identify the highest priority population-scale issues for marshbird conservation and management. This was done by examining existing reports that document needs (e.g., regional waterbird conservation plans, State Wildlife Action Plans, federal Focal Species Action Plans, Webless Migratory Game Bird Priority Information Needs), and during a third workshop that was held December 2011 in Mobile, Alabama. Based on these efforts, partners believe that monitoring to inform specific management decisions should proceed as priority issues are identified by the marshbird management community.

Pilot Results

As population monitoring was identified as a means of filling several information needs, a pilot monitoring study was conducted during 2008-2011 in seven states. The pilot study revealed that: (1) a general-omnibus style survey design (e.g., like the Breeding Bird Survey) in emergent marsh habitat is valuable for estimating abundance of common species such as clapper rail, sora, Virginia rail, and American bittern; (2) a general survey design is not useful for estimating the status of rare species such as the black, king, and yellow rail and is unlikely to effectively inform habitat management decisions; and (3) use of stratification within a general design would allow for tailoring monitoring to test ecological or management hypotheses.

Issues for a National Program

Issues that were identified before, during, and after the 2011 Workshop can be grouped into three broad categories: harvest management, habitat management, and management to sustain or improve the status of rare or declining species. As described above decision- or hypothesis-driven monitoring designs are needed to inform habitat and population management. The list of priority issues below is not exhaustive and will be refined with issues added or removed in the future. Thus, a dynamic program is being proposed that will directly inform management decisions and meet information needs for emerging issues. This represents a new approach to implementing a national monitoring program; rather than a single omnibus survey, scale-appropriate monitoring will be conducted based on existing or developing decision frameworks or to test ecological or management hypotheses. Although some issues will vary by region, it is a "national" program in that issues identified represent the highest priority issues for the U.S. Moreover, because the same protocol targeting all marshbirds is used for all breeding season surveys, efficiencies exist due to the significant overlap among issues. For example, data collected to test hypotheses concerning king rail habitat requirements can also be used to inform other habitat and harvest management issues. The use of a common protocol and probabilistic design will allow for data to be compared across space and time, and analyzed at various spatial scales to address specific questions.

Priority Issues Identified December 2011

- ***Reversing declines in the Midwest populations of King Rail.*** King rails have declined in abundance throughout their range, with the Midwest population evidently in the greatest trouble. Declines are

believed to be related to habitat loss. King rails are also subject to harvest. Habitat related hypotheses predicting presence have been tested along the south Atlantic Coast (North Carolina), Gulf Coast, and in the Upper Midwest. Additional habitat hypotheses are being developed and one is being tested in 2012 in the lower Midwest (mostly in Arkansas).

- **Habitat-specific densities of wintering Yellow Rail and Black Rail.** Little is known about the ecology and status of these two species but populations of both have apparently declined. Conservation of wintering habitat along the Gulf Coast is thought to be the most critical need for these species. Habitats in this region are not managed for these two species, yet management of wetlands undoubtedly affects them. A study is being developed with a monitoring program to estimate and compare wintering densities of these two species among vegetative communities and among management regimes along the Gulf Coast. Habitat and management hypotheses are being developed and field work will begin winter 2012-2013.
- **Evaluation of Management treatments – Wetland prescriptions for the benefit of all wetland birds.** Habitat quantity and quality are the fundamental drivers of marshbird populations. There are many regional issues and work has begun on some of these. Two efforts in particular are quite advanced: salt marsh management in the San Francisco Bay, and addressing sea level rise in salt marsh habitat in the Northeast. Other work being considered includes assessing the effect of impounded wetland management and invasive plant species management on marshbird populations in the Upper Midwest.
- **Harvest Management.** Eight marshbird species are harvested (four rails, purple and common gallinule [latter was formerly the common moorhen], American coot, and Wilson's snipe). Most harvest occurs in coastal states on the wintering grounds in the Atlantic, Mississippi, and Central Flyways. There are no formal harvest management strategies for these species. Depending on the strategy adopted, there are many options for monitoring to inform harvest decisions. The most expensive would likely be a probabilistic survey tailored to inform management. To inform a harvest decision like those in the interim mourning dove strategies, estimated annual cost for monitoring per Flyway in freshwater habitats is \$50-150k, depending on target species and desired precision (clapper rail in coastal habitats would need its own monitoring effort). Alternatively, a model-based approach that uses habitat associations and data from other efforts can be used to estimate abundance, which would be cheaper but carries more assumptions.
- **State Wildlife Action Planning (SWAP) Needs.** Each state's role in addressing priority issues will vary, and this may be done in conjunction with SWAP. Each state in the U.S. must develop a SWAP document to receive federal funds for conservation. SWAP identifies conservation issues, needed actions, and individual species of special concern due to rarity or decline. Even though marshbirds are listed as species of concern on many SWAP documents, there is typically little empirical data to assess their status or conservation needs. Individual state-based monitoring can be couched within other issues here, which would ensure that conservation enacted at the state level contributes to regional population objectives.

A business plan is being drafted that expands on the issues identified above and identifies areas of overlap. The plan will be circulated to all stakeholders for review. The estimated date for completion of the plan is fall 2012. For further information contact any member of the plan's steering committee: Mark Seamans: mark_seamans@fws.gov, Jennifer Wheeler: jennifer_wheeler@fws.gov, Katie Koch: katie_koch@fws.gov, Tom Cooper: tom_cooper@fws.gov, Chris Dwyer: chris_dwyer@fws.gov, Courtney Conway: cconway@usgs.gov, Greg Shriver: gshriver@UDel.Edu.