Assessing Joint Venture Status and Approaches for Integrated Planning and Habitat Delivery across Bird Taxa

Unified Science Team and North American Waterfowl Management Plan Science Support Team

Technical Report No. 2022–1

Gregory J. Soulliere
Upper Mississippi/Great Lakes Joint Venture

Brad A. Andres
U.S. Shorebird Conservation Partnership

Mark J. Petrie
Ducks Unlimited

Anne E. Mini
Lower Mississippi Valley Joint Venture

William G. Vermillion
Gulf Coast Joint Venture

Josh Vest
Prairie Pothole Joint Venture

Recommended citation:

Soulliere, G. J., B. A. Andres, M. J. Petrie, A. E. Mini, W. G. Vermillion and J. Vest. 2022. Assessing Joint Venture approaches for integrated planning and habitat delivery across bird taxa. Unified Science Team and North American Waterfowl Management Plan Science Support Team, Technical Report No. 2022–01. 25 pp.

EXECUTIVE SUMMARY

Habitat Joint Ventures (JVs) originally formed under the auspices of the North American Waterfowl Management Plan have assumed responsibility for the conservation of multiple bird groups including waterfowl, landbirds, shorebirds, and waterbirds. Using a variety of methods, JVs are identifying the conservation needs for each bird group, which are typically described in JV Implementation Plans. As JVs continue to make progress in establishing conservation objectives for each bird group, there is growing interest in determining how objectives might be integrated across bird groups to increase the efficacy of all-bird conservation. As a result, we assessed and reported integration techniques used by JVs. This effort included developing a set of questions used to interview staff members from all 22 North American habitat JVs and document the current state of bird-taxa integration by the JV community. Joint Venture regional partnerships have unique geographies and distinct political, cultural, historical, and biological features affecting their operations. Our intent was to capture the full range of bird-group integration experiences within JVs.

Joint Venture representatives participating in this assessment indicated appreciation for the opportunity to contribute. Most (59%) JVs responded that their conservation work included consideration of more than one bird group using “common habitats” within planning units, but only three (14%) indicated their planning documents explicitly integrated (combined) habitat conservation objectives for multiple bird taxa. Joint Ventures more advanced in multiple bird-group planning had a strong science foundation linked to species-habitat models and landscape prioritization and often designated focal species or umbrella species as habitat representatives. The waterfowl bird group had the strongest science foundation in the highest proportion (82%) of JVs. Nearly half (45%) of JVs used BCRs as their primary planning units, but many also specified that they “step-down” large BCRs into smaller sub-regions for planning or habitat implementation. Planning for designated focus areas, typically dominated by a primary bird habitat category within a BCR(s), was also common (27% of JVs).

The potential to increase efficiencies related to multiple bird-group planning and habitat delivery was recognized at various scales, ranging from individual projects to planning landscapes to entire JV regions. Most (82%) JVs indicated existing government-funded conservation programs were broadly suitable for delivering JV-established objectives for at least some bird groups. In general, JVs identified the USDA Natural Resource Conservation Service Farm Bill programs as most suitable for implementation, followed closely by projects supported by the North American Wetlands Conservation Act (NAWCA). Two categories — data/knowledge needs (35%) and capacity/resource needs (30%) — were identified by JVs as the most important barriers to increasing integrated conservation across bird taxa. Predictably, the top (65%) solution identified by JVs to eliminate barriers was to increase capacity for science and implementation. The majority of JVs indicated meeting a mission for all-bird conservation required integration of bird-group conservation in some manner.

Regarding measuring effectiveness, no JV identified a dedicated program in place to evaluate their all-bird conservation outcomes beyond site-scale monitoring efforts. Many JVs assume conservation actions targeted at focal species also benefit other birds in specific habitat guilds or occurring in common areas. The most frequently identified opportunities to move integration forward were associated with JV habitat-focus areas for wetland birds (32%) or wetland-grassland-pollinator complexes in cropped landscapes (18%).

Highly variable approaches to integrating multiple bird-taxa objectives and inconsistent spatial planning units among JVs may hamper ability to integrate work across regions sharing common bird cohorts during the full annual cycle. Furthermore, inequity in the knowledge base of various bird groups remains a barrier for achieving integrated conservation of all birds (i.e., science weakness in ≥ 1 taxa area leads to weakness in integration). Although various direct and indirect bird-conservation integration is already taking place, expanded capacity for JVs and their collaboration networks was considered critical to leverage more resources, especially related to expanding and complementary environmental initiatives (e.g., addressing climate change). Moreover, if land cover changes due to development, intensive agriculture, and climate factors continue at current rates, traditional JV decision-support models will become less meaningful. Predicting future bird response to habitat management may be even more uncertain due to accelerated environmental change. Consequently, the focus on customary products (e.g., bird species/guild abundance and distribution) familiar to previous generations of wildlife managers may need to become more pliable as we plan and work in increasingly altered and changing systems. Continued networking among bird scientists, land managers, and other relevant experts will be important to better leverage knowledge and resources to most benefit birds and people.

INTRODUCTION

The North American Waterfowl Management Plan (NAWMP) was established in 1986. It advocated the use of regional joint ventures, partnerships that combine skills and resources to create synergy, to achieve NAWMP goals for restoring continental duck populations. The 1998 NAWMP offered an updated vision that *Plan partners collaborate with other conservation efforts, particularly migratory bird initiatives, and reach out to other sectors and communities to forge broader alliances in a collective search for sustainable uses of landscapes*. The U.S. Fish and Wildlife Service Director's Order No.146 further articulated collaboration among migratory bird initiatives in 2002. It stated that *a Joint Venture should accept the responsibility for delivery of national or international bird conservation plans, and Joint Ventures should work to develop the capacity to become the delivery agents for all migratory bird habitat conservation priorities in their geographic areas*.

Regional bird habitat Joint Ventures (JVs) have adopted a variety of approaches for addressing goals in continental bird plans focused on waterfowl (NAWMP), landbirds (Partners in Flight), shorebirds (U.S. Shorebird Conservation Plan), and waterbirds (North American Waterbird Conservation Plan). Some have developed separate habitat

chapters (or strategy documents) for each bird group within their implementation plans, each with population and habitat objectives specific to bird groups or guilds. Other JVs have used more general approaches, describing land-cover characteristics required by specific or multiple bird groups and developing expert-based conservation targets to sustain abundances of birds and key habitats occurring in that JV geography.

In recent years, the Unified Science Team (UST) membership has shared methods and examples for JV integration of population and habitat objectives across bird groups as well as integration of biological and social objectives. In 2019, the UST – working with members of the North American Waterfowl Management Plan Science Support Team (NSST) – committed to summarize the current state of integration across bird taxa and develop an information product to share with the JV community. The UST envisioned a document illustrating integration examples and identifying means to help JVs further their integration efforts. To accomplish this task, the UST established an ad hoc committee (Team 2) to develop a questionnaire survey and to conduct interviews of key staff members from all regional bird habitat JVs in North America. Joint Venture regional partnerships have unique geographies and distinct political, cultural, historical, and biological features affecting their operations. Our intent was to capture the full range of JV integration experiences and provide information to help inform a bird-group integration roadmap or framework for interested JVs.

METHODS

We (Team 2 subcommittee) established a questionnaire survey to use for interviews of JV staff members, principally targeting JV Coordinators but also welcoming others at the discretion of the coordinator. Both new and seasoned coordinators often invited the JV Science Coordinator and, less frequently, other staff members to participate in the interview. Six primary questions (one with four components) were developed and refined by members of the ad hoc Team 2, which included one social scientist. The questionnaire was pilot tested on a sample of JV Coordinators and Science Coordinators (n = 4), resulting in additional minor adjustments to question wording as well as establishment of a standardized interview introduction. During the winter of 2021, about one month before scheduled interviews, a final set of questions (Appendix A) was distributed to the remaining 20 JV Coordinators not involved in the pilot study. Interviews were conducted virtually (Microsoft Teams and Zoom) during the winter and early spring of 2021.

Each interview session began with a few minutes of casual conversation among participants, and interviewees were informed the process would take less than one hour. They were then read the prescribed introduction (Appendix A) prior to asking question one. Interviewees were allowed as much time as necessary to answer each question. Their responses were recorded in writing and or digitally, based on interviewer preference. Interviewers who digitally recorded their sessions received permission from interviewees. Within 2-5 days after the interview, JV staff members (interviewees) were provided a draft copy of their interview responses on a standard form and given two weeks to review the information for accuracy; occasionally minor adjustments were

recommended by interviewees following their reviews. Interviewers then summarized (condensed to key points) question responses and entered these data into a question-response matrix (Excel® spreadsheet). Each of our Team 2 subcommittee members were then assigned an interview question and responses (i.e., a column in the question-response matrix) to summarize across JVs and, when appropriate, to apply simple statistics to the pooled results.

RESULTS

We interviewed representatives from all 22 habitat JVs in Canada and the U.S. (see https://mbjv.org/joint-venture-map/), which consisted of 21 distinct interviews. Of these 21 interviews, 38% included only the JV Coordinator (or designee), and 62% included staff additional to the JV Coordinator, typically the JV Science Coordinator. On average, interviews lasted 59 minutes (n = 17), although some JV staff (interviewees) spent additional time developing printed responses before the interview was conducted or commenting on drafts of transcribed text. In addition to data gathering for the evaluation, both interviewers and interviewees indicated the process was a positive experience and provided a good venue to advance communication across the JV community. Responses for each survey question are summarized below. Headings include a reference to the questions (Q) in Appendix A.

Objectives integrated across bird groups (Q 1)

When asked whether they integrated objectives for multiple bird groups during conservation planning, most (59%, n = 22) JVs indicated their work included consideration of more than one bird group using “common habitats” within planning units. Although these common habitats were considered static, the timing and nature of management actions has significant influence on the degree to which integration is considered in management. When asked to provide more detail regarding integration methods, only (32%) of JVs indicated multi-taxa planning was actually explicit. For other JVs, benefits for multiple groups were assumed when the JV focused conservation on “priority habitats,” landbird habitats, or waterfowl habitats (Figure 1).

Species vs. habitat focus (Q 1a)

Where integrated planning for multiple taxa was explicit (n = 3 JVs), the habitat needs for bird groups using the same habitat category (also termed habitat type or class) were first calculated independent of one another. Habitat quantity calculations for the bird group with the greatest habitat-area need served as the integrated habitat objective for the multiple groups dependent on that habitat class. This process allowed JVs to quantify a habitat-class objective that would theoretically accommodate population abundances for multiple taxa (e.g., waterfowl and waterbirds dependent on aquatic bed wetlands). However, these JVs indicated that specific habitat quality criteria for individual bird groups must also be considered, such as degree and timing of wetland inundation as well as plant community composition (e.g., Appendix B). Another JV approach to integration included landscape prioritization for conservation based on

multiple bird taxa occurrence (*n* = 2), where conservation emphasis is placed on areas having overlapping habitats important to focal species from different bird groups (i.e., grassland obligate birds and ground-nesting ducks).

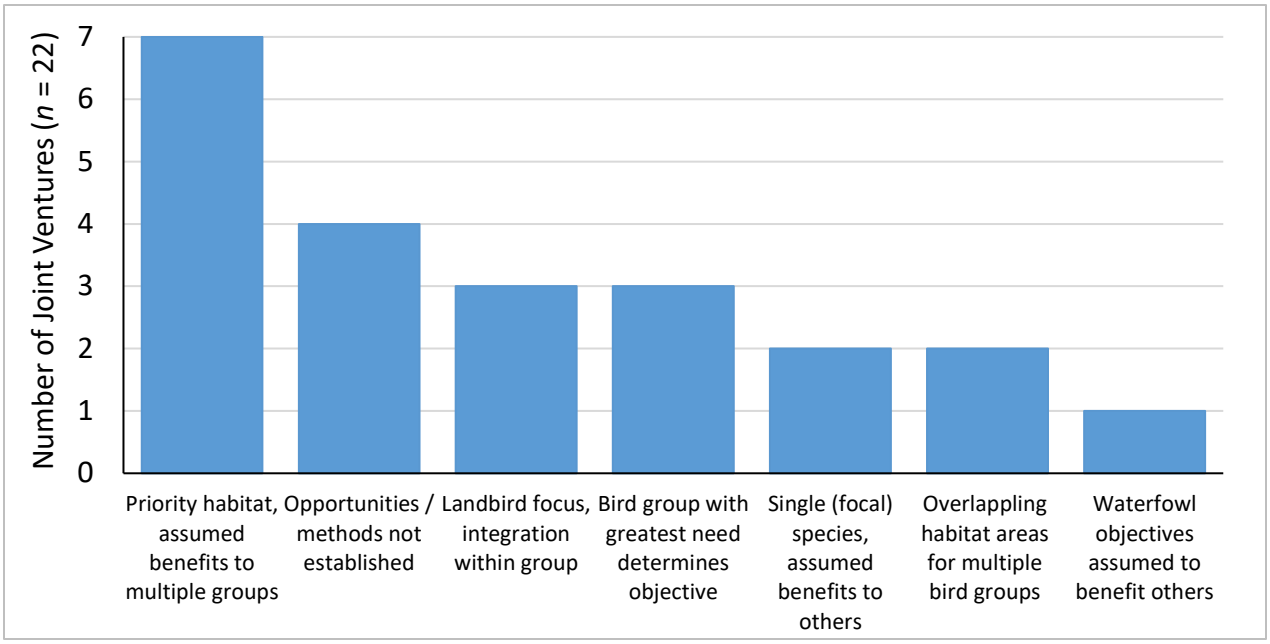

Figure 1. Methods used by Joint Ventures to integrate objectives for multiple bird groups during conservation planning.

Methods used to integrate objectives (Q 1b)

A high proportion (50%) of JVs indicated combinations of species, guilds, and habitats are simultaneously appraised during biological planning or they start with a habitat category (32%) and then consider a suite of species that they deemed good indicators of various habitat conditions (Figure 1). Few (9%) JVs assumed a single "focal" or "priority species" could be used to develop specific habitat objectives reflecting the needs of multiple species or bird groups. However, one or more umbrella species were sometimes chosen to represent a specific habitat focus (e.g., Atlantic Coast saltmarsh), conditions within a general habitat type (deciduous forest seral stages), or across all habitat categories established by the JV (e.g., coastal prairie, managed wetlands, native grassland). There seemed to be general acceptance for using multiple representative species, often within groups or guilds, to develop breeding and nonbreeding habitat objectives. Other approaches focused on setting objectives for specific priority species, which often included species of high conservation concern. To reduce redundancy when establishing objectives in habitat categories, two (9%) JVs prioritized the individual bird group with the greatest need, thus serving as an umbrella group for a habitat type or condition. In this case, spatially explicit models developed for one bird group (e.g., priority waterfowl) can serve as the base map to evaluate benefits to other species or species groups. Some JVs mentioned condensing objectives across guilds to achieve integration. Joint Ventures may also use a mixed approach based on the amount and quality of information available and or considering the annual cycle period of planning focus (e.g., density for breeding songbirds and energetics for passage

shorebirds). Due to other priorities within JVs, a formal analysis of the effectiveness of umbrella species or habitat representatives appears to be absent.

Strength of biological foundation (Q 1c)

Waterfowl had the strongest science foundation for planning in the largest number of JVs (90%), with the primary exception being JV regions with very limited wetland area and with a landbird/upland gamebird focus. About half of JVs considered their biological foundation for shorebirds and landbirds reasonably sound, though it was not always the same JVs for both bird groups. Those with large wetland planning focus had a greater understanding for shorebird habitat needs, especially nonbreeding shorebirds. Other JVs prioritized landbird planning (e.g., Northern Bobwhite, Greater Sage-Grouse) over shorebirds and waterbirds. Of the JVs that commented on waterbirds (*n* = 16), most (69%) considered the current science foundation weak for this group. Explicit habitat objectives for non-breeding landbirds and waterbirds are generally lacking for most JVs. Even where JVs indicated a strong science foundation for certain bird groups, their focus has been largely on individual umbrella species or species of greatest conservation need.

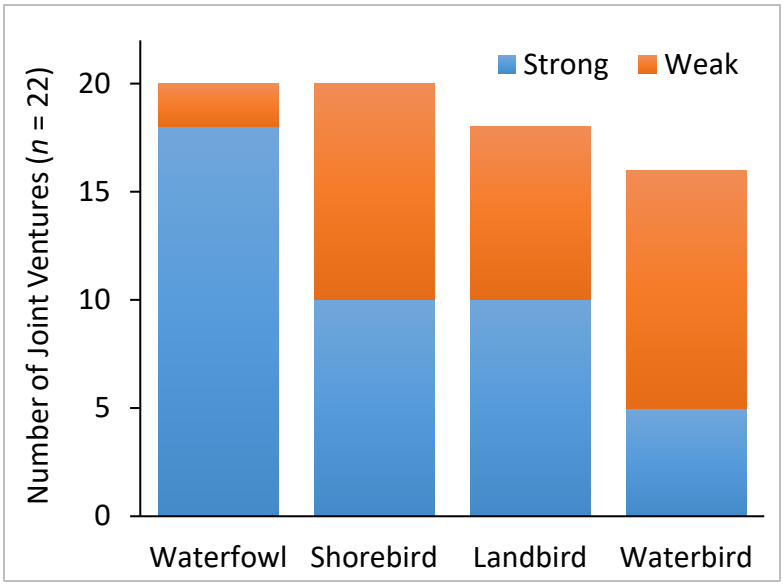

Figure 2. Self-assessment of Joint Venture science foundation regarding conservation planning for primary taxonomic bird groups.

Planning units (Q 1d)

Nearly half (45%; Figure 3) of JVs indicated *Bird Conservation Regions* (BCRs) were their primary planning units, but many also specified they "step-down" large BCRs into smaller sub-regions for planning (objective setting) or habitat implementation. Planning for designated focus areas, typically dominated by a primary bird-habitat category within a BCR(s), was also common (27%), especially for large JV regions. Three JVs (14%) indicated they use eco-regional boundaries that differ from BCRs; one of these JV regions was established before the official adoption of BCRs as a fundamental planning unit for the bird conservation community. Three JVs, including two large Canadian JVs, also indicated they use political provincial or state boundaries for their planning units.

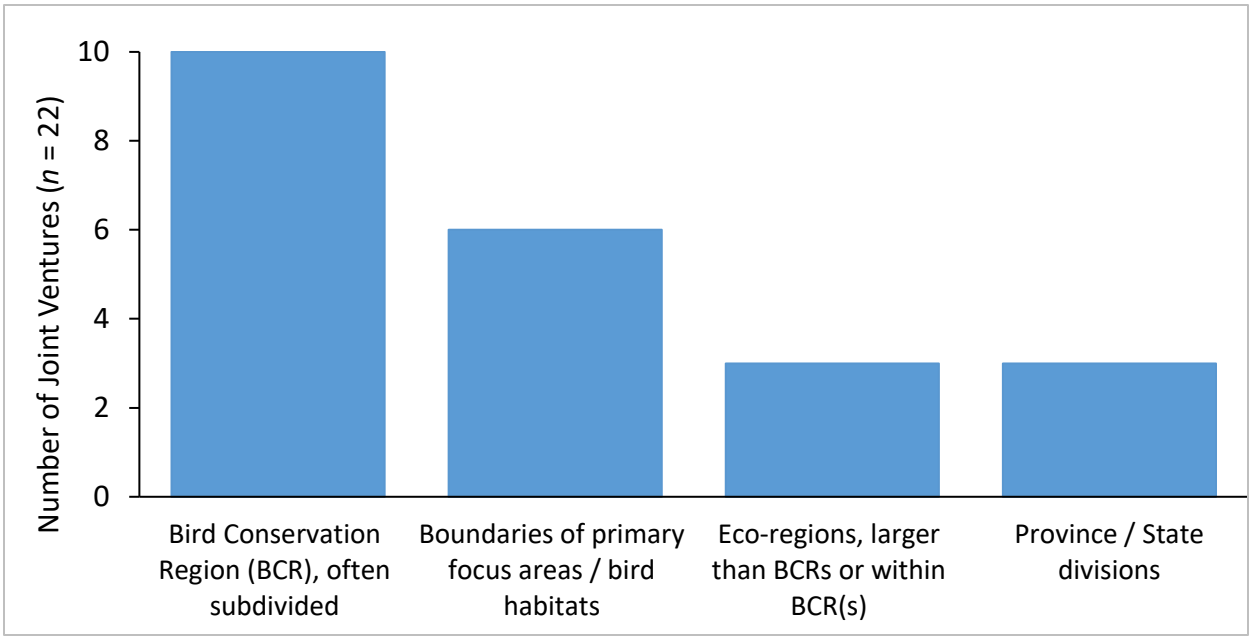

Figure 3. Primary spatial units used by Joint Ventures for bird conservation planning.

Integration efficiencies (Q 2)

The potential to increase efficiencies related to multiple bird-taxa planning and habitat delivery were recognized at various scales, ranging from individual projects, to planning landscapes, to entire JV regions. Ten JVs mentioned that efficiencies were achieved at the local or project scale, such as water level management to meet the needs of multiple bird groups throughout the year. However, there was also the perception that more tradeoffs occur at local scales, where managers must balance among multiple stakeholder concerns and may be limited in their ability to meet all resource needs. Nevertheless, integration among bird groups was viewed positively for providing opportunities to expand interests to novel and multiple partners, which leads to greater leveraging of investments. JVs also indicated integration provides a simpler message and enhanced communications to a larger set of stakeholders. Large-scale, holistic conservation approaches provide collateral benefits to species that may not be the primary target of JV habitat-delivery, although, like objective setting, benefits have been largely assumed. A “working lands” perspective is inherently a holistic approach, supporting resilient landscapes and multiple species. Related management actions, such as an easement sign-up, can accommodate differences in life history stages across bird groups or species. Some JVs commented that continuing to remove traditional “silos” in bird-group management through integration could encourage bird conservation partnerships to build capacity that is more efficient at all scales and to deliver holistic bird conservation benefits. As an example, the *JV8 Central Grasslands Conservation Initiative* can enhance conservation efficiencies for grassland birds by multiple JVs working across the vast Great Plains region.

Suitability of habitat delivery programs (Q 3)

Recommendations for improving conservation programs:

- Improve/expand grassland conservation initiatives
- Improve public land forest practices for priority birds
- Increase incentives for non-waterfowl bird groups
- Use native seed mixes for plant community restorations
- Incorporate JV science, add technical expertise
- Increase emphasis on rangeland management
- Align carbon sequestration and priority bird habitat delivery
- Communicate benefits of bird habitats to people

When asked if the current suite of conservation delivery programs available to JV partners was suitable for integrated bird conservation, most (81%) JVs responded that existing government-funded conservation programs were broadly or generally suitable for delivering objectives for at least some bird guilds or primary bird-habitat types. Joint Ventures within the U.S. seemed to have a far greater assortment of conservation programs to select from, with only the North American Wetlands Conservation Act (NAWCA) grant program mentioned as important for bird habitat delivery in the U.S., Canada, and Mexico. Programs best suited for integrated bird-group conservation according to JVs (41%) were USDA Natural Resource Conservation Service Farm Bill programs, followed closely by NAWCA (36%).

Two JVs identified Neotropical Migratory Bird Conservation Act grants as an important form of support for integrated bird conservation, and several other environmental and private lands initiatives with bird-habitat benefits were discussed in interviews. Several JVs identified programs targeting fisheries/water quality, wildfire recovery, pollinators, and climate change adaptation having great potential to benefit birds. Some JVs were already tailoring their habitat delivery priorities to reflect evolving conservation / environmental initiatives and funding opportunities, or they were selecting delivery programs situationally. Conversely, a couple JVs were uncertain about which programs were best suited for integrated conservation in their region, in part because they were in the process of identifying or revising bird planning priorities and population and habitat objectives.

Joint Ventures were asked which current programs could be improved or expanded to address integrated bird conservation. Although USDA Farm Bill programs were identified as best suited for integrated bird habitat delivery, many JV respondents noted a need for program enhancement. Recommended improvement ranged from general (increased emphasis on bird-friendly practices) to specific (tall-grass seed mixes inappropriate for JV region with grassland focus). Some JVs indicated they ignored program flaws and simply tailored bird-habitat delivery to take advantage of broader resource concerns such as those related to “working lands” targeted by Farm Bill and other programs. Wetland conservation funding such as NAWCA is important for habitat delivery, but some JVs struggle to compete for these funds, due to project size, limited number of match-funding partners, or the relative importance of their region to continental waterfowl populations.

Barriers and solutions to expand conservation of all birds (Q 4)

Overwhelmingly, two categories — data/knowledge needs and capacity/resource needs — were identified as the most important JV barriers to achieving integration across bird groups (Figure 4). Science needs typically related to knowledge gaps, data deficiencies for developing species-habitat models, and improving the quality of spatial data. Capacity and resource limitations included JV staff and relevant partner positions, with focus on both science and bird habitat delivery. To a lesser degree, JVs indicated bird habitat diversity and geographic size and scope were challenges for integration in their regions. Finally, a couple JVs identified deficient communication as a barrier to integration, where expanded outreach to the public and greater collaboration with habitat delivery partners could result in greater support for all-bird conservation.

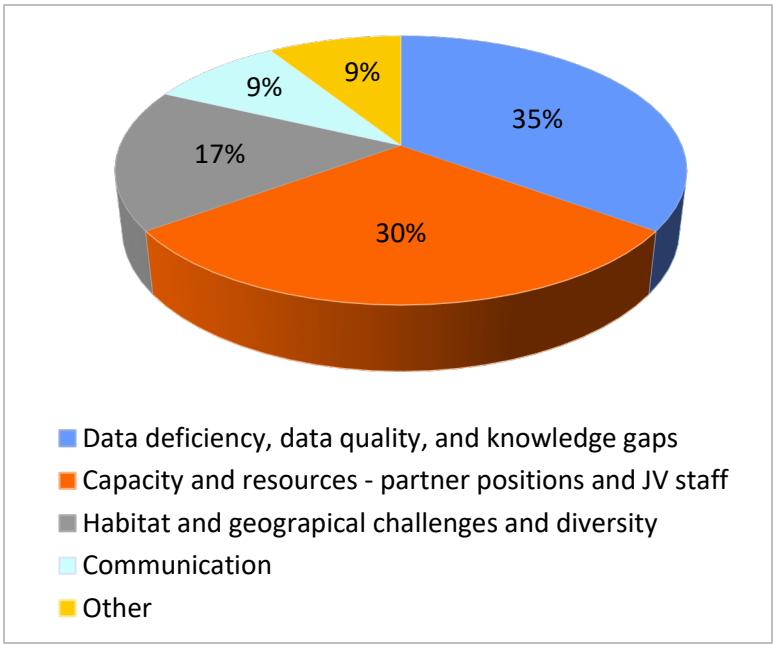

Figure 4. Main barriers to achieving integration across multiple bird groups within Joint Ventures.

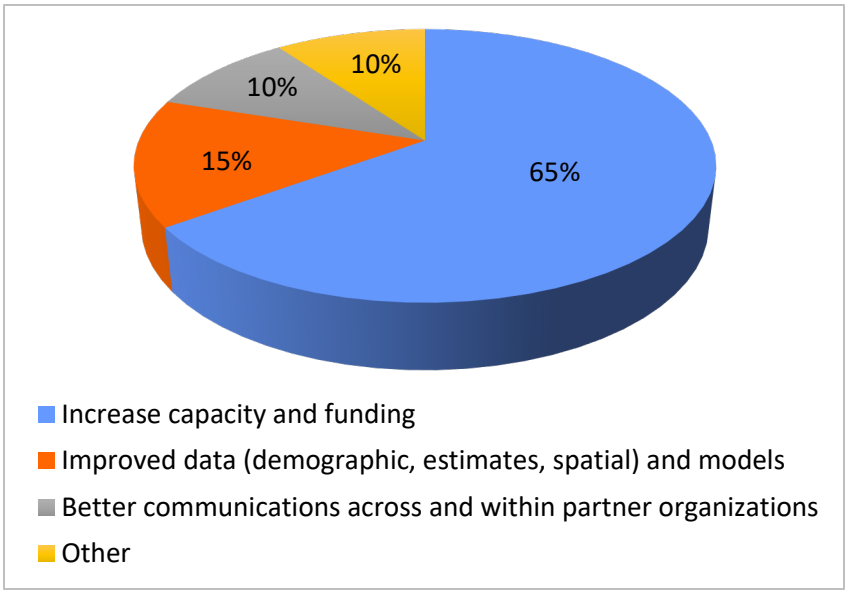

Figure 5. Primary solutions to overcome barriers for achieving integration across multiple bird groups within Joint Ventures.

Regardless of the barrier, the top solution (65% of responses) identified by JVs was to increase capacity and funding (Figure 5). Having additional science and communications capacity and additional bird-habitat delivery personnel would increase the ability of JVs to address data and planning needs, communicate the importance of integration, and work across diverse bird habitats and landscapes. Increased capacity requires increased funding. However, increased funding can be realized through additional

support for existing conservation programs. The majority of JVs (65%) responded that they cannot conduct all-bird conservation without integration of bird taxa in some manner. However, others indicated it was possible to meet planning and implementation needs of all-bird conservation, but it may be less efficient because potential synergies will not be realized. Many JVs do not see integration as a choice, because it is something that they are already inherently doing.

Evaluating effectiveness (Q 5)

When asked whether the JV partnership had programs in place to evaluate their effectiveness implementing all-bird conservation, responses suggest there was considerable variation in how JVs interpreted the question, particularly the terms "effectiveness" and "all-bird conservation." Many JVs interpreted the question as having the ability to measure a demographic parameter (e.g., abundance, density, presence) for more than one group of birds. Nearly half of JVs responding in this way identified project- or site-scale monitoring efforts associated with conservation actions. These included monitoring efforts either facilitated by the JV or led by a partner agency or organization. Other JVs related measuring "effectiveness" to conducting periodic or retrospective evaluations at various landscape scales. Evaluations would be either from species-habitat models, including measures of positive or negative consequences of conservation actions on individual species, or from regional avian monitoring programs such as the Breeding Bird Survey, Integrated Monitoring in Bird Conservation Regions or dedicated guild-based surveys (e.g., Four Square Mile Waterfowl Breeding Survey, Secretive Marsh Bird Surveys). At least one JV interpreted the question of effectiveness in terms of the ability to enhance conservation delivery, noting efforts to monitor change in area of priority habitats at landscape scales.

Nearly one-third of JVs either responded with a "no" regarding evaluation or did not explicitly respond to the question, suggesting that many JVs may have interpreted the question more narrowly – perhaps in the context of their partnerships having a dedicated or systematic approach for measuring all-bird outcomes. No JV identified a dedicated program in place with the goal of evaluating all-bird conservation outcomes beyond site-scale monitoring efforts, although some periodic assessments have occurred for individual conservation programs. Several JVs noted the challenge of identifying meaningful metrics and appropriate spatial and temporal scales to measure population outcomes for migratory birds, particularly during the non-breeding period. JVs indicated it is easier to evaluate program effectiveness regarding the planning and deliver of bird habitat conservation, rather than measuring the variety of habitat types/conditions actually needed to support all birds. Additionally, existing monitoring efforts vary widely by guild and scales. For many JVs that have conservation funding focused on high priority species or guilds (e.g., sage-grouse, waterfowl), tools (models) are in place to evaluate collateral benefits from conservation investments at landscape scales and can be evaluated periodically. Overall, the variety of responses to this question suggest there is considerable variation in what effectiveness and all-bird conservation means among JVs, reflecting the unique nature and diversity of regional conservation partnerships.

Potential candidates for integration (Q 6)

Several JVs indicated they were considering approaches for attempting multiple-taxa integrated planning or they were evaluating means to further current integrated planning and habitat delivery across bird groups. When asked about potential projects to move integration forward within their planning area, JVs most commonly (32%) identified examples with habitat-delivery regions for wetland birds (e.g., waterfowl, waterbirds, shorebirds) or wetland-grassland-pollinator complexes in cropped landscapes (18%; Figure 6). Some JVs (23%) had not yet identified potential pilot-integration projects or focal areas. Others identified potential integration opportunities with private working lands/ranch lands (14%) and in flooded agriculture settings (i.e., rice impoundments for various wetland birds; 9%), including private duck hunting clubs. One unique response described multiple taxa considerations when managing upland forests for multiple landbird groups dependent on canopy complexity within stands and or multiple seral stages in close proximity.

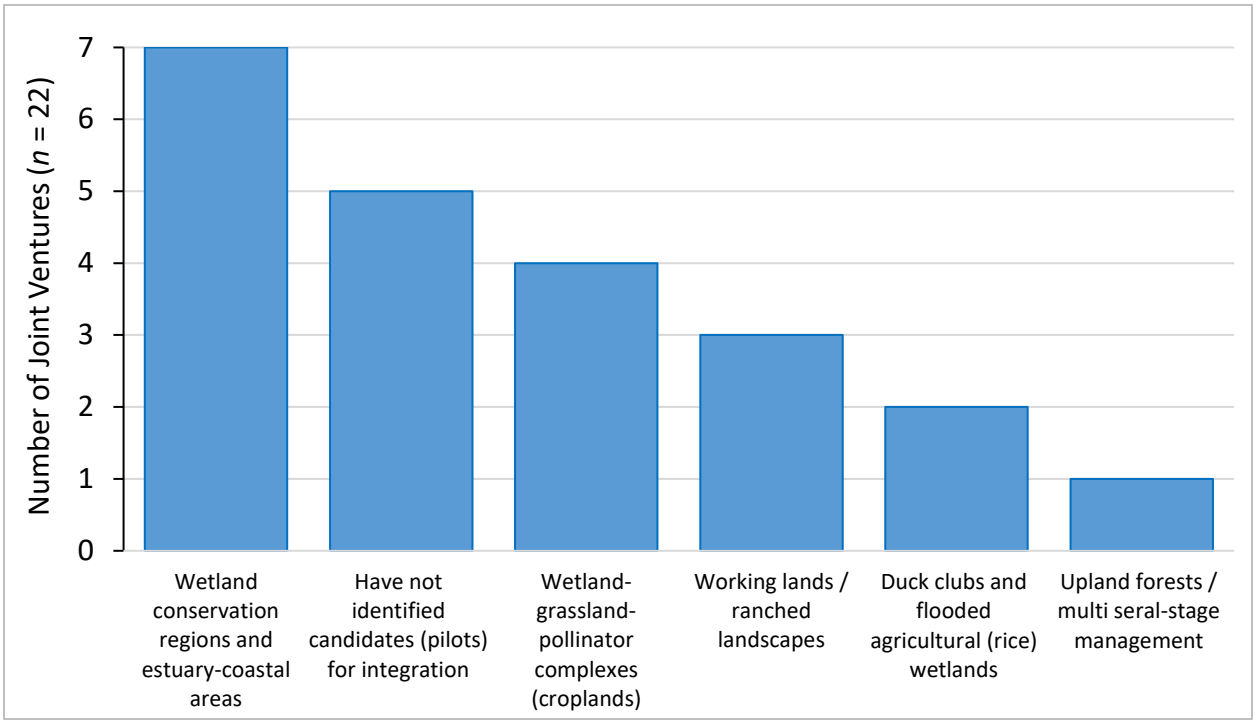

Figure 6. Examples of potential landscape cover types or bird-habitat associations that are good candidates for pilot cooperative projects to illustrate successful integrated planning and habitat delivery across bird groups.

DISCUSSION AND CONCLUSIONS

Participants in this effort to evaluate JV status and approaches to conservation integration across bird taxa found the personal and professional discussion before, during, and after interviews valuable. Several JV representatives (both interviewers and interviewees) indicated gratitude for time spent reestablishing JV relationships as well as learning about unfamiliar geographies, partnerships, and conservation delivery

systems. The whole communications process completed by the ad hoc Team 2 and its interview sub-committee may have been especially appreciated at this time, due to lack of in-person professional gatherings related to the coronavirus pandemic.

Regarding JV summary results from interviews, response themes seemed to fall broadly into one of three categories: 1) integration across bird taxa was still in its infancy, 2) the JV was engaged in some form of “structured” integration, or 3) JV integration was more “indirect.” Additionally, although not explicitly asked in interview questions, some responses suggested effective integration requires strong links between conservation planners (science) and bird-habitat field staff and program managers (delivery). Scientists can learn much from conservation implementers that will inform planning and evaluation, especially regarding trade-offs in varied management regimes to meet the needs of different bird groups (i.e., effective bird-taxa integration is not a purely “top-down” process).

The first category (infancy or pre-integration) was typical of newer JVs or those who simply had not established capacity to process biological information needed to integrate planning across bird groups. In contrast, JVs actively practicing structured integration typically used focal species or bird-group habitat models to calculate objectives for specific habitat categories. For example, the amount of winter-flooded rice needed by shorebirds and waterfowl may be independently estimated using food-energy or species-habitat models, and those quantified habitat estimates were then integrated (often by choosing the higher number). However, for many bird guilds, JVs lacked basic biological information to build such models, and or JV support for a model-based approach was limited due to high levels of uncertainty around bird population response. Joint Ventures developing bird-group habitat models generally employ science-focused staff members (science coordinators, spatial modelers) and typically are beneficiaries of substantial earlier work on waterfowl. This model-based integration may not present the best path forward for many JVs.

Several JVs described indirect approaches to conservation integration. Rather than emphasizing specific needs of a focal species or guild, JVs worked toward understanding general values associated with a target bird habitat. In other words, what bird resources or environmental benefits did the community type (e.g., tall-grass prairie) historically provide in time and space? If JVs are able to replicate those conditions, they may assume indirect integration from the multiple bird benefits provided by the restored or enhanced community (i.e., bird habitat type). By managing for conditions under which all bird species using that habitat evolved, JVs may relieve themselves of sophisticated models based on life histories of bird species or guilds. This could be an efficient form of integration for many JVs, but the primary drawback is an inability to answer *how much* of this habitat is needed across spatial and temporal scales? Generating objectives for how much to restore and retain, typically based on species-habitat models, has been a unique and valuable emphasis of bird habitat JVs. Selecting focal or priority species to represent a suite of birds common to general habitat categories (e.g., salt marsh) may be another version of indirect integration. However, the assumption that a single

species can represent multiple bird species or groups occurring in common areas often remains untested, and these assumed benefits should be evaluated.

Integrated conservation across bird groups seemed largely confined to the boundaries of a given bird habitat type, based on JV interviews. For example, attempting to generate regional wetland conservation objectives to meet the needs of both waterfowl and waterbirds (e.g., Appendix B) or restoring bottomland hardwood forests in a way that accommodates wintering waterfowl and breeding songbirds. It is harder to envision integration opportunities across different primary cover types, but one example is occurring in a western JV region where forest conservation is discussed in terms of forest-dependent birds as well as downstream water-quantity benefits conveyed to sage grouse and other wildlife. Other examples of integrated conservation planning and delivery across bird groups have been presented in detail at recent UST gatherings (Appendix C). Integration within and across JV regions may be accelerated with use of common planning units (i.e., BCRs), universally available spatial data (e.g., National Land Cover Database, National Wetlands Inventory, and Rangeland Analysis Platform), and shared conservation terminology and technical approaches (model development). However, JVs are often faced with the investment trade-off of better science or increased habitat delivery, yet both are necessary, as effective conservation delivery is guided by robust science and collaboration with habitat delivery specialists. Initiatives that include multiple JVs, such as the *JV8 Central Grasslands Conservation Initiative* and Central Valley/Intermountain West wetland-bird efforts, are promising possibilities for integrating bird conservation at larger scales through JV collaboration. Large-scale focus groups such as the Unified Science Team provide an essential hub for all-bird technical networks to foster these cross-regional collaborations.

Integrated conservation across bird taxa will increasingly take place in landscapes important to people. Bird habitat placement that addresses social needs such as nutrient/sediment retention, production from working landscapes, flood attenuation, and outdoor recreation are critical for our bird conservation enterprise if we hope to remain relevant to society (i.e., retain and expand support for conservation). Similarly, it will be increasingly important to understand and communicate the collateral benefits to birds from conservation investments focused on other social priorities such as food production (working lands) and ecological services (e.g., carbon sequestration, water quality, flood abatement) and how those investments contribute to supporting priority bird species or populations. Collaboration among bird scientists and social scientists is improving our understanding of how best to adjust and refine our work while evaluating conservation tradeoffs. Moreover, if land cover changes due to development, intensive agriculture, and climate factors continue at current rates, traditional JV decision-support models will become less meaningful. The composition of migratory birds occurring at any one location is difficult to forecast, but predicting future species response to habitat management may be even more uncertain due to accelerated environmental and land-use changes. Consequently, the focus on customary products (e.g., bird species/guild abundance and distribution) familiar to previous generations of wildlife managers may need to become more pliable as we plan and work in increasingly altered and changing systems.

Diversity of natural vegetation, historical perspective, and capacity all dictate the ability of JVs to fully develop and implement science-based objectives for regional bird conservation. Joint Ventures indicated that existing conservation-funding programs were generally suitable for delivering bird habitat. However, several JVs lacked implementation capacity to maximize use of traditional (i.e., Farm Bill and NAWCA) as well as developing programs being established to address environmental concerns. Likewise, the science foundation for specific bird taxa continues to vary widely among JVs and seems largely related to the presence of dedicated science coordination within the JV. Whereas ad hoc technical committees and science teams leading JV conservation planning often have diverse knowledge regarding JV landscapes and birds, a dedicated JV Science Coordinator appears essential to make the greatest progress with integration across bird groups. It should not be surprising that the waterfowl taxa was identified by most JVs as having a strong science foundation, considering the long history of funded research as well as related science and habitat delivery partnerships (e.g., JVs were established as a result of the NAWMP). The current *Road to Recovery* effort (addressing the 3-billion-bird loss) is elevating science needs for numerous at-risk species and could aid in strengthening their science foundation. Enhanced opportunities for all-bird management and potential leveraging of resources from complementary environmental programs are increasingly presenting a challenge of riches for a bird conservation community in need of more capacity.

ACKNOWLEDGEMENTS

We thank Joint Venture Coordinators, Science Coordinators, and other colleagues who reviewed draft interview questions and or provided other guidance in this assessment process. We especially appreciate JV staff members who participated in interviews: T. Fearer (Appalachian Mountains JV), A. Weldon and M. Correll (Atlantic Coast JV), A. Huang (Canadian Intermountain JV and Canadian Pacific Birds Habitat JV), J. Fitzgerald and C. Joos (Central Hardwoods JV), J. Cogswell and G. Yarris (Central Valley JV), C. Rideout and R. Holbrook (East Gulf Coastal Plain JV), T. Morais (Eastern Habitat JV), B. Wilson, W. Vermillion, and J. Lancaster (Gulf Coast JV), D. Smith (Intermountain West JV), S. McKnight and A. Mini (Lower Mississippi Valley JV), C. Wightman (Northern Great Plains JV), J. Giocomo and A. Matthews (Oaks and Prairies JV), S. Evans-Peters (Pacific Birds Habitat – U.S. JV), M. Carter and A. Bartuszevige (Playa Lakes JV), D. Dixon and J. DeVries (Prairie Habitat JV), S. Fields and J. Vest (Prairie Pothole JV), A. Bishop and D. Varner (Rainwater Basin JV), A. Roberson and J. Franco (Rio Grande JV), S. Scoggin (San Francisco Bay JV), J. Duberstein (Sonoran JV), and D. Gorby and G. Soulliere (Upper Mississippi/Great Lakes JV). The report also benefited from the reviews and comments of M. Carter, D. Demarest, D. Humburg, D. Varner, and A. Roberts.

REFERENCES

Brown, S., C. Hickey, B. Harrington and R. Gill. 2001. The U.S. Shorebird Conservation Plan, 2nd edition. Manoment Center for Conservation Sciences, Manomet, Massachusetts. 64 pp. Available at: https://www.shorebirdplan.org/plan-and-council/.

Kushlan, J. A., M. J. Steinkamp, K. C. Parsons, J. Capp, M. A. Cruz, M. Coulter, I. Davidson, L. Dickson, N. Edelson, R. Elliot, R. M. Erwin, S. Hatch, S. Kress, R. Milko, S. Miller, K. Mills, R. Paul, R. Phillips, J. E. Saliva, B. Sydeman, J. Trapp, J. Wheeler and K. Wohl. 2002. Waterbird conservation for the Americas: the North American waterbird conservation plan, version 1. Waterbird conservation for the Americas, Washington, D.C. 78 pp. Available at: https://www.fws.gov/sites/default/files/documents/north-america-waterbird-conservation-plan.pdf.

North American Bird Conservation Initiative (NABCI). 2000. The North American Bird Conservation Initiative in the United States: a vision of American bird conservation. Available at: https://www.nabci-us.org/assets/downloads/NABCIfndtn.pdf.

North American Waterfowl Management Plan (NAWMP). 1986. North American waterfowl management plan: a strategy for cooperation. U.S. Department of Interior – Fish and Wildlife Service and Environment Canada – Canadian Wildlife Service. Available at: https://nawmp.org/documents.

NAWMP. 1998. Expanding the vision: 1998 update, North American Waterfowl Management Plan. U.S. Department of Interior, Fish and Wildlife Service, SEMARNAP Mexico, and Environment Canada, Canadian Wildlife Service.

NAWMP. 2012. North American Waterfowl Management Plan 2012: People conserving waterfowl and wetlands. Canadian Wildlife Service, United States Fish and Wildlife Service, Secrataria de Medio Ambiente y Recursos Naturales. Available at: https://nawmp.org/documents.

NAWMP. 2018. Connecting people, waterfowl, and wetlands. Canadian Wildlife Service, U.S. Fish and Wildlife Service, Secretaria de Medio Amiente y Recursos Naturales. Available at: https://nawmp.org/documents.

Rosenberg, K. V., J. A. Kennedy, R. Dettmers, R. P. Ford, D. Reynolds, J. D. Alexander, C. J. Beardmore, P. J. Blancher, R. E. Bogart, G. S. Butcher, A. F. Camfield, A. Couturier, D. W. Demarest, W. E. Easton, J. J. Giocomo, R. H. Keller, A. E. Mini, A. O. Panjabi, D. N. Pashley, T. D. Rich, J. M. Ruth, H. Stabins, J. Stanton and T. Will. 2016. Partners in Flight Landbird Conservation Plan: 2016 Revision for Canada and Continental United States. Partners in Flight Science Committee. Available at: https://www.partnersinflight.org/resources/the-plan/.

Rosenberg, K. V., A. M. Dokter, P. J. Blancher, J. R. Sauer, A. C. Smith, P. A. Smith, J. C. Stanton, A. Panjabi, L. Helft, M. Parr and P. P. Marra. 2019. Decline of the North American avifauna. Science 366(6461):120–124.

U.S. Fish and Wildlife Service. 2002. Joint Venture Administration, Director's Order No. 146. U.S. Fish and Wildlife Service, Washington, D.C. Available at: https://www.fws.gov/policy/721fw6.html.

U.S. Shorebird Conservation Plan Partnership. 2015. Shorebirds of conservation concern in the United States of America – 2015. Available at: http://www.shorebirdplan.org/wpcontent/uploads/2015/01/ShorebirdsConservationConcernJan2015.pdf.

APPENDIX A. Form used when interviewing staff from Joint Ventures regarding their approaches for integrated planning across major bird groups.

JV:
JV Staff Interviewed:
Date:
Time start: Time end:

Interview Introduction: During this interview, I will ask you six questions regarding integrated planning across bird groups, which for most JVs includes waterfowl, landbirds, waterbirds, and shorebirds. A couple questions have multiple parts. Please provide as much information as you like, and feel free to ask me to clarify questions if needed. Your responses will be combined with those from other Joint Ventures and developed into a Unified Science Team report. We realize that each JV partnership has a unique set of political, cultural, historical, and biological features that affect its operations, and we hope to capture the full range of experiences across JVs. Our intent is to produce a report with an integration roadmap or framework for current and future JV staff. This interview should take less than one hour. Do you have any questions before we start? [Are you ok if I record this session]? A summary of the interview will be provided to you and other JV staff for review before being incorporated into the report. [The recording will not be shared or distributed.]

1. Does your JV integrate objectives for multiple bird groups during conservation planning? If so, what are the primary methods used in your JV partnership?

    a. Does your JV focus on priority species (e.g., focal species, species of conservation concern) or “habitats” (plant and wildlife communities) when establishing conservation objectives or both?

    b. Are objectives first developed explicitly for specific species or guilds or are some groups considered umbrellas for other birds groups occurring in shared landscapes.

    c. What bird groups have a reasonably strong biological foundation to allow integrated consideration? Which do not?

    d. Is the BCR the primary planning unit used by your JV for conservation planning? If not, what is?

2. We assume integrated planning across bird groups leads to efficiencies in all-bird habitat conservation delivery. What are the important efficiencies that your JV partnership achieves or could it achieve by integrated bird-group planning and delivery and at what scales (project, BCR, JV)?

3. Are the current suite of conservation delivery programs available to your JV partnership (e.g., NAWCA, FSA/NRCS conservation provisions, NRCS regional partnerships, private lands consultation) suited to deliver integrated bird habitat objectives? Which programs are best suited? Which could be improved or expanded?

4. If integration across bird groups is limited within your JV region, what are the barriers to achieving all-bird integration and how might they be resolved? Can the JV commitment to all-bird conservation be achieved without comprehensive integration?

5. Does your JV partnership have programs in place to evaluate the effectiveness of implementing all-bird conservation actions? At what scales?

6. Do any examples of potential landscape-scale or bird-habitat associations stand out as good candidates for pilot cooperative projects to illustrate successful planning and delivery integration among bird groups?

APPENDIX B. Example of integration products resulting from collaboration of the waterfowl and waterbird committees of the Upper Mississippi/Great Lakes Joint Venture (JV).

Biological planning establishes a foundation for effective bird habitat conservation by describing current conditions and trends, establishing species-habitat relationships, and identifying conservation goals. Use of *focal species* and habitat models provide JV planners a means to quantify conservation targets for various habitat associations; population objectives developed for focal species are translated into habitat objectives via biological models. Population responses (e.g., abundance, distribution, reproductive success) by focal species provide measures for progress toward biological objectives.

Focal Species and Habitat Associations

Wetland-obligate birds regularly use areas with multiple wetland types (e.g., combinations of emergent, aquatic bed, and unconsolidated/open water). Juxtaposition and extent of wetlands combined with characteristics of associated uplands influence habitat quality. For spatial data analysis and habitat modeling, the JV used simple cover-type combinations comprising habitats for each JV focal species. Waterfowl and waterbirds have extensive overlap in habitat requirements, and integrated planning for these groups helps ensure conservation delivery complements, rather than excludes, species within common habitat guilds. For instance, habitat generalists (e.g., Mallard) occupy the same breeding areas as species with more rigid habitat requirements (e.g., Common Gallinule or King Rail), but the opposite may not be true.

Spatial data available from the National Wetland Inventory (NWI), supplemented with National Land Cover Data (NLCD), were used to describe broad habitat associations required by wetland-bird guilds during breeding and non-breeding periods. First, primary wetland bird habitats were grouped into four NWI wetland classes (Table B-1): 1) *Emergent* (including persistent and non-persistent herbaceous vegetation), 2) *Forested* (deciduous only), 3) *Aquatic Bed* (open wetlands dominated by submerged aquatic plants), and 4) *Unconsolidated* (including unconsolidated bottom and shore, which together represented open-water communities). Spatial data at the NWI class level represent wetland area in terms of dominant vegetation and physical geography, which are important features of bird habitats and useful for planning at a regional scale.

Habitat associations for focal species (and guilds) were further distinguished by adding secondary attributes, following definitions of both NWI and NLCD classes. For example, breeding King Rails are most associated with the NWI emergent (persistent and non-persistent) wetland class, but habitat for this species typically includes shallow aquatic bed, as well as surrounding areas of upland grassland/herbaceous cover and limited forest. Conversely, breeding herons and egrets (forested wetland guild) often use a variety of emergent, aquatic bed, and or scrub-shrub wetlands for foraging but they require proximate deciduous forest and or scrub-shrub nesting cover. Hence, the JV described combinations of wetland types and upland features that provide habitat

Table B-1. Species-habitat associations for wetland-bird guilds occurring in the Upper Mississippi / Great Lakes Joint Venture (JV) region during breeding and non-breeding (migration and winter) periods. *Primary* (NWI wetland classes) and *Secondary* (NWI classes and or NLCD upland cover classes) column headings reflect spatial data used in habitat modeling for each guild. Individual species use multiple wetland types and bird groupings are for planning purposes; **bold** names are JV **focal species** emphasized in planning. Multiple focal species were used for a single habitat category to encompass larger geographic areas within the JV region.[a]

Primary →	Emergent		Forested	Aquatic Bed	Unconsolidated Bottom/Shore
Secondary →	Aqautic Bed or Unconsolidated	Aquatic Bed and Grassland/herbaceous	Aqauitc Bed/Emergent or Scrub-Shrub and Deciduous Forest[b]	Emergent and Unconsolidated	Aquatic Bed or Emergent, plus islands
Breeding Waterbirds					
	American Bittern	**King Rail**	**Black-crowned Night-Heron**	**Black Tern**	**Common Tern**
	Least Bittern	**Sora**	Great Blue Heron	Pied-billed Grebe	**Common Loon**
	Common Gallinule	**Yellow Rail**	Great Egret	Red-necked Grebe	Double-crested Cormorant
	American Coot	Black Rail	Snowy Egret	Forster's Tern	American White Pelican
		Virginia Rail	Little Blue Heron		Ring-billed Gull
		Sandhill Crane	Cattle Egret		Herring Gull
		Whooping Crane	Green Heron		Great Black-backed Gull
			Yellow-crowned Night-Heron		Caspian Tern
					Least Tern
Non-breeding Waterbirds					
	American Bittern	**Sora**	**Great Blue Heron**	**Pied-billed Grebe**	**Common Loon**
	Least Bittern	**Sandhill Crane**	Black-crowned Night-Heron	**American Coot**	**Common Tern**
		Cattle Egret	Great Egret	Red-necked Grebe	Double-crested Cormorant
		Yellow Rail	Snowy Egret	Common Gallinule	American White Pelican
		Black Rail	Little Blue Heron	Forster's Tern	Ring-billed Gull
		King Rail	Green Heron	Black Tern	Herring Gull
		Virginia Rail	Yellow-crowned Night-Heron		Great Black-backed Gull
					Caspian Tern
					Least Tern
Breeding Waterfowl					
	Mallard	**Blue-winged Teal**	**Wood Duck**	**Ring-necked Duck**	Common Merganser
	Gadwall	Northern Shoveler	Common Goldeneye	American Black Duck	Red-breasted Merganser
	Green-winged Teal	Canada Goose	Hooded Merganser	Redhead	
				Trumpeter Swan	
Non-breeding Waterfowl					
	Northern Pintail		**Wood Duck**	**Gadwall**	**Lesser Scaup**
	Green-winged Teal		American Black Duck	**Canvasback**	Greater Scaup
	Mallard			American Wigeon	Surf Scoter
	Blue-winged Teal			Redhead	White-winged Scoter
	Northern Shoveler			Ring-necked Duck	Black Scoter
				Ruddy Duck	Long-tailed Duck
				Snow/Ross' Goose	Bufflehead
				Canada Goose	Common Goldeneye
				Trumpeter Swan	Hooded Merganser
				Tundra Swan	Common Merganser
					Red-breasted Merganser

[a] Cover type categories were developed using NWI and NLCD classifications to better enable conservation planning and monitoring land cover change. More specific descriptions of species habitat requirements for the breeding period can be found in strategy species accounts.

[b] Species in the Forested Wetland guild require upland or wetland deciduous forest for different purposes during breeding (e.g., waterbird rookeries, duck nest cavities) and non-breeding (e.g., waterbird roosting) periods. Also, species in this guild readily use emergent, aqautic bed, and scrub-shrub wetlands for foraging as long as suitable deciduous forest is nearby for nesting and roosting.

complexes essential to focal species – and associated guilds – but that were modeled with spatial data readily available for this large JV region.

The five habitat categories used for integrated wetland-bird planning (Table B-1) were robust combinations of primary wetland types (i.e., NWI classes) and other landscape features (NWI and NLCD cover classes) associated with each species group. Using this information, the JV formulated a general landscape design through habitat modeling, while recognizing that characteristics of local high quality habitats for focal species are actually more complex than these planning categories. Detailed descriptions of high quality focal species habitats were provided in species accounts of the JV Waterfowl (2017) and Waterbird (2018) Habitat Conservation Strategies.

Addressing an Integration Concern

Quantity objectives for non-breeding waterfowl were generated for each habitat association (Table B-1) using energy-based models. However, the JV lacked a science-based means to quantify habitat objectives for waterbirds. Because of their greater diversity and abundance, wide distribution across the JV region, significant habitat-area requirements, and overlap in habitat characteristics with waterbirds, the JV assumed habitat conservation objectives for non-breeding waterfowl could adequately support regional non-breeding waterbird populations. However, these potential habitats must be available when non-breeding waterbirds occur in the region, and waterbird scientists were concerned this was not the case in some areas, primarily during migration stopover periods.

In the southern half of the JV region (BCR 22), >90% of natural wetlands have been drained, and intensively managed impoundments (i.e., wetlands where water levels are manipulated to create specific conditions) account for a significant proportion of remaining high quality wetland-bird habitat. Emergent (e.g., moist-soil management) and aquatic bed wetland associations (Table B-1) are the most commonly managed wetlands, and traditionally, dabbling ducks have been the targeted bird group, often with hunting recreation as a management goal. Nevertheless, integrated conservation in an area with limited habitat necessitates flooding regimes of managed wetlands that accommodate both bird groups, especially species of high conservation concern. The JV had to determine migration chronology for target species to inform wetland management but it lacked systematic abundance surveys by partner organizations.

Using eBird data, JV planners determined temporal distribution within the region for breeding and non-breeding focal species from both bird groups. However, occurrence chronology for species of highest conservation concern (i.e., rails and terns) was most important in order to assess and guide water-management approaches. The eBird data analysis revealed timing of waterbird abundance during fall was somewhat variable (Figure B1), but rail and tern occurrence was highest during August and September, before the traditional fall peak in dabbling duck abundance and before managed wetlands in the region are typically flooded. Spring abundance for rails and terns peaked in May, a period when dewatering begins at managed wetlands as part of a

regime to promote moist-soil plant growth for duck foods. Using information from this analysis, managers can time wetland inundation to assure at least some suitable habitat for non-breeding waterbirds during primary stopover periods, and integrated management actions may be most critical in the wetland-limited BCR 22 portion of the JV region.

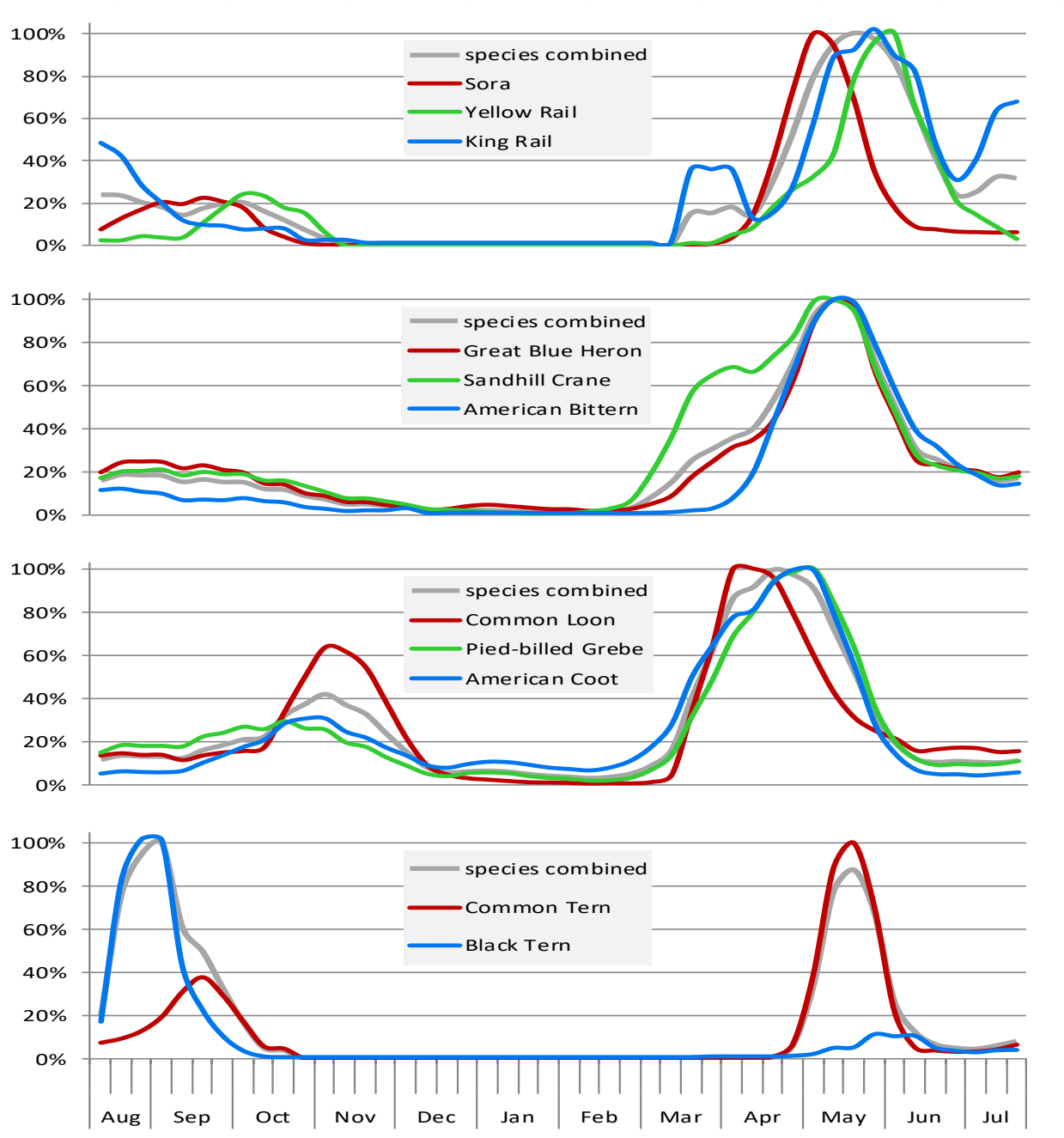

Figure B-1. Occurrence chronology of waterbirds in the Upper Mississippi/Great Lakes region based on eBird data, 2007–2016. Counts for Bird Conservation Regions 12, 22, and 23 were summed by week, standardized within groups (species combined curves), and depicted with a 3-week moving average to display timing of relative abundance.

REFERENCES (Appendix B)

Caro, T. 2010. Conservation by Proxy: Indicator, Umbrella, Keystone, Flagship and Other Surrogate Species. Island Press, Washington, D.C., USA.

[FGDC] Federal Geographic Data Committee. 2013. Classification of wetlands and deep-water habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, D.C., USA.

Homer, C. G., J. A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N. D. Herold, J. D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing 81:345–354.

Soulliere, G. J., M. A. Al-Saffar, J. M. Coluccy, R. J. Gates, H. M. Hagy, J. W. Simpson, J. N. Straub, R. L. Pierce, M. W. Eichholz, and D. R. Luukkonen. 2017. Upper Mississippi River and Great Lakes Region Joint Venture Waterfowl Habitat Conservation Strategy – 2017 Revision. U.S. Fish and Wildlife Service, Bloomington, Minnesota, USA. 2017JVWaterfowlStrategy.pdf (umgljv.org)

Soulliere, G. J., M. A. Al-Saffar, R. L. Pierce, M. J. Monfils, L. R. Wires, B. W. Loges, B. T. Shirkey, N. S. Miller, R. D. Schultheis, F. A. Nelson, A. M. Sidie-Slettedahl, C. M. Tonra, and D. J. Holm. 2018. Upper Mississippi River and Great Lakes Region Joint Venture Waterbird Habitat Conservation Strategy – 2018 Revision. U.S. Fish and Wildlife Service, Bloomington, Minnesota, USA. 2018JVWaterbirdStrategy.pdf (umgljv.org)

[USFWS] U.S. Fish and Wildlife Service. 2014. Selecting surrogate species for Strategic Habitat Conservation in the Upper Midwest Great Lakes geography. Bloomington, MN. Writing Team: N. Powers, M. Brouder, S. Blomquist, B. Potter, J. Dingledine, C. Deloria, G. Soulliere, T. Kerr, and K. Steiger-Meister.

[USFWS] U.S. Fish and Wildlife Service. 2016. National Wetlands Inventory. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

APPENDIX C. Example integration projects presented at Unified Science Team meetings, January 2020 and March 2021.

1. Integration between Central Valley and Intermountain West JVs for waterfowl and shorebirds (Mark Petrie, Ducks Unlimited; Matt Reiter, Point Blue Conservation Science).

2. Grassland Summit, JV8 and identifying science needs for grassland birds (Jim Giocomo, American Bird Conservancy; Anne Bartuszevige, Playa Lakes JV).

3. Integrating planning for Canada's Prairie/Parklands (Jim Devries, Ducks Unlimited Canada).

4. Wetland birds in the Heartland (Dana Varner, Rainwater Basin JV).