Integrated Bird Conservation

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As an "all bird" Joint Venture, the PPJV is committed to addressing the conservation needs of all avian species that use this region of the Northern Great Plains. This is a daunting task, because each species occupies a unique ecological niche and may be subject to a unique set of limiting factors. Effective conservation requires a strategic, science-based approach. Sections II-V of this plan address the conservation needs of four species groups: waterfowl, shorebirds, waterbirds, and landbirds. For waterfowl, planning relies on the **North American Waterfowl Management Plan**, and its various derivatives specific to the Prairie Pothole Region (Section II). Shorebird conservation plans are derived from the **United States Shorebird Conservation Plan** (Section III). Waterbirds are addressed as a component of the **North American Waterbird Conservation Plan**, and the associated step-down plan for the PPR, the **Northern Prairie and Parkland Waterbird Conservation Plan** (Section IV). Lastly, the **North American Landbird Conservation Plan** was the foundation for conservation planning for this diverse group of species (Section V). The four species group sections will be updated as often as necessary to reflect revisions to national plans, new knowledge of population status and trends, and new scientific findings that bear on conservation delivery. Although Section I (Plan Foundation) of this Implementation Plan will be less dynamic than the other sections, it too will be updated as often as necessary to keep pace with new challenges, important scientific discoveries, and fresh opportunities.

Planning by Species Groups

Our knowledge of the population dynamics and ecology of avian species in the PPJV ranges from fairly complete for several species of waterfowl (particularly the Mallard), to rudimentary for many waterbirds, shorebirds, and landbirds. The ultimate goal of most bird conservation efforts is to enhance or maintain populations at desired levels. Given this demographic objective, we focus on mortality (death rates) and/or natality (birth rates), and largely ignore immigration and emigration rates due to the nature of these migratory bird populations. When mortality and natality are further dissected into demographic sub-components (e.g., female survival during nesting, nest survival, pre-fledging survival, etc.), the sub-components are often termed "vital rates." Understanding variation in vital rates, identifying which vital rates are most responsible for population change, and quantifying how vital rates vary across landscapes and time, are all critical to informing conservation planning and management.

A great deal is known about vital rates for waterfowl because band recoveries from ducks shot by hunters allow us to estimate annual survival and harvest rates. Moreover, duck research has been better funded and ducks are big enough to tolerate radio transmitters. This includes seasonal patterns of mortality for some species. Tracking individuals provides unbiased estimates of recruitment rates and hen success. Duck and goose nests are relatively easy to locate and can be monitored for survival. These birds even tolerate large, visual markers that

utilize sophisticated techniques to determine vital statistics like "true" recruitment rates and philopatry.

For many smaller birds that are not hunted, only gross population trends based on surveys that index populations are understood. And while mark-resighting studies of mortality and natality are starting to bear fruit, the precision of these estimators is often poor and the monitoring period brief, thus making it difficult to ascertain long-term temporal changes or variation.

The upshot is that integrated planning for migratory birds must recognize the strengths and deficiencies in understanding demography and vital rates of various species, and planning will occur based on different levels of knowledge and will be improved over time as we learn more.

In this plan, waterfowl conservation will be as sophisticated as warranted by the state of knowledge. Likewise, planning for other bird groups will be at a level appropriate to scientific understanding. It is important that plans not "reach" beyond the state of knowledge or reasonable conjecture, but rather build a solid foundation on what we know or assume to be true.

The upshot is that integrated planning for migratory birds must recognize the strengths and deficiencies in our understanding of demography and vital rates, and accept that planning will occur based on different levels of knowledge.

To the extent possible, each species group plan addresses the following topics. A ***Background and Context*** section describes the importance of the U.S. PPR to each bird group and sets the stage for understanding the challenges ahead. ***Population and Habitat Trends*** review our knowledge of the population dynamics for important species. A ***Biological Foundation*** section summarizes the basic ecological relationships and associated conservation challenges that form the underpinnings for the goals, objectives, and strategies of each plan. Because there is incomplete knowledge of natural systems and the avian species that use them, the Biological Foundation depends on an adaptive management loop of ***Biological Assumptions*** (which are explicitly stated), ***Key Uncertainties*** (those questions that are most important to the success of the program), and ***Research and Monitoring***, which will be used to test the validity of our key uncertainties. Research and monitoring programs will validate/invalidate biological assumptions, and adjust those accordingly.

After the biological foundation, ***Population*** and ***Habitat Goals*** may be identified and may also include a discussion of actions and treatments by ***Focal Species***. Focal Species are those that have: (1) a high level of conservation priority because of declining status in the PPR, or (2) a high rate of occurrence in the PPR, constituting the core of the species breeding range, and (3) represent a habitat utilized by several other species of interest. The use of Focal Species helps make the scope and scale of all-bird conservation tractable by allowing one to concentrate programs, monitoring efforts, and research on a sub-set of birds that are both representative and/or most important to the PPJV. ***Threats and Limiting Factors*** are identified and associated

with Focal Species. Often, ***threats*** relate more to the need to retain existing, critical habitats, whereas ***limiting factors*** constrain population growth rates by impacting one or more vital rates. The threats and limiting factors are then addressed with ***Actions or Treatments***, often specific to Focal Species. Lastly, conservation programs are targeted to specific locations within the PPJV using ***Models*** that result in ***Spatial Prioritization***. When urgency, opportunity, and resource limitations are important considerations, some species group plans also set programmatic and temporal priorities, in addition to spatial priorities.

Spatial Models

Despite its superficial appearance, the PPR is remarkably diverse. This diversity causes some areas to be differentially attractive—and important—to certain species. Locations with unusually rich wetland communities or large expanses of native grasslands are two important examples. However, it may also be critical to pinpoint rare habitats used by a species in decline. The PPJV has a history of using spatially-explicit GIS models to target conservation programs. This Implementation Plan builds on that tradition and expertise. Such models offer conservation planners unparalleled abilities to integrate diverse data to inform management decisions.

For all of their merits, GIS models should be interpreted and applied with some caution and used along with other tools and criteria. At first glance, the map-like appearance of GIS products lends the impression that the information they convey is flawless. However, GIS maps are typically derived from remote sensing data, or as products or sums of estimators, all of which have associated errors and variances that usually are not depicted on GIS maps. The problem is amplified when multiple GIS layers are "stacked" one upon another, producing a single, new GIS product that has "accumulated" variance terms from each layer. GIS maps also tend to "average out" the considerable temporal variation associated with prairie ecosystems. Thus, for example, a location depicted as important for a particular species may have the resources needed by this species only a couple of years out of several, due to natural environmental variation. Lastly, GIS maps often display bird density metrics (number of individuals per unit area, for example) that are implied indicators of habitat quality. Ecologists, however, have recognized that density may be a misleading indicator of habitat quality (Van Horne et al. 1983), so such maps must be used with an awareness of that concern.

These limitations are offered as cautionary notes. Spatial models have great utility. However, users of these products must avoid thinking of them as maps that depict "the truth," but rather as visual planning tools that approximate reality. Whenever possible, PPJV spatial models will attempt to quantify error terms and temporal variation while conveying the proper interpretation of density metrics. Moreover, validation of spatial models has been, and will continue to be, an important PPJV science priority. Ultimately, spatial models offer the best hope of prioritizing and implementing bird conservation in a 100,000 square mile landscape.

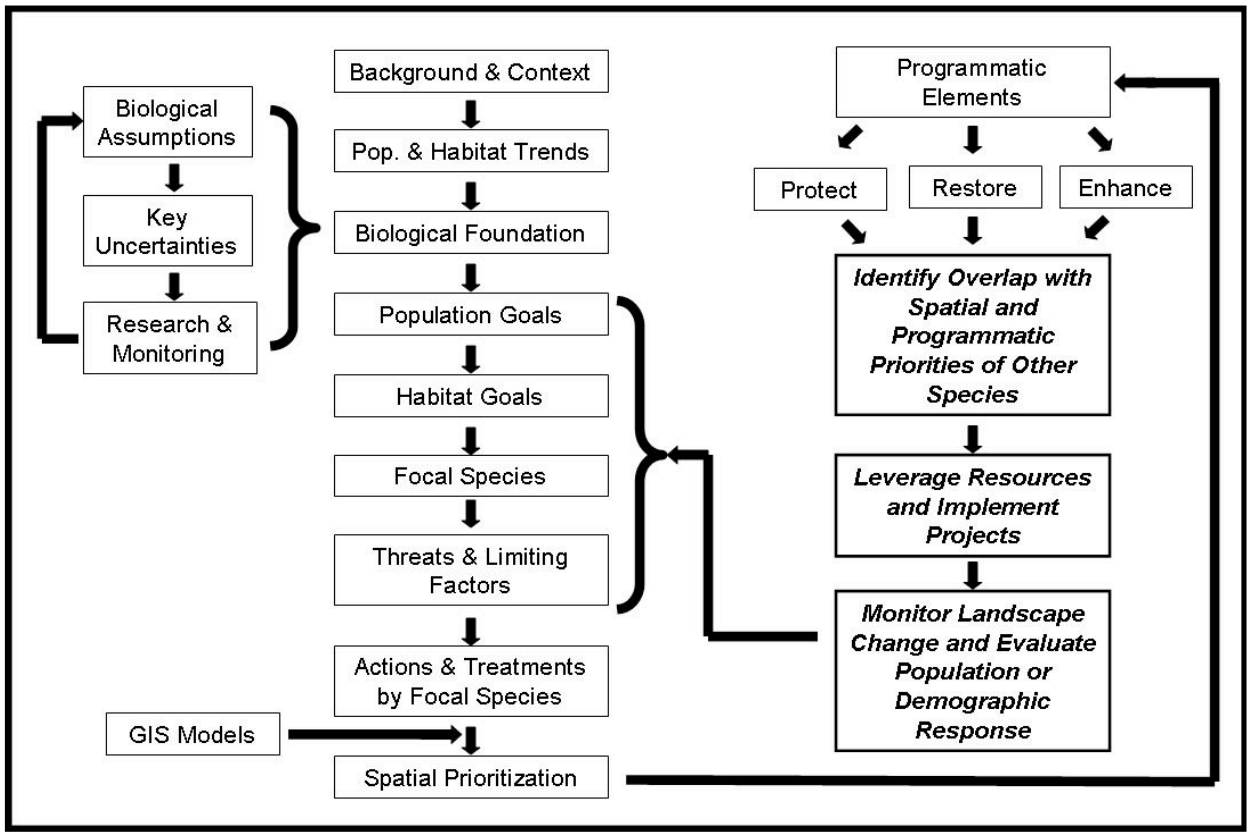
Integrating Species Plans

Spatial models developed for a suite of focal species will lead to ***Programmatic Elements*** (protection, restoration, or enhancement) that will compose our conservation delivery. In many cases, a mix of all three may be warranted. Each species group will develop a series of ***Tactical Plans*** that set forth programs that best address conservation needs in particular landscapes.

Several Tactical Plans are at various stages of development in the PPJV and will be considered supplements to this Implementation Plan when finalized and come "on-line".

After spatial priorities have been identified and a mix of programmatic elements decided upon, ***overlap with spatial and programmatic priorities among species*** will be sought. This is the first integrative step in the process of bringing together Tactical Plans from each of the bird groups, and provides the opportunity to ***leverage resources and implement projects*** in a collaborative way. It also sets the stage for cooperation in ***monitoring landscape change and demographic responses*** to actions. The results of monitoring feed back into setting new population and habitat goals in an adaptive management context.

The entire planning sequence described above is depicted diagrammatically below:

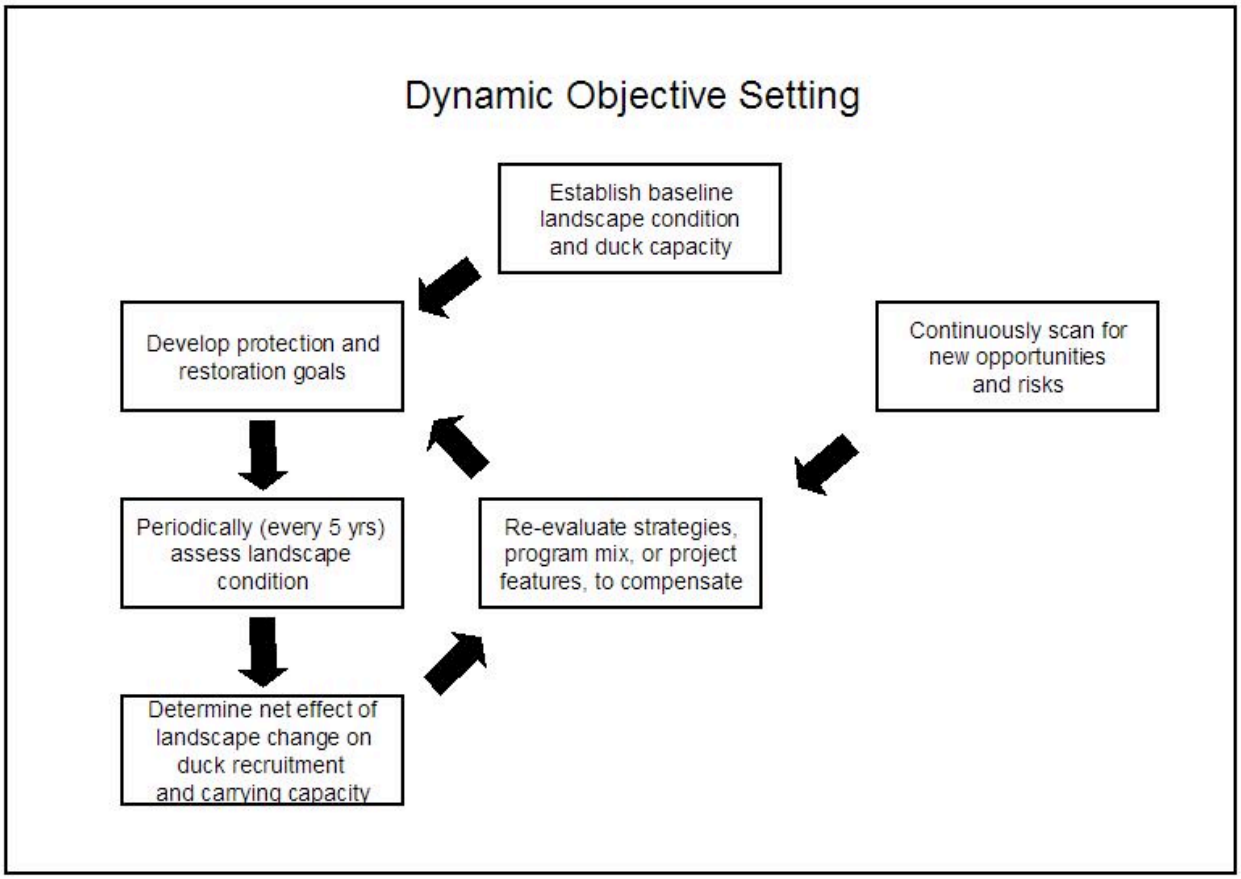


Monitoring Landscape Change and Evaluating Demographic Responses

The process of ***monitoring landscape change and evaluating population or demographic response*** may best be implemented as an iterative loop in and of itself. For example, with waterfowl, planners have decided on a baseline landscape condition that will result in the desired duck recruitment potential. However, as conservation programs ("gains") are delivered over the course of years, we also anticipate that degradation of habitat ("losses") will occur because of actions beyond our control. The need, then, is to periodically re-assess the overall landscape

condition to determine the *net* effect of all changes on duck recruitment potential. We plan to conduct this reassessment at roughly five-year intervals, and use the results to re-evaluate the mix of programs and strategies needed for the future (at this point, branching back to habitat and population goals in the diagram above). Demographic and spatial models will be used to relate landscape changes to anticipated demographic responses.

This general adaptive model (below), which we term ***Dynamic Objective Setting***, will be adopted as appropriate by all of the bird groups and plans.



Important Considerations for Integrated Bird Conservation

The integration process will ultimately allow us to designate "hot spots" on the PPJV landscape where we can pool resources for the greatest benefit to multiple species. This has intuitive appeal for several reasons, not the least of which is more efficient use of personnel and financial resources. However, there are several important considerations as we implement this approach.

"Separate planning, integrated action" – This strategy allows the best available science to drive the most sophisticated planning possible. It is particularly relevant when the disparate knowledge for the various species groups is considered. For example, there is extensive

understanding of waterfowl (duck) population biology, distributions, vital rates, habitat selection, and ecology enables the development of very sophisticated models. Knowledge of other species groups is comparatively meager, and therefore models will be less sophisticated. If waterfowl planning was implemented under a common framework with other non-waterfowl species, it would require that we plan with whatever common body of knowledge exists for all species involved. This would result in waterfowl plans that were substandard compared to that which could be achieved by utilizing all of the available information. A preferred approach is to use the knowledge accumulated over decades of waterfowl research and planning to accelerate the progress made by the other species groups, thereby allowing integrated planning using an advanced state of understanding.

"Multi-species spatial overlap does not necessarily equate to greater conservation benefits" – This might occur for two reasons. First, some rare and declining species are in that situation *precisely because* they use rare habitats, including some that are not used by many other species. The Piping Plover's preference for alkaline mudflats and barren sandbars is one example. Thus, in some cases, the most effective conservation might be targeted to areas with little or no overlap with other species. A second reason relates to the gradients of habitat quality that can be identified for most species. Delivering conservation projects in an area of overlap that is simply "okay" for several different species may result in fewer net conservation benefits than if separate projects were delivered in exceptional areas for each species, none of which were overlapping. To guard against this circumstance, "areas of overlap" should involve a high threshold of habitat quality for all species involved.

"Managing for one species will impact the welfare of another" – Organisms exploit their environments in different ways. Given the disparate vegetative preferences, successional stages, food habits, and breeding requirements of the avian species that occupy the PPJV, it is a virtual certainty that any decision to restore or enhance habitat for a particular species will benefit one species to the detriment of another. The "all-bird" management philosophy has yet to resolve this potential conflict. Logically, management for endangered or declining species should trump that for more common species when there is a conflict. This situation notwithstanding, most decisions of this type may ultimately rest with the owner of the property on which management is being implemented. Partners will need to address this issue proactively in advance of project delivery.

Who Will Be Responsible for Planning, Implementation, and Evaluation?

Ultimately, every active partner in the PPJV should play some role in these activities. However, some division of labor and expertise is beneficial and obvious. The PPJV Technical Committee (PPJVTC) has, starting with the development of this plan, laid the biological foundation and set forth higher-level population and habitat goals. The PPJVTC needs to continue with planning by identifying focal species, clarifying spatial priorities, establishing baseline habitat conditions, refining models that relate habitat features (and change in habitat features) to avian demography, and helping to prepare and review stepdown "Tactical Plans" (below).

The lead in monitoring and evaluation should naturally fall to the Habitat and Population Evaluation Team Offices, which were created to help support the planning and evaluation efforts of the PPJV. In addition, some PPJV partners (U.S. Geological Survey, Ducks Unlimited, state wildlife agencies, universities) have significant planning, monitoring, research and evaluation capabilities, and will continue to work in a collaborative way with the HAPET offices. Implementation of conservation programs will be the responsibility of many PPJV partners, particularly land management agencies and non-governmental agencies charged with delivery of conservation programs.

Development and Execution of Tactical Plans

As mentioned previously, this Implementation Plan provides a context and strategy for delivering integrated bird conservation, but does not provide details such as the specific tactics to be employed and associated acreage objectives, costs, and partner responsibilities. For this, it is expected that ***Tactical Plans*** will be developed by species groups and executed using the integrated approach described above. For some species groups, such plans already exist or are under development. The "Multi-Agency Approach to Planning and Evaluation" (MAAPE) process developed detailed tactical plans for waterfowl conservation. These MAAPE plans need to be re-examined and, if necessary, updated. In addition, partners engaged in habitat protection for waterfowl have developed tactical plans for the purchase of grassland/wetland easements and fee title acquisitions, and are currently finalizing a strategy to re-address waterfowl management on cropland-dominated landscapes in the Dakotas. Finally, several groups have formed to work on public policy issues, including farm bill policy (most notably the re-enrollment of expiring CRP contracts and the 2007 farm bill) and the need for additional funding to secure habitat in the PPJV (involving additional funding from the Migratory Bird Conservation Fund).

As tactical plans are prepared by individual organizations or groups of partners, the expectation is that such plans will be shared among the PPJV membership and become supplements to this implementation plan. Ideally, the PPJVTC should serve as the coordinating body that reviews and attempts to align tactical plans for greatest conservation advantage. This can be accomplished most efficiently by creating "Working Groups" (e.g., a "Waterfowl Working Group," a "Shorebird Working Group," etc.) that focus on species groups conservation, and report up through the main PPJVTC. It will be vitally important to keep information flowing among partners in order to capitalize on opportunities to integrate projects and leverage additional funding from various sources. Undoubtedly, new tactical plans will come into existence as PPJV partners gain new insights, realize new urgencies, and perceive new opportunities. The evolving priorities and missions of member organizations will also drive the creation of new tactical plans. This adaptive planning framework has, in fact, existed within the PPJV since its inception. The intent is that this implementation plan will add a cohesive and science-based foundation, and afford the basis for a new level of collaboration and leveraging of resources to accomplish the overarching goals of PPJV partners.

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