Population and Habitat Goals

The goal of the Waterfowl Plan is to sustain the overall duck production capability that existed in the PPJV during 1994-2003 by restoring and enhancing habitat in areas where wetlands and grasslands have been lost and protecting habitat in areas that are now highly productive.

Several approaches will be used to accomplish this goal. "Protection" is defined as actions that maintain existing habitat features. "Restoration" actions are those that put back in place habitat features that have been destroyed or degraded, or create new habitats that serve as ecological equivalents of habitat that has been lost. "Enhancement" projects are defined as actions designed to improve waterfowl recruitment over that which would have occurred in the absence of management. As such, "enhancement" is distinguished from operations and maintenance (O&M), in that O&M are actions that are necessary to keep existing habitat values from degrading. Importantly, we note that both O&M and public policy are actions that can and often do apply to the entire matrix. For example, Waterfowl Production Areas must be maintained by vegetative management, and without regular monitoring and enforcement the habitat values protected by permanent easements would be at risk. Likewise, important public policy initiatives affect annual, term, and perpetual programs.

Habitat Protection

Protection efforts will emphasize securement of conservation values in perpetuity, either through fee title acquisition or perpetual easements. Limited-term protection tools—such as 30-year WRP agreements, Grassland Reserve Program (GRP) rental agreements, and even the "swampbuster" provision of the Farm Bill—are extremely valuable but are still considered interim solutions to securing the future of breeding duck habitat in the PPR. The goal of the PPJV is perpetual protection of habitat. Numerical objectives specific to our most important habitat types are described below.

Wetland Protection – Maintaining the duck production capacity of the PPJV is the highest priority of the Joint Venture. This requires that wetland basins remain intact and functional. A recent analysis by Reynolds (HAPET, FWS) provides valuable insights into the wetland protection needs of the PPJV.

Overall, the wetland resources of the U.S. PPR (excluding the northern tier of counties in Montana) provide breeding habitat for an average of 4.25 million breeding duck pairs, with a average distribution as depicted in Fig. 4. Maintaining these pairs requires that wetland basins remain intact and functional.

The NAWMP set population objectives for ten of the most common duck species in North America. The sum of the NAWMP duck population objectives was 38.5 million breeding birds. When species like Lesser Scaup (which breeding primarily outside of the PPR) are subtracted from the goal, *about 30 million breeding ducks represent the goal of the entire Prairie Pothole Region of the U.S. and Canada*. Roughly one-third of that total—10 million breeding ducks—was envisioned to occupy the PPJV. The FSM survey data indicate 8.5 million ducks is the long-term (for the period of the survey) average population. During 1999-2001, the PPJV

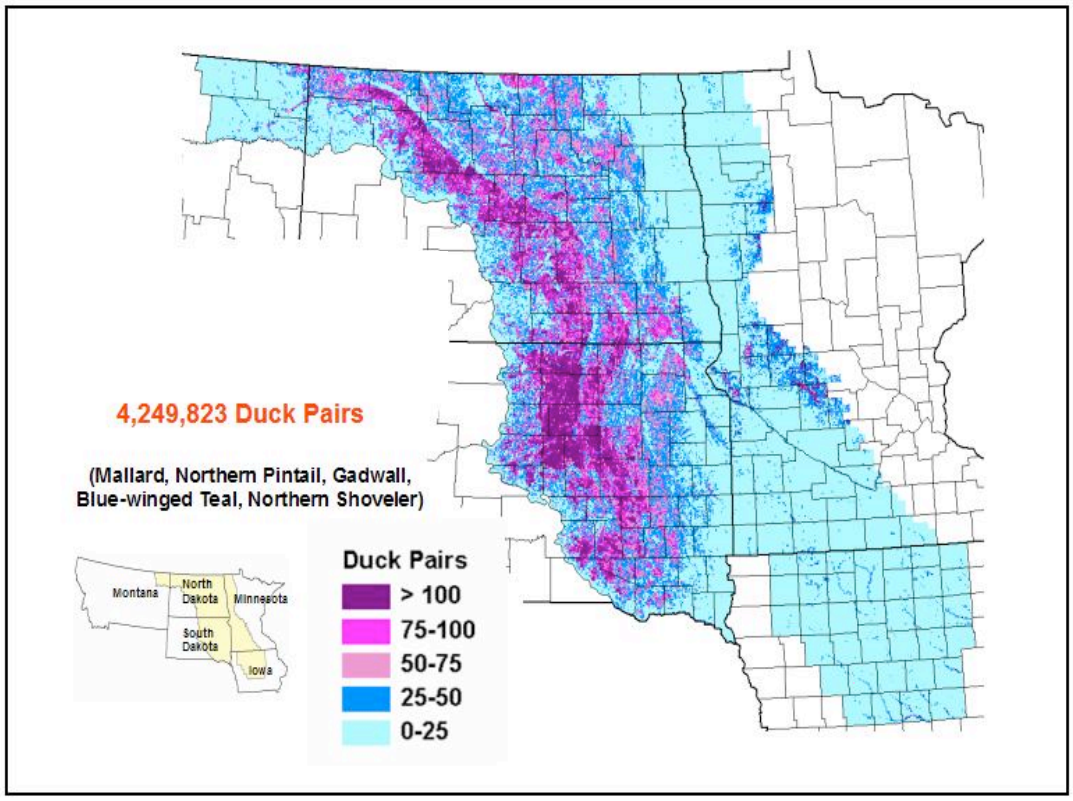

Figure 4. The present size and distribution of the PPJV breeding duck population (excluding most of Montana).

approximated or exceeded the 10 million duck objective, demonstrating that the capacity exists to sustain this population level under favorable ("wet") conditions. Depending on the interpretation of "average environmental conditions" that is stated as a condition of attaining population goals in the NAWMP, it appears that the PPJV is close to or above the NAWMP objective, and would clearly exceed it if the proposed suite of habitat protection, restoration, and enhancement objectives were met.

Currently, these pairs are supported on 7.33 million acres of wetlands, of which 1.49 million acres are protected through fee title acquisitions or perpetual wetland easements held by the FWS. Some 1.15 million pairs reside on the protected wetlands, leaving the majority of the breeding pairs (3.10 million, or 73%) dependent on wetlands that are unprotected except through the "swampbuster" provision of the Farm Bill.

Reynolds and Loesch (HAPET, FWS) examined the 5.85 million acres of unprotected wetlands to further identify the most important wetlands to breeding ducks. They defined "wetlands at risk" of loss as those small and shallow wetlands less than 1 acre in size that are totally or partially embedded in cropland and which currently are unprotected. Further, they defined "priority wetlands" as "wetlands at risk" that exist in landscapes that support over 25 duck pairs per square mile. Using these criteria, they identified 1.4 million acres of priority wetlands that

are in greatest need of protection. These high priority wetlands support 1.5 million duck pairs. This analysis forms the basis for the following wetland protection objective:

Protect in perpetuity 1.4 million acres of high priority wetlands at risk (as defined above).

Sub-Objective: Protect 1.2 million acres through perpetual easements.

Sub-Objective: Protect 200,000 acres though fee title acquisitions.

Wetland complexes identified for protection have been mapped at the legal section level for the PPJV area and are available from the HAPET offices.

Grassland Protection – Ducks depend on grasslands for nesting, and an increasing body of evidence suggests that nesting success increases with the amount of grassland in the landscape. Landcover mapping indicates that 21.3 million acres of grasslands exist in the PPJV area of the Dakotas and northeast Montana. Reynolds and Loesch (HAPET, FWS) examined the distribution of grasslands in relation to wetlands to identify "priority grasslands" for ducks, defined as patches of grassland over 55 acres in size that are accessible to over 25 duck pairs per square mile. They identified 11.56 million acres of this type. They then further sub-set this group to exclude those grasslands already protected by fee title acquisitions (508,423 acres) or perpetual grassland easements (701,259 acres). It is critical that the remainder of these high-priority, unprotected grasslands (10.4 million acres) be secured. Even the loss of a portion of these grasslands could have significant implications. For example, using productivity models from Cowardin and Johnson (1979) and input data from Reynolds et al. (2001), it is estimated that a 10% decline in the remaining high-priority grasslands in the PPJV would result in an annual reduction of 250,000 ducks into the fall flight.

> ***"The most important nesting habitat of prairie mallards and pintails is the remnant tracts of native grassland communities that have persisted mainly as pastures on otherwise intensively farmed land. Losses of grassland continue at the rate of 2 percent annually and, in the last decade, one-third of the remaining grassland was converted to cropland."***
> - The North American Waterfowl Management Plan, 1986

This analysis forms the basis for the following grassland protection objective:

Protect in perpetuity 10.4 million acres of priority grassland (as defined above).

Sub-Objective: Protect 10 million acres through perpetual easements.

Sub-Objective: Protect 400,000 acres through fee title acquisitions.

Legal sections identified as priority areas have been mapped for the PPJV area and are available from the HAPET offices.

The objectives for both additional wetland protection (1.4 million acres) and grassland protection (10.4 million acres) are substantially more than the 1,891,315-acre object set forth in the NAWMP (North American Waterfowl Management Plan, Plan Committee 2004). Nevertheless, the goals in this waterfowl plan are based on updated scientific analysis, and deemed necessary achieve the long-term waterfowl productivity of the PPJV.

Restoration Objective

Restoration can take many forms, from the short-term benefits provided by grazing and water level management, to limited-term benefits derived from restoring grasslands and wetland function with the CRP, to permanent benefits of restorations associated with perpetual projects under NAWMP or the WRP. As with protection projects, the PPJV desires to gain the most cost-effective return on restoration projects, which usually means investing in projects with the most enduring benefits. The following numerical restoration objectives are derived through updated analyses of the original MAAPE planning exercise.

Wetland Restoration – Substantial wetland and grassland losses have occurred throughout the PPJV. It's desirable and necessary to address these losses through restoration even while we strive to maintain the wetlands and grasslands that still exist.

The following objectives are derived from original MAAPE analyses, modified to reflect current thinking on the opportunities and needs for wetland restoration.

Restore wetlands sufficient to carry an additional 492,000 total breeding duck pairs over the capacities identified in Table 1.

Sub-Objective for FWS Region 6: Restore wetlands sufficient to carry an additional 337,000 total breeding duck pairs over the capacities identified in Table 1. (This objective is from the 8.5% increase from the MAAPE process.)

Sub-Objective for FWS Region 3: Restore wetlands sufficient to carry an additional 155,000 total breeding duck pairs (including Wood Ducks) over the capacities identified in Table 1.

The response of breeding duck pairs to restored wetlands will be based on model applications that assume the same pair/wetland relationships identified from surveys used to develop Table 1. We estimate that approximately 337,000 acres of wetlands in Region 6, and 345,000 acres of wetlands in Region 3 will need to be restored to meet sub-objectives. In order to offset the continuing loss of wetlands, restoration goals could be adjusted upwards from the above objectives based on the difference between wetland habitat present in 1982 (latest photography used by National Wetland Inventory) and that available currently or in the future.

Grassland Restoration – Within the PPR, grasslands have suffered even greater percentage losses than wetlands, and though several million acres of grasslands have been restored through farm programs like CRP, these restored acres are not secure.

To ensure adequate grassland cover, the PPJV will continue to seek opportunities to restore grasslands within and around existing high density wetland communities or, where both grasslands and wetlands can be restored together, to develop landscapes that support breeding waterfowl. While large Farm Bill programs like CRP and WRP are the most effective means to achieve landscape-level change, the following objective for grassland restoration (derived from the MAAPE planning) constitutes a grassland restoration objective over and above the need to maintain restoration opportunities under the conservation titles of the Farm Bill:

Restore 393,000 acres of grasslands associated with high density wetland communities.

Enhancement Objective

Enhancement (sometimes called "intensive management") projects received a great deal of attention in the original MAAPE planning effort. Subsequent research has shown some of the management tools perform as expected, whereas others do not elicit the expected increase in duck recruitment, are more costly than anticipated, or experience failures that caused O&M to be prohibitive. Additionally, certain treatments objectives may be unreasonable. Based on these findings, the PPJV Waterfowl Working Group will re-evaluate the recommended mix of tools now identified in the MAAPE planning and suggest changes as appropriate. In the interim, enhancement objectives for this plan are those outlined in the MAAPE plans for each Waterfowl Management District (Waterfowl Plan Appendix A).

Actions and Treatments

The suite of objectives presented above is daunting in its scope and scale, and clearly exceed the current human and financial resources currently available to the PPJV. Accordingly, while we strive to attain additional resources, there is a need to consider setting priorities so the most important jobs can be accomplished first. Many approaches are possible. Here, we consider issues of urgencies, opportunities, and cost-effectiveness as a basis for prioritization.

The most compelling cases for urgency are circumstances where existing habitat resources are in imminent danger of being lost and are irreplaceable. Considering the investment required to convert wetland and upland habitat to other uses such as cropland, it's no surprise that the cost of restoring these resources is also high. Some ecologists suggest that native wetlands and prairie may not be "restorable", in the sense of re-establishing the complete suite of micro-organisms, plants, and other elements that make these habitats complete. While one might debate whether native habitats can be fully restored, there is no disagreement that -- at a minimum – plowed prairie takes a very long time to return to its original state. Therefore, this plan places special emphasis on protecting existing wetland and grassland habitats identified as high priority based on risk of conversion and loss of biological value.

There are over 7.3 million acres of wetlands in the U.S. PPR. These wetlands do not provide identical waterfowl values, nor are they at equal risk of being converted to cropland. Large, deep wetlands are unlikely to be targeted for conversion, and there is also little incentive to drain any wetland imbedded in grassland because they provide water and a source of hay for livestock.

However, small, shallow wetlands are at high risk of being converted when they occur in cropland, former cropland (i.e., CRP), or in grassland that is at risk of being plowed. Such wetlands are the highest priority for protection.

Native prairie and other forms of grass cover (e.g., tame pasture, "go back" hayland, and expired CRP plantings) are all important components of cover in the PPR. Because nesting ducks (and many other grassland birds) key on grass structure and not grass species, it may make little difference whether the grass cover is planted or native. Additionally, field studies show that all types of grass areas complement all other grass areas in a landscape relative to duck nest success (Reynolds et al. 2001). However, because native prairie typically exhibits greater plant diversity than restored grassland, it seems prudent to consider this as added ecological value. On this basis, there is urgency in protecting grasslands that still exist, especially in areas of moderate to high wetland density, with emphasis on native prairie. As identified above, the PPJV objective is to protect 10.4 million acres of priority, at risk grasslands.

As with any treatment where funding is limited, prioritization of grasslands identified for protection are essential. Identifying grasslands at risk is more difficult than identifying wetlands at risk. Ducks Unlimited's Great Plains Regional Office is attempting to identify criteria associated with risk. For example, as current landowners and ranchers age and the rural countryside depopulates, lands are transferred. When land changes hands, the risk increases that the next landowner will convert existing grassland to cropland. Socio-agriculture factors in specific geographic areas may also be important. Grassland areas that had been cropped previously (e.g., "go back," expired CRP) may be at high risk to re-conversion because of the reduced preparation costs that such tracts require to make them productive. And finally, small but ecologically important grassland areas may be at increased risk to conversion because their isolated nature may not suit typical uses (e.g., large livestock operations) of grasslands.

An argument for urgency to conserve grasslands includes escalating costs of protection and restoration, which may put some projects out of financial reach if they are delayed too long. Likewise, it is often possible to achieve the same habitat goals through different routes that vary markedly in cost. For example, native grassland in North Dakota can be protected in perpetuity for ~$80/acre with grassland easements, but replanting just four species of native grass costs as much as $200/acre.

Change can also create opportunities. Land transfers present opportunities to work with landowners or perhaps enable conservation organizations to purchase the property in fee title. The proposed increase in Migratory Bird Conservation Funding suggested for the PPJV region, along with NAWCA rules that favor long-term protection, also present enhanced opportunities for funding some types of projects. Lastly, expanded partnerships within the new "all-bird" PPJV create new opportunities that did not previously exist. These opportunities are greatest where priority conservation interests overlap. Protection of key natural assets—particularly native grasslands and wetlands—often affords more conservation overlap among partners (bird groups) than do restoration and enhancement projects, which may have a more species-specific focus.

The longevity of our conservation investments is increasingly important to prioritizing actions. Since its inception, the PPJV has prioritized long-term (preferably perpetual) protection of waterfowl habitats. This decision has its roots in pragmatic cost-benefit analyses, as well as a philosophical basis, i.e., securing habitat for future generations is preferable to obligating future generations with the need to maintain habitat on an annual or periodic basis, thereby incurring ongoing costs.

Programmatic Elements

The PPJV has always employed a diverse array of conservation tactics, including various forms of acquisition, restoration, and enhancement (the latter is sometimes called "intensive management"). It will be important to continue using a diverse array of tools in the decades to come; however, PPJV partners are increasingly focused on the longevity of the benefits that result from their application. Some of this attention has resulted from scoring criteria applied by key funding sources (e.g. NAWCA), wherein projects that afford longer-term benefits are more likely to be funded. Yet another factor is partners taking a more business-like approach to conservation, and as a result applying cost-benefit criteria that include the cost of the conservation work amortized over the expected life of the project. Conceptually, each tactic can be arrayed in a matrix that considers both the type of conservation action and the duration of its benefits (Fig. 5).

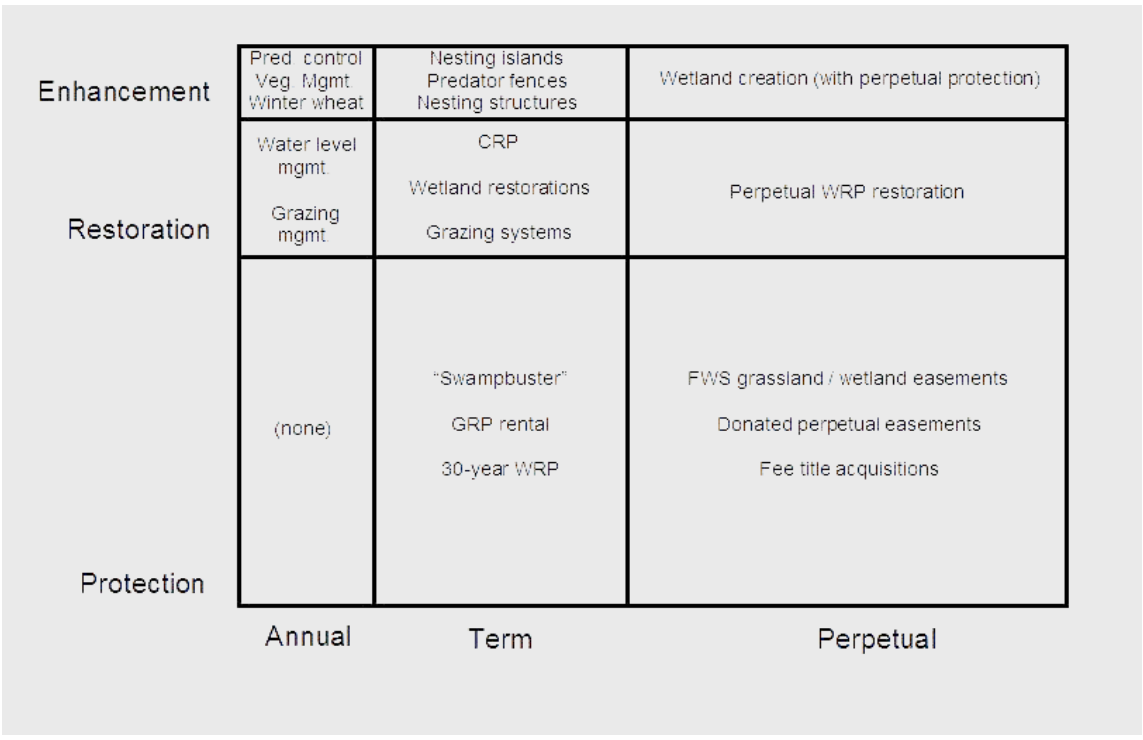

Figure 5. Waterfowl conservation tactics typically used in the PPJV. Individual tactics are displayed in relation to the three primary programmatic elements (protection, restoration, and enhancement) and the duration of benefits received. This depiction displays larger cells as relatively higher priority in consideration of the biological foundation of the PPJV plan.

To the extent the PPJV Plan prioritizes maintaining existing habitat and realizing long-term benefits of conservation actions, the size of the cells reflects the relative priority of actions across the PPJV as a whole.

Spatial Prioritization

Spatial databases generated using GIS have enabled PPJV planners to understand the distribution, abundance, and trends in important landscape features in ways that were never imagined when the PPJV was formed. Two GIS products—the predicted distribution of breeding duck pairs (Fig. 6) and the distribution and abundance of perennial vegetation (Fig. 7)—have been particularly important for waterfowl conservation purposes.

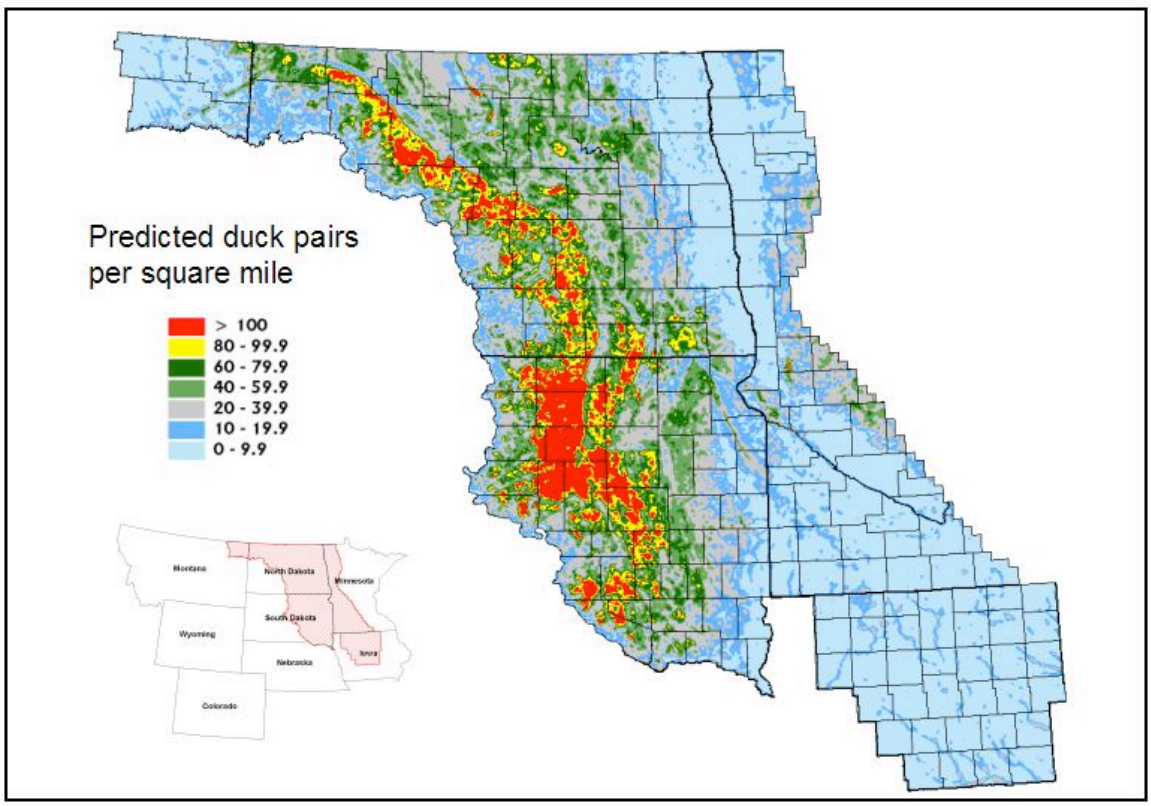

Figure 6. Predicted distribution of duck breeding pairs in the PPJV landscape where four-square-mile-surveys are conducted. PPJV partners often refer to this GIS model as the "thunderstorm map" because of its resemblance to a weather radar image.

Conservation Strategies and Targeting

Whereas figure 5 provides a strategic umbrella to conceptualize conservation actions together with the longevity of their benefits, there remains a need for a biologically-based decision process that directs where certain treatments or tactics should be targeted on the landscape.

Since about 1995, a simple "decision matrix" has been used by PPJV partners for this purpose (Fig. 8). This matrix uses a combination of wetland abundance (because wetlands affect pair densities) and grassland abundance (because of the generalized relationship between the amount of grassland in the landscape and duck nesting success) to suggest an appropriate management

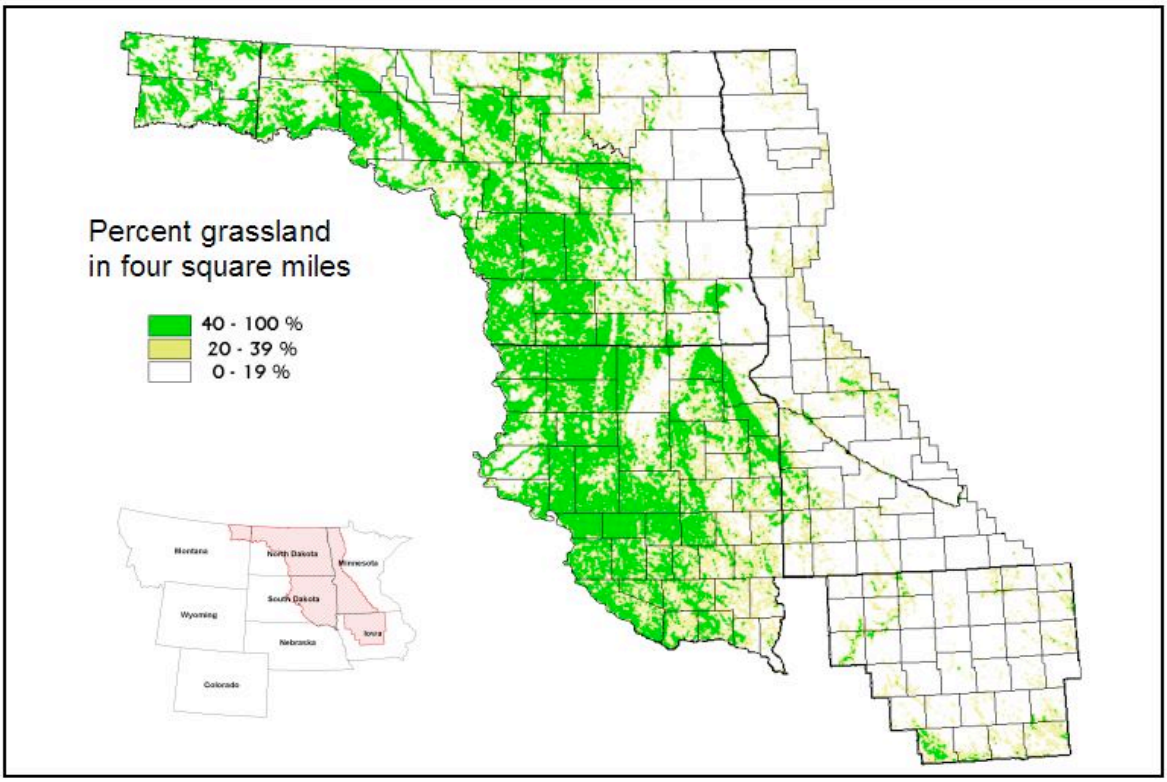

Figure 7. Percent perennial cover (within a four-square-mile area) for most of the PPJV landscape (derived from LANDSAT TM data, FWS, and Ducks Unlimited).

tactic. Different partners employ different "cutpoints" between the categories. In the Dakotas and Montana, a typical dividing line for the wetland (pair density) dimension is 50 pairs per square mile, and for the grassland dimension is 40% grass within a 4 square-mile-area (20% between "intensive management" and "grassland restoration" boxes). Lower pair and grassland densities are usually applied to the PPJV portion of Minnesota and Iowa.

Using GIS, this conceptual matrix can be made spatially explicit (Figure 9) by combining two separate GIS products, in this case the maps depicted in Figures 6 and 7. Using approaches like this, PPJV planners can identify the best tactics to employ in particular geographic areas. These maps have been used since 1988 for targeting PPJV program delivery, and similar products will continue to evolve as a key part of conservation planning and delivery for waterfowl.

Monitoring Landscape Change and Evaluating Demographic Response

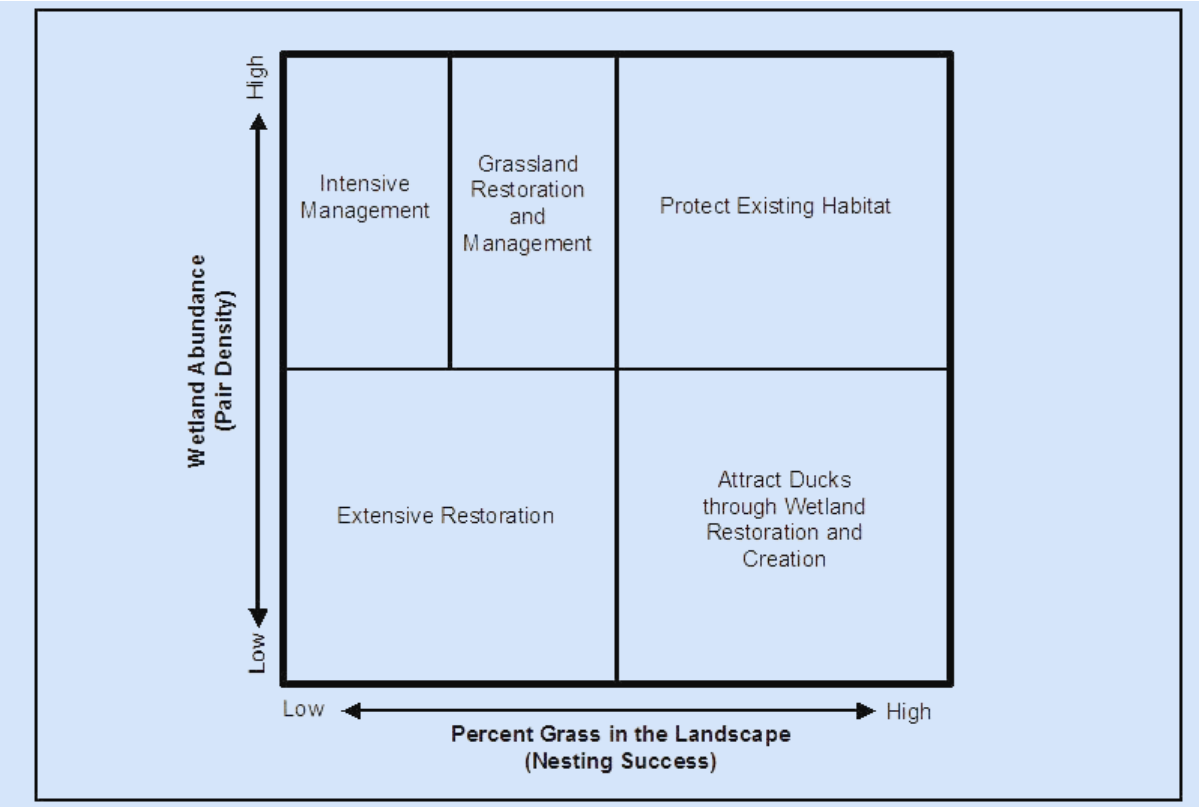

Figure 8. A conceptual decision matrix for waterfowl conservation that displays the recommended action in relation to combinations of wetland abundance and percent grass in the landscape.

Waterfowl conservation programs in the PPJV will follow the dynamic objective setting approach described in Section I of the PPJV Implementation Plan. Specifically, we intend to document the critical landscape features (particularly wetlands and grasslands) that existed during the duck boom years of 1994-2002 to establish a habitat baseline. On a large spatial scale, LANDSAT satellite imagery and the digital National Wetlands Inventory database can serve this purpose. Those database have already been obtained for most of the PPR.

Unfortunately, some important habitat features cannot be identified and tracked over time using LANDSAT imagery. These include subtle changes in the quality of upland and wetland habitats, and the loss or partial drainage of small wetlands. Using remote sensing (satellite) information with higher resolution capabilities creates an unworkably large data file if this information is collected for the entire PPR. The solution is to utilize a statistically valid design that identifies sample plots which are representative of the PPJV as a whole. That sampling frame exists