



PLAN FOUNDATION

SECTION 1



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The mission of the Prairie Pothole Joint Venture is to implement conservation programs that sustain populations of waterfowl, shorebirds, other waterbirds and prairie landbirds at objective levels through targeted wetland and grassland protection, restoration and enhancement programs. These activities will be based on science and implemented in collaboration with multiple stakeholders.

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EXECUTIVE SUMMARY

The Prairie Pothole Joint Venture (PPJV) boundaries include one-third (100,000 square miles) of North America's Prairie Pothole Region (PPR). Its uniqueness lies in the millions of depressional wetlands that constitute one of the richest wetland systems in the world. These "prairie potholes" and their surrounding grasslands are highly productive and support an incredible diversity of bird life. The PPR is breeding habitat for myriad wetland and grassland birds and also supports significant numbers of spring and fall migrants.

Once a vast grassland, the PPR is now an agrarian system dominated by cropland. Changes in land use have been, for the most part, detrimental to the migratory birds that use the PPR. Many wetlands have been drained or degraded, and the loss of native prairie—particularly in the eastern portion of the PPJV—has been extensive. Despite these losses, millions of wetlands and large tracts of native prairie still remain. The PPR is one of the most altered—yet also one of the most important—migratory bird habitats in the Western Hemisphere. It is the backbone of North America's "duck factory," and critical habitat for many wetland- and grassland-dependent migratory birds.

The PPR is envisioned as a place where abundant populations of wetland and grassland birds can be sustained in perpetuity for the benefit of all people who enjoy these species. Accordingly, the mission of the PPJV is to implement conservation programs that sustain populations of waterfowl, shorebirds,

other waterbirds, and prairie landbirds at objective levels through targeted wetland and grassland protection, restoration, and enhancement programs. The PPJV operates through partnerships to accomplish its mission.

The U.S. PPR is a dynamic place, socially as well as climatically. Nowhere is that more apparent than in rural communities, which are experiencing difficult social stresses due, in large part, to depopulation and changing economies. Several factors are involved, including human demography, new land uses, advances in farm equipment, new crops, and energy development. These factors affect migratory bird resources as well as human populations and economies. The PPJV recognizes these interrelationships and believes that by addressing factors that impact both people and birds, we can have positive impacts on both communities and avian conservation. Today, approximately 90% of the entire U.S. PPR is privately owned, most of which consists of working farms and ranches. This overwhelming private landownership underlies the need to work cooperatively with agricultural producers to achieve the goals and objectives outlined in this plan.

This plan provides a road map for integrating the conservation of all migratory birds under one framework. The process involves stepping down the objectives of the four, international "species groups" plans for waterfowl, shorebirds, waterbirds, and landbirds as they apply to the PPJV. Population and habitat trends, coupled with knowledge of how



Casey Stämmer

species respond to landscape change, will then be used to build a biological foundation and set quantifiable goals. Priority species have been selected to represent groups of birds of special interest, and associated threats and limiting factors will be identified. Conservation actions and treatments will be proposed, and models will be developed that depict where to implement particular conservation actions. After each species group has set spatial and programmatic priorities, an integrated landscape design will be developed by overlaying priority habitats for focal species from each bird group. Conservation actions will then be partitioned into protection, restoration, or enhancement projects for on-the-ground delivery. Monitoring and evaluation will be used to measure performance and provide feedback to improve future management performance.

Currently, the four bird groups differ markedly in what is known concerning their population status, habitat requirements, and understanding of factors that most affect population change. Goals and objectives of the four bird plans reflect this diverse state of knowledge.

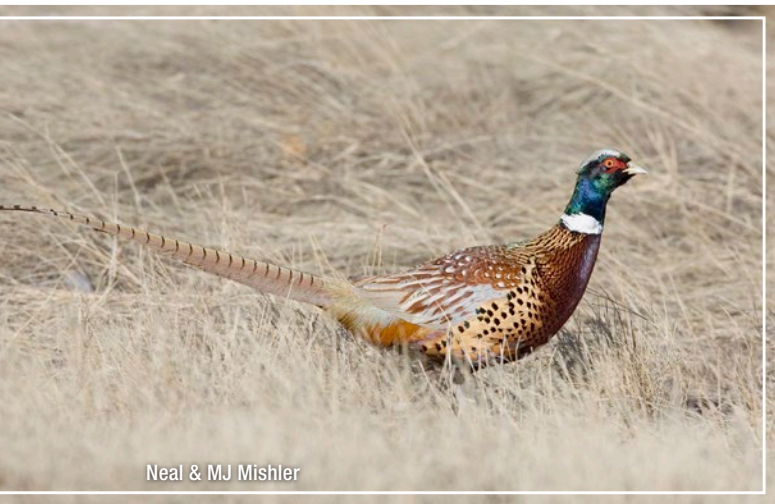
For waterfowl, the duck population boom that occurred during 2007-2014 is considered evidence of the potential capacity of the PPJV to recruit ducks when wet conditions prevail. Accordingly, the foundation of the waterfowl plan is to maintain the prairie ecosystem to support pulses of landscape level productivity to maximize reproductive potential for breeding waterfowl. This will require that 1.78 million wetland acres and 10.8 million grassland acres remain in the PPJV landscape. Given that habitat loss occurs at rates higher than protection, it is unreasonable to assume that all priority acres can be perpetually protected. However, it is critical that the remainder of these high-priority, unprotected wetlands and grasslands be perpetually available for breeding waterfowl. For the 5-year period covered by this plan (2017-2022), objectives for perpetual protection include 133,000 acres of priority wetland and 446,000 acres of priority grassland habitats. Term-limited conservation programs that complement perpetual protection programs will be important to keeping these habitats available in the near future. In addition, the waterfowl plan sets a goal of restoring 36,000 wetland acres and 296,000 acres of grasslands associated with priority waterfowl population. Because waterfowl populations

utilize habitats on both sides of the U.S. - Canadian border, it will be important to coordinate with the Prairie Habitat Joint Venture as the PPJV moves forward in implementation.

The shorebird plan recognizes the importance of the PPJV to breeders (13 species) as well as those birds that use the PPJV for stopover habitat during migration (23 species). Much basic research needs to be conducted to better understand habitat use, distribution, and vital rates. Recently developed, spatially-explicit Geographic Information System (GIS) models have proven useful for predicting shorebird abundance and distribution in the PPR. Highest priority management needs relate to Piping Plover and Mountain Plover. Protection of existing wetlands and grasslands is a high priority; recovery of declining populations will require additional focus on enhancement of these habitats that have been degraded.

For waterfowl, the duck population boom that occurred during 2007-2014 is considered evidence of the potential capacity of the PPJV to recruit ducks when wet conditions prevail.

Waterbirds constitute an important group of species in the PPJV. The PPR contains over 60% of the continental breeding population of Franklin's Gull; over 50% of the continental population of Pied-billed Grebe, American Bittern, Sora, American Coot, and Black Tern; and approximately 30% of the American White Pelican and California Gull populations. The first objective of waterbird conservation in the PPJV is protection of existing wetlands and grasslands. Areas to be conserved can be prioritized through application of spatially explicit habitat models, and risk assessment should also be included in the prioritization process. Retention and development of wildlife-friendly agriculture programs (e.g., "Swampbuster" provision in U.S. Farm Bill) will also have a major impact on waterbird conservation in the PPR by helping preserve the existing wetland and upland habitat base.



The landbird plan recognizes the importance of grasslands – particularly native prairie – to declining populations of grassland songbirds. Approximately 189 species of birds breed in the Prairie Potholes Bird Conservation Region (BCR 11), which closely approximates the area encompassed by the Prairie Pothole Joint Venture in the United States and the Prairie Habitat Joint Venture in Canada. Sixteen bird species have more than 20% of their continental breeding population in the PPR. At the top of this list are four landbirds considered to be high priorities by Partners In Flight: Baird’s Sparrow, with >90% of its population in the PPR, Sprague’s Pipit, Chestnut-collared Longspur, and McCown’s Longspur. The theme of Partners In Flight (PIF) has always been to “keep common birds common.” As a starting point for Watch List species, the 2016 continental plan set population objectives for the short term (10 years) and the long term (30 years). Habitat conservation strategies for other prairie wildlife, including the migratory birds addressed by the other bird initiatives, will generally not differ substantially from those strategies implemented to meet the needs of waterfowl. Implementation strategies will focus on

the protection, restoration, and enhancement of prairie wetland, riparian, grassland, and sagebrush steppe communities.

The common thread that runs through each plan is the protection of existing wetlands and native grasslands. At this juncture, there is potential for rapid progress in integrated planning and conservation. However, as we embrace the philosophy of integrated, all-bird conservation, there are some important principles to bear in mind. These include: (1) the merits of separate planning and integrated action, (2) the potential pitfalls of identifying geographic priorities strictly on the basis of spatial overlap, and (3) an awareness that managing for one species will impact the welfare of another. These concerns notwithstanding, the planning framework presented here should provide for future growth and opportunities under the paradigm of integrated, “all-bird” conservation.

State Tactical Plans

Detailed step-down plans for implementing the goals and objectives identified in this plan are provided as State Tactical Plans for each of the 5 PPJV states. The supplemental state-level plans concisely describe the priority resources and the implementation strategies to conserve those resources over the next 5 years. Future conservation needs are also identified in the context of research, funding, staff and public policy at the state level. Additionally, methods for monitoring and evaluating the efficacy of conservation strategies and the resulting effects on priority species are described. State Tactical Plans complement the adaptive planning framework the PPJV has embraced since its inception and provide a level of partner collaboration for leveraging resources to accomplish the overarching PPJV goals at the state level.

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PREFACE

The 2005 Prairie Pothole Joint Venture (PPJV) Implementation Plan is a foundational document detailing the history, core values, and long-term conservation goals of the Joint Venture. Although the 2005 plan incorporated the most current information of the time, new information, challenges, and opportunities across the U.S. Prairie Pothole Region warranted an update to the existing plan. For example, agricultural technology and policy have changed, energy development has expanded, and more is known about conservation

needs across the entire PPJV landscape. Many of the concepts and much of the document text and organization were retained in this update. Therefore, the 2005 authors are recognized in this update with the 2017 authors. This 2017 PPJV Implementation Plan is a document that continues to spotlight the partnership's common ground while detailing the strength of each partner's approach to integrated bird conservation for the next 5 years (2017-2021).¹

¹ Recommended citation: Prairie Pothole Joint Venture. 2017. Prairie Pothole Joint Venture Implementation Plan. S. P. Fields, editor. U.S. Fish and Wildlife Service, Denver, Colorado, USA.

INTRODUCTION TO THE PRAIRIE POTHOLE REGION OF NORTH AMERICA

The Prairie Pothole Region of North America (PPR; Figure 1) is a unique and extraordinary ecosystem. Before crop-based agriculture began to transform the landscape (circa 1890), the region was part of one of the largest grassland-wetland ecosystems on earth. In the late 1700s, between 7 and 8 million acres of wetlands existed in the North Dakota and South Dakota portion of the U.S. Prairie Pothole Region alone (U.S. PPR; Dahl 1990). Early pioneers described portions of southern Minnesota and northern Iowa as impassable during spring and early summer due to the abundant ponds and marshes. The innumerable wetlands and vast grasslands were exceptionally important to Western Hemispheric avifauna, particularly migratory waterfowl, shorebirds, and grassland birds.



Figure 1. The Prairie Pothole Region of North America

As a result of the nation's westward expansion, the lure of fertile soils and a strong northern European work ethic converged in an unprecedented effort to plow the prairie and drain its wetlands. Wetland drainage accelerated dramatically during the 1940s (Johnson and Higgins 1997). Today, more than half of the historic U.S. PPR wetlands are gone (Dahl and Johnson 1991), and in the eastern parts of the region fewer than 10% of the original potholes and less than 1% of the native prairie remain. Nearly 70% of the original grasslands now support crop production. The conversion of grassland to cropland peaked in the 1920s, and by 1960 it was generally believed that all of the tillable ground had been converted to

cropland. However, technological advancements and economic drivers continue to re-define the meaning of "tillable ground." Today, approximately 90% of the entire U.S. PPR is privately owned, most of which consists of working farms and ranches. This overwhelming private landownership underlies the need to work with agricultural producers to achieve the goals and objectives outlined in this plan.

The U.S. Prairie Pothole Region – A National Ecological Treasure

The U.S. PPR is a young ecoregion in geologic time. It is a subtly heterogeneous region from east to west and north to south; however, anthropogenic changes to the U.S. PPR landscape have magnified this heterogeneity creating pronounced differences in habitats, species distribution and abundance, and approaches to conservation across the region. Its unifying features are a result of recent glacial history: the retreat of the Late Wisconsin glaciers at the end of the Pleistocene Epoch from 13,000 to 10,000 years ago left in their wake shallow wetlands of unparalleled density and productivity in North America. Eventually, the rolling spaces between these "prairie potholes" became dominated by vast grasslands that confronted European settlers and reminded many of an ocean with only an occasional thin line of trees along a creek suggesting a distant shoreline.

This is obviously a simplified description of the region. Traveling southeast to northwest across the U.S. PPR, grassland communities change with precipitation and frequency of drought from the tallgrass prairie in the south and east, including Iowa where total annual precipitation averages 30-35", lowland terrain in Minnesota (25-30") and the Red River Valley, to mixed-grass prairie west of the James River (20-25"), and west and northward along the Missouri Coteau (15-20"), to dry mixed-grass prairie across northern Montana (10-15") to the Front Range region of the Rocky Mountains.

Wetland heterogeneity is more dependent on terrain produced by local glacial processes. Wetland basins are classified most often by their degree of permanence at their deepest point. Saturated wetlands are

flatlands with an upwelling of groundwater; other prairie potholes are depressional basins. Temporary wetland basins hold water for 7-30 days during the growing season; seasonal basins 30-90 days; semi-permanent basins throughout the growing season in most years with normal precipitation; and permanent basins, or lakes, go dry only during periods of prolonged, exceptional drought (Stewart and Kantrud 1971, Cowardin et al. 1979). Each has its own predominant plant and animal communities and distinctive role in local complexes of wetland basins. Lateral and terminal moraines tend to be hilly and studded with numerous small, steep-sided basins with seasonal and semipermanent water regimes in the east and seasonal water regimes in the west. In outwash plains flowing from the melting glaciers and glacial lake beds, much of this terrain is buried under stratified sediment. These regions tend to be flatter with high densities of larger and often saturated, temporary and seasonal basins. For example, wetlands historically covered at least 24% of the PPR of Iowa (C. Ensminger, unpubl. data) and 18-20% of the Minnesota PPR (R. Johnson, unpubl. data) compared to 9% of the Missouri Coteau. Historically, areas like the Missouri Coteau contributed periodically to waterfowl population eruptions when the whole U.S. PPR was wet, an uncommon occurrence, but Iowa and southern Minnesota and much of the Central Lowlands in eastern North and South Dakota were the breadbasket for waterfowl in average years.

Geography of the Prairie Pothole Joint Venture

The Prairie Pothole Joint Venture (PPJV) includes counties in Iowa, Minnesota, North Dakota, South Dakota, and Montana (Figure 2), west of the Mississippi River, east of the Rocky Mountains, and east and north of the Missouri River and conforms as closely as county boundaries permit to the U.S. PPR. Subtle, but meaningful differences in landscape

morphology exist across the PPJV. These differences are attributable to the pre-glacial topography and the pace and manner of glacial melting. Coupled with current climatic factors, these differences

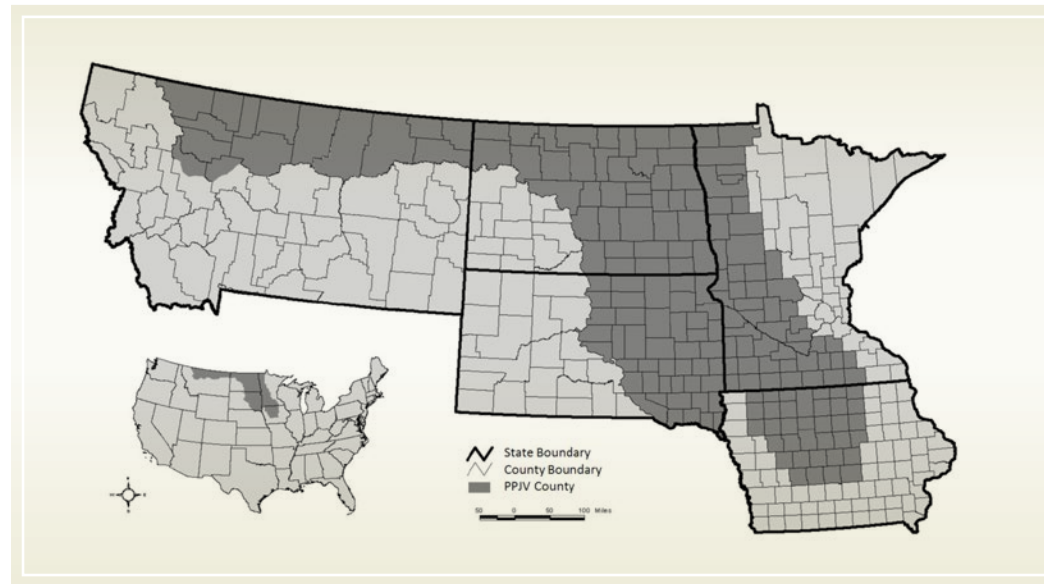


Figure 2. States and counties in the Prairie Pothole Joint Venture

shape current land use and conservation actions. These major physiographic regions (Figure 3) are described below.

Glacial Lakes Agassiz and Dakota – Glacial Lake Agassiz and Lake Dakota cut drainage outlets during the period of glacial retreat. These outlets ultimately became the Minnesota, Red, and James Rivers. The lacustrine sediment layer beneath the lakes is exceptionally flat, and the historic prairie was often saturated with scattered, small, shallow wetland basins. The bed of Lake Agassiz, commonly called the Red River Valley of the North, was undoubtedly once one of the most impressive spring migration staging areas for waterfowl and shorebirds in North America. Today the area has been drained so heavily that in many areas no wetlands or grassland remains; where they do remain, the combination of wetlands in a low relief landscape and grazed native grasslands sustain some of the highest densities of historically abundant waterfowl, waterbirds and shorebirds in the eastern U.S. PPR.

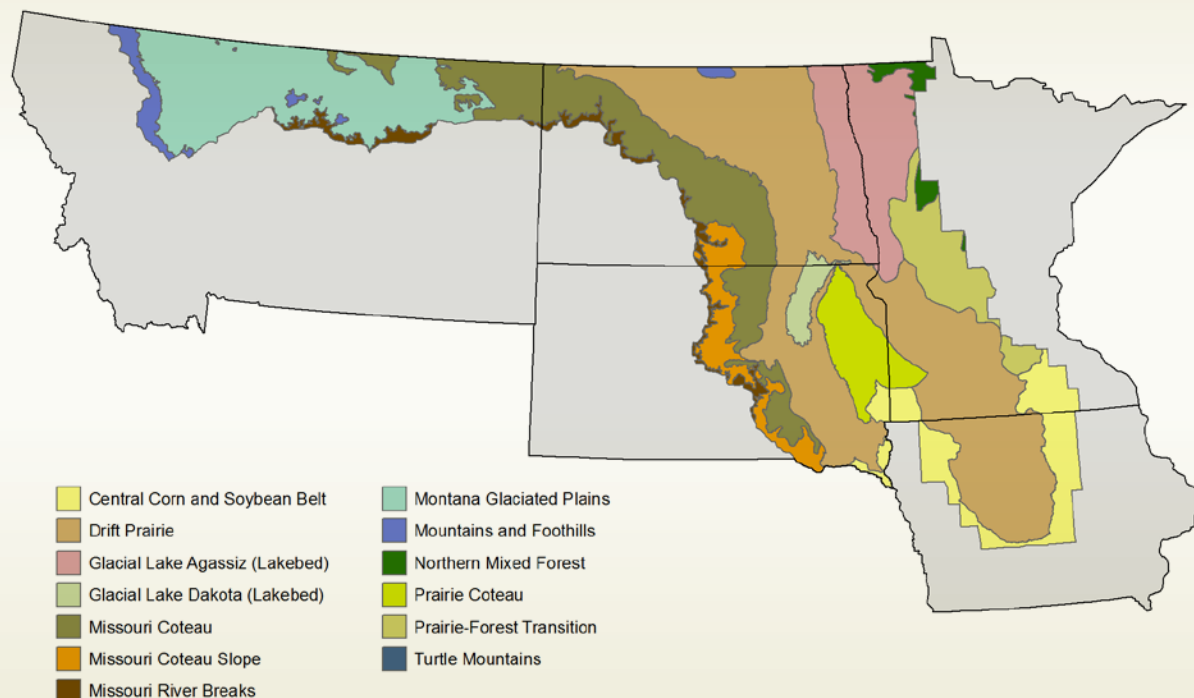


Figure 3. Physiographic Regions of the Prairie Pothole Joint Venture

Over most of the Red River Valley, intensive restoration of the grassland-wetland complex is the only available conservation practice. High agricultural production potential (particularly for the heavily subsidized sugar beet industry) and high land values have prohibited most habitat restoration, although USDA programs directed primarily at flood damage reduction are promising. The sandy beach ridges that border the Valley in Minnesota and North Dakota still support some large grasslands and the conservation of these for grassland land birds and shorebirds is a priority.

The bed of Lake Dakota, principally in South Dakota, has been less heavily drained; temporary and seasonal wetlands are abundant, but deeper wetlands are few. These wetlands remain important spring migration habitat and their protection as such is a priority.

Prairie Coteau – This region is a wedge-shaped, pre-glacial plateau. It was created when glaciers advanced and scoured up sediment from the slopes and deposited it, along with embedded blocks of ice, on the surface. After glacial retreat, the result was a landscape of moderate to high relief with numerous small, steep-sided, semi-permanent wetland basins.

Steep topographic relief, especially at the northern end along the margins of the Coteau, has prohibited some tillage agriculture and wetland drainage to date. Thus, the northern end of the Prairie Coteau is one of the eastern-most, relatively intact grasslands in North America. Deeper basins and relatively abundant precipitation make this area a stronghold of waterfowl production when more westerly areas of the U.S. PPR are dry. Wetland and grassland protection through fee title and easement acquisitions are priority conservation actions. The Prairie Coteau slopes inward and southward, where its characteristics and conservation priorities are more similar to the Drift Prairie.

Drift Prairie – This region demarks the primary paths of glacial advance. Its glacial history caused the Drift Prairie to be shaped like an inverted Y, the western lobe extending to the Missouri River in eastern South Dakota, and the eastern (or Des Moines) lobe extending through western Minnesota into central Iowa. Terrain relief is generally low, and wetlands tend to be small and shallow, with temporary and seasonal wetland basins predominating and exceptionally abundant in many areas. This area is well suited to tillage agriculture, and the associated conversion of wetlands and grasslands has been extensive. Habitat loss has been most severe in the southeast. In the west, a drier climate has

slowed the expansion of tillage agriculture but pressures on wetlands and grasslands have escalated. During wet periods when seasonal basins retain water throughout the brood-raising period, the Drift Prairie provides valuable migration habitat and may help facilitate periodic “booms” in continental waterfowl populations like that which occurred in the 1990s. A mixed approach of habitat protection and restoration, complemented by enhancement techniques in a few key areas, characterizes the approach of PPJV partners. The positive impact of agricultural programs, especially the Conservation Reserve Program (CRP) and the Wetlands Reserve Program (WRP), and successor programs under the Agricultural Conservation Easement Program (ACEP), cannot be over emphasized.

Missouri Coteau and Coteau Slope – The Missouri Coteau was formed in ways similar to the Prairie Coteau. Comparatively steep terrain and relatively poor soils have, until recently, limited tillage agriculture. However, new crops and crop varieties, coupled with favorable commodity support policies, have increased the rate of grassland loss in recent years, particularly in South Dakota. Intact grasslands and abundant seasonal wetland basins make the Missouri Coteau a continental mainstay for many species of waterfowl and other wetland and grassland birds. The Coteau Slope that borders the Missouri River has an older glacial history and is characterized by fewer depressional wetlands and more coulees and streams, many of which are dry for most of the year. Consequently, the Coteau Slope is a lower priority for waterfowl, but is important habitat for many priority species of grassland land birds. Grassland and wetland protection are the primary goals in these physiographic regions.

Montana Glaciated Grasslands – An area of slight to moderate relief, the Montana Glaciated Grasslands are dry because of the “rain-shadow effect” of the Rocky Mountains. This is dry mixed-grass prairie, adapted to the natural forces of drought, wind, and fire. For wetland-dependent birds, it is a boom-and-bust system. During periods of deluge, wetland communities of the Montana grasslands can be extremely productive breeding habitats for ducks. Several species, most notably northern pintails, settle to breed in this region when wetlands are flooded in early spring. Owing to its droughty nature, the Montana Glaciated Grasslands were once thought

suitable only for grazing. However, the development of drought-tolerant crops has stimulated the plowing and cultivation of vast tracts of prairie. As in other locales, intensification of agriculture has caused the loss and degradation of wetlands. Fortunately, large expanses of native prairie still exist in this region, which provide an opportunity for grassland and wetland easements to protect the remaining habitat. In addition, land owned and managed by federal agencies receives an added measure of protection because actions are subject to a suite of regulatory reviews and statutes. The glaciated grasslands of Montana are a priority for conservation/protection since several priority grassland bird species extensively use this area for breeding, including pintail during favorable habitat conditions.

The Importance of the U.S. Prairie Pothole Region to Wildlife

The historic PPR was a mecca for breeding waterfowl unparalleled anywhere else in North America. Ducks produced in the U.S. PPR are harvested in 49 states of the U.S. (the only exception being Hawaii) as well as Canada, Mexico, the Caribbean and northern South America (Figure 4).



Figure 4. Hunter band returns from ducks banded in the U.S. PPR

Although every regular breeding species of waterfowl occurs in each state, the diversity of species increases from southeast to northwest. In Iowa and Minnesota, mallards (*Anas platyrhynchos*), blue-winged teal (*Anas discors*), and wood ducks (*Aix sponsa*) predominate, while in North Dakota, South Dakota, and Montana the species are more diverse

– mallards, blue-winged teal, northern pintail (*Anas acuta*), gadwall (*Anas strepera*), northern shoveler (*Anas clypeata*) and American wigeon (*Anas americana*) among other dabbling and diving ducks are the common species (see Waterfowl Section Appendix A). Despite agricultural conversion of wetlands and grasslands, the U.S. PPR remains a national treasure for its waterfowl and other wildlife. In the late 2000s, when the entire U.S. PPR was wet, the region supported nearly 14 million ducks, and in a typical year is believed to be able to sustain up to 10 million ducks. Based on data from the U.S. Fish and Wildlife Service (USFWS) and Canadian Wildlife Service (CWS) Waterfowl Breeding Population and Habitat Survey (WBPHS), the PPR portion of the eastern Dakotas, which comprises just 7% of the traditional survey area, supported about 22% of the total breeding pairs counted throughout the entire survey area in the US and Canada. The PPR portions of Minnesota, Iowa, and Montana contribute more to that total.



Neal & MJ Mishler

The historic production of breeding ducks must have made these estimates pale by comparison. For example, in Iowa, where survey-based models yield current estimates of about 57,000 breeding pairs in average years, historical wetlands probably once supported over 1.1 million pairs (Bishop 1981, Tiner 1984). Southern Minnesota production was similarly impressive.

The value of the U.S. PPR to wildlife goes far beyond waterfowl, providing breeding or migration stopover habitat for 36 of 50 shorebird species that regularly occur in the US, breeding habitat for 13 of 20 species, and migration stopover habitat for 23 of 36 species (Skagen and Thompson 2001). Skagen et al. (2008) found that in wet years when small basins are ponded, at least 98% of shorebirds use small wetland habitats, rather than large, often

well-known, stopover sites. Ironically, removal of residual emergent vegetation by farming in areas without extensive grazing may have improved habitat for some shorebirds that use shallow wetlands. However, drainage of these wetlands could be significantly affecting populations of some of these species, especially short-distance migrants that require regular feeding stops to refuel and add weight from high-protein invertebrates to continue migration. Fortunately, in most years even drained wetlands and sheet water provide abundant, food-rich habitat for shorebirds in the spring, albeit for brief periods. Terrain remodeling and sediment accumulation in farmed-through shallow wetlands may be further impairing their value for shorebirds and other wetland species as shallow depressions slowly disappear.

U.S. PPR wetlands provide habitat for at least 40 species of waterbirds such as terns and gulls, secretive marshbirds like rails and bitterns, and American white pelicans. Black terns are known to use quality seasonal and semi-permanent basins, and, as surveys expand, more species are found or found to be more common than believed. One such example is the king rail, currently found at number of sites in the Iowa PPR where it was thought to be extirpated. Recolonization and range expansion may also be factors in these observations.

Grassland birds are a group of North American species of special concern because their populations are declining faster than any other group of birds (Knopf 1994, Sauer and Link 2011). In particular, 4 species of mixed-grass specialists are of conservation concern due to ongoing population declines (Sauer 2014): Sprague's pipit (*Anthus spragueii*), Baird's sparrow (*Ammodramus bairdii*), McCown's longspur (*Rhynchophanes mccownii*) and chestnut-collared longspur (*Calcarius ornatus*). Of the three grassland ecosystems in the U.S. PPR (Figure 5), the tallgrass ecosystem has suffered the greatest losses of habitat and populations, with many species being extirpated, followed by the mixed-grass and dry mix-grass prairies in order of severity of habitat loss and impacts to populations. These losses persist. Dahl (2014) estimated that South Dakota alone had lost 600,000 acres of grassland to cropland conversion from 1997-2009 with further losses since then with the return of USDA Conservation Reserve Program (CRP) grasslands to cropland.

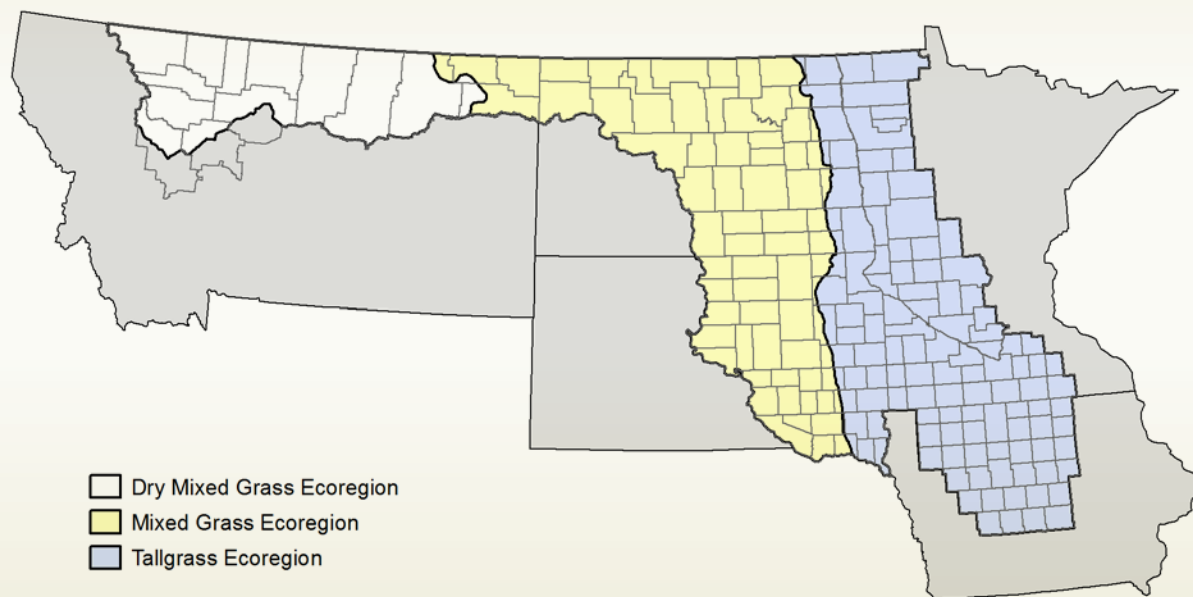


Figure 5. Grassland ecoregions of the PPJV based on Wright and Bailey (1982).

Some grassland bird species are “area sensitive,” requiring relatively large blocks of grassland to settle and breed (Johnson and Igl 2001, Davis 2004). Moreover, nesting success of ground nesting birds including waterfowl may be higher in large grassland patches. Fragmentation of grasslands reduces habitat suitability for many native species and may reduce production to a level below that needed for population maintenance.

U.S. PPR wetlands are critical for migrating waterfowl, shorebirds, and waterbirds; waves of species pass through the region each spring and fall. The only consistent exceptions seem to be in the Iowa and southern Minnesota PPR where birds may encounter widespread habitat loss which has undoubtedly caused a shift in migration patterns, likely affected migration survival rates of some species, and potentially affected fecundity. Thus, even though the U.S. PPR is at the northern edge of the country, it is a continental nexus for species migrating to and from the southern U.S., Mexico, Central America, and South America. Northern Pintails wintering in California’s Central Valley often fly through the PPR, remaining to breed or reversing direction to northern Canada and Alaska (Miller et al. 2005). Remaining U.S. PPR wetlands and grasslands are

essential links in a chain of migratory habitat that runs the length of the Western Hemisphere.

Most recently, monarch butterflies and other pollinators have received an immense amount of attention because of rapid population declines, particularly in the tallgrass portion of the U.S. PPR, and the potential ramifications of declining pollinator populations to the security of the world’s food supply. For example, producers in U.S. PPR states maintained 40% of the U.S. honey bee colonies that produced 51% of the 2014 national honey production (National Agricultural Statistics Service 2016). The causal factor for pollinator declines appears to be the continuing loss of native habitat to cropland and cropland technology including the use of glyphosphate herbicide and neonicotinoid-treated seed. Loss of these species is a graphic illustration of the destabilization of ecosystems and the ecosystem services provided to humans that occurs with extensive habitat loss. If there is a positive note in this emerging crisis it is that, in general, what is good for one species of conservation concern is generally good for another, making habitat protection, restoration and management in the U.S. PPR even more critical. For example, tallgrass prairie restoration efforts provide habitat for several priority species of grassland birds, while providing nectar source plants and milkweed for butterflies and other pollinators.

Anthropogenic Changes

To settlers emerging from the shaded eastern deciduous forests, the brightness of the U.S. PPR prairies was blinding. In Iowa, the first area settled, woodlands sold for about \$35-50/acre while prairie, which was thought to be less fertile, could be had for \$3-5/acre. Once the woodlands were taken up, settlers on the prairie quickly set about changing the environment. The first change in the 1850s was to cultivate the tough, deep tallgrass prairie sod with plows pulled by teams of oxen. If a farmer lacked this equipment he often contracted the first plowing for as much as \$3-4/acre, a substantial amount of money in the late 1800s. Farther west, in the mixed-grass prairie of the Vermillion River in South Dakota, a Clay County farmer advertised for someone to break 20 acres of prairie for \$20. In 1837, a man named John Deere copied an earlier design for a plow that was self-scouring and had thousands made using New England rolled steel, which he peddled across the eastern PPR of Iowa, Minnesota and eastern North and South Dakota. By 1910, most of Iowa's native prairie had been plowed under, followed shortly after by the prairies of southern Minnesota, the Red River Valley, and the eastern tier of counties in the Dakotas. The first crops were predominantly small grains, but over the years, corn and eventually corn and soybean rotations became king.



Casey Stemler

Precipitation patterns across the U.S. PPR have profoundly affected land conversion to agriculture and crop types. Much of the Missouri Coteau in North Dakota and South Dakota and the dry mixed-grass prairie of Montana remain rangeland. However, farm programs that reduce the risks of

farming, and the lack of a comparable safety net for livestock producers, have encouraged farming in these marginal regions in recent years. Development and application of genetically modified drought-tolerant crops have also exacerbated conversion of marginal croplands.

The Swamp Land Act of 1850 authorized the transfer of federally owned wetlands to states that would agree to drain the land and turn it to productive, presumably agricultural, use.

As the last of the prairie in the eastern U.S. PPR was plowed, farmers began eyeing the wetland “wastelands” as new sources of income. Some wetlands were used for hay for livestock and others were drained and planted to crops. Besides, most were considered a nuisance to travel and to farm around, especially as mechanized farming became the standard in the early 1900s.

The Swamp Land Act of 1850 authorized the transfer of federally owned wetlands to states that would agree to drain the land and turn it to productive, presumably agricultural, use. Primarily aimed at the development of Florida's Everglades, the law also had application elsewhere, and spurred drainage and development in many areas of the United States. Later considered to have been ecologically problematic, many of its provisions were eventually reversed by the Wetland Protection Act of 1972 and later legislation; however, its historical effects on U.S. development and settlement patterns remained. The first drainage districts in Iowa were established in 1908. In South Dakota, a ditch then known as the “Little Panama” was excavated from 1908-1910 across Yankton County to the Vermillion River draining about 70,000 acres of wetland.

Hilly, morainal topography tends to be harder to drain, thus has the highest remaining density of wetlands. Drainage has been most extensive in the flatter outwash plain, especially in the eastern U.S. PPR (Johnson and Higgins 1997), and the loss of these wetlands has reduced the cyclic peaks in duck

It is important that this updated plan be built on a foundation of accumulated knowledge and that this knowledge be used as a context by which we set our future direction.



production and made the troughs in duck numbers deeper than they ever were historically. By the end of the 20th century, wetland basins had declined by 50% in North Dakota, 35% in South Dakota, 80% in the PPR of Minnesota, and 99% in Iowa (Bishop 1981; Tiner 1984; Johnson and Kjellsen, unpubl. data for Minnesota). This drainage continues today. Between 1997 and 2007, Minnesota lost 18% of its remaining PPR wetlands, Iowa lost 14%, and North and South Dakota lost 4-5%, with only Montana showing a slight gain (Dahl 2014).

Grassland losses have been just as dramatic in some cases in recent years (Dahl 2014, Lark et al. 2015) with federal farming subsidies reducing the economic risks of tilling marginal soils and slopes in areas with climates better suited to livestock production than tillage agriculture. Many of these lands

were tilled in the early 20th century and returned to grass after the Dust Bowl of the “Dirty Thirties.” Thus a whole new suite of species is now at risk of population decline or even extirpation and leading one to ask, “Are we setting the stage for another dust bowl?”

The result of wetland drainage and loss of grasslands that historically held water and slowed runoff has been that water levels in remaining wetlands have often increased, altering their hydrology (Wiltermuth 2014). In the case of rivers, spring flows and flooding tend to be more frequent and longer in duration, and summer and fall low flows tend to be lower because of water table depression. In effect, in intensively drained parts of the U.S. PPR, drainage has induced a nearly permanent condition of spring and summer drought.



Rick Bohn

Effects of Landscape Change on Predators

An important consideration for avian conservation in the U.S. PPR is the population trends of certain avian and mammalian species that prey on nesting birds, their newly hatched young, and unhatched eggs. When the northern plains were first settled, farmsteads, towns, and cities increased coincident with the initial conversion to cropland which left a wake of denning sites like culverts and rock piles for mesocarnivores (e.g., red fox, coyote, raccoon, and skunk). The number of farms peaked in the 1920s, and has declined since. The resulting “rural depopulation” of the U.S. PPR has left many abandoned farmsteads and other human structures to provide additional sites favorable to mesocarnivores. These features—coupled with abundant agricultural foods, the extirpation of some “keystone” species, and the suppression of fire and an increase in the number of trees—have had the net effect of changing the distribution and increasing the abundance of mesocarnivores in addition to species such as badgers, mink, and ground squirrels, along with avian predators such as red-tailed hawks, and great-horned owls (Sargeant et al. 1993). The impact of these species on their prey is magnified by fragmented habitats that give rise to edges, perches, and other features that enhance predator foraging efficiency. While long-term decreases in nesting success are well documented for ducks (Drever et al. 2004), there also is evidence that other avian groups may have suffered the same fate (Jones et al. 2010, Davis et al. 2012).

U.S. PPR Demographics

The human populations of the U.S. PPR and agriculture have historically been inextricably intertwined. High crop prices from 1910-1918, the “golden age” of agriculture in the U.S., stimulated massive land conversion. In the early 20th century, the institution of government farming subsidies liberalized bank loans to farmers who were encouraged by bankers to “improve” their land to qualify for higher loans. As crop prices fell in response to overproduction, the beginnings of an agricultural safety net were instituted in the 1920s. The provisions included direct assistance by federal and state agricultural agencies for wetland drainage and were intended to insure profits to individual farmers and secure domestic

food production. The unintended consequences of these programs were that the percentage of Americans living on farms dropped from 41% in 1900 to 1.9% in 2000, and the average number of crop types grown on farms declined from 5 to 2. By the end of the century, the number of farms dropped by 63% and average farm size rose by 67%. Further, the percent that agriculture production comprised of the GDP declined from 7.7% in 1930 to 0.7% in 2002 as surplus crops were dumped on the market at prices less than the cost of production (Demitri et al. 2005).

Inevitably, these changes led to changes in the rural population of the U.S. PPR and a destabilization of the region’s economy. Outmigration of the population from rural U.S. PPR counties is well known. About 70% of all U.S. PPR counties lost population between 2000 and 2010 (USDA Economic Research Service 2015). The results have included fewer and larger farms, a declining and aging rural population, school consolidation, loss of local medical care and social services, business closings because of fewer and fewer customers, and declining home values. In 1950, the USDA Economic Research Service determined that virtually every county in the U.S. PPR, except those including the region’s largest cities, derived at least 20% of total income in the county from agriculture. By 2000, only 6 Iowa PPR counties, 10 Minnesota counties, and about half the counties in North and South Dakota derived 15% or more of total income from farming-related activities (Demitri et al. 2005). More and more farmers were relying on off-farm earnings to augment their income, from 30% of farmers in 1930 to 93% in 2002.

Gascoigne et al. (2013) reported that counties with quality of life amenities including habitat for outdoor recreation tended to attract business at a significantly higher rate than counties with fewer of these amenities, and it was these businesses that created off-farm income and contributed to rural economic growth. Moreover, of money spent on tillage agriculture returns, 1-2% was recycled within the local community, the rest being disseminated in the national and global economy. By contrast, money spent in local businesses like motels and hotels, restaurants, and main street businesses returns as much as 50 cents on the dollar to the local community.

HISTORY, MISSION, AND VISION OF THE PPJV

The vision of the Prairie Pothole Joint Venture is to have abundant populations of waterfowl and other wetland and grassland birds that can be sustained in perpetuity.

The joint ventures formed under the North American Waterfowl Management Plan (NAWMP) are one of the most visible conservation successes of the last century. Joint ventures work for one simple reason: partners have realized that they can achieve more through collaboration than they can accomplish acting alone. Partnerships are the engines that drive joint ventures to success.



Kevin Barnes

The Prairie Pothole Joint Venture (PPJV) was established in 1987 under the NAWMP, the largest cooperative effort ever initiated to protect wetlands, waterfowl, and other wildlife. The Plan committed the United States, Canada, and Mexico to reviving North American waterfowl populations through the retention and restoration of crucial wetland and upland habitats across the continent.

In 1987, 6 regional self-directed partnerships (called Joint Ventures) involving Federal, State and local government agencies, non-governmental conservation organizations, corporations, Tribes, and other entities were formed to implement the NAWMP. The PPJV is one of the 6 original joint ventures. Today, with the advent of an all migratory bird focus, joint ventures cover virtually all of the conterminous U.S., Hawaii, and large regions of Alaska and Canada.

A vital function of the PPJV is as an information/coordination resource for partners and external entities. To that end, The PPJV Management Board, the PPJV Technical Committee, and the agencies, organizations, and individuals share information and coordinate actions. PPJV members:

- » Are guided by biology-based planning that is refined through science-based research and evaluation.
- » Work together to define and attain the landscape conditions needed to foster increasing and sustainable populations of wetland and grassland birds.
- » Collaborate and forge alliances with a variety of conservation and community efforts in the development of conservation, economic and social policies and programs that positively benefit grassland and wetland resources across the U.S. Prairie Pothole Region landscape.
- » Strive to continually improve scientific knowledge and the conservation approach of bird conservation.

Since its inception, the PPJV has used the best available science to guide programmatic decisions and develop management tools. These tools include traditional wildlife management techniques targeted at one or more species, as well as broader conservation efforts intended to provide multiple social, economic, and environmental benefits. Most notable among the latter are USDA programs such as the Conservation Reserve Program (CRP), the Wetland

The mission of the Prairie Pothole Joint Venture is to implement conservation programs that sustain populations of waterfowl, shorebirds, other waterbirds and prairie landbirds at objective levels through targeted wetland and grassland protection, restoration and enhancement programs. These activities will be based on science and implemented in collaboration with multiple stakeholders.

Reserve Program (WRP), the Conservation Reserve Enhancement Program (CREP), and the successor programs administered under the Agricultural Conservation Easement Program (ACEP). The PPJV partners use existing and emerging conservation programs to enhance the collective benefits to migratory and non-migratory birds while respecting the unique authorities, priorities and purposes of each partner.

PPJV partners will work together to define and attain the landscape conditions needed to foster increasing and sustainable populations of wetland and grassland birds.

Conservation creates a legacy by building on cumulative successes, and important lessons are learned from experiences and mistakes. The PPJV must account for, and adjust to, a dynamically changing landscape. For these reasons, it is important that this revised plan be built on a foundation of accumulated knowledge and this knowledge used as a context by which the PPJV sets its future direction.

In late 1987, a PPJV Steering Committee that represented major partners in the U.S. prairies was formed and a Joint Venture Coordinator was identified. State Action Groups with respective Coordinators were established. Five PPJV “Specialty Teams” were created to develop an Implementation Plan, as well as address issues of communications, funding, waterfowl population modeling, and revenue sharing. Over time, the organization and functions of the PPJV have evolved to address the complex business of conservation. Readers are referred to Appendix A. – Organization, Function and Responsibilities, for additional details.

A “step-down” planning process was begun in 1987 that used objectives from the NAWMP as a basis to establish plans for the PPJV. These plans, to be implemented at the state and project level, identified specific habitat retention, management, and enhancement strategies. In June of 1988, the “Concept Plan for Waterfowl Habitat Protection – U.S. Portion of the Prairie Potholes and Parklands” was released. The goals, objectives, and strategies

for the retention of prime waterfowl breeding habitat were discussed in this 15-year plan. Emphasis was on actions that would be taken by the U.S. Fish and Wildlife Service. In addition to waterfowl, the Concept Plan noted that “the wetland and upland habitats of the Region provide breeding areas for numerous marsh, wading, and shorebirds; gulls and terns; raptors; song birds; and other avian species,” and suggested that “further protection of prairie potholes and their associated uplands will provide breeding habitat for many avian species, in addition to the ducks for which the areas are primarily managed.

In August 1988, the purpose of the PPJV was defined by partners as: “to involve the public in a broad scale, unified effort to increase waterfowl populations by preserving, restoring, and enhancing wildlife habitat in the PPR of the U.S.” Special emphasis was given to protecting and enhancing 1.1 million acres of breeding habitat; promoting habitat improvement on private lands; increasing waterfowl production on public wildlife areas (including habitat improvement, controlling disease and predators); addressing research issues to improve management performance; seeking to integrate wildlife, agriculture and water development programs; and evaluating PPJV efforts and the response of waterfowl to habitat projects.

In April of 1989, the first PPJV Implementation Plan was completed. The U.S. Fish and Wildlife Service (USFWS) Concept Plan and the Central Flyway Mallard Management Plan (March 1985) provided background information. The Plan noted that “the strategies outlined in this plan provide general guidance for future management actions that will benefit at least 10 key duck species as well as migratory nongame birds that breed in the Region; contribute towards countless hours of consumptive and non-consumptive wildlife related activities; and contribute millions of dollars to regional, national, and international economies.” Through the “step-down” planning process, State plans would include those strategies and actions that would be most appropriate for each state in the PPJV.

Priority actions included planning and evaluation, managing and enhancing public and private lands, communications and education, land acquisitions, fund raising, and affecting legislation and regulations.

The objective for the original Implementation Plan was to “Maintain an average breeding population in years of average environmental conditions of 6.8 million ducks (1.2 million mallards and 1.1 million pintails) and 13.6 million ducks in the fall flight by the year 2000.” USFWS Regional Directors were requested by the PPJV Steering Committee to continue to develop and implement a computerized modeling technique (Mallard Model) for planning beginning in 1990. State and project plans would use the Mallard Model as a tool to develop and evaluate habitat protection and enhancement strategies.

In 1989, at the request of the PPJV Steering Committee, Habitat and Population Evaluation Team (HAPET) offices were established in Bismarck, ND and Fergus Falls, MN to assist in the coordination and guidance of waterfowl management activities in the PPJV. Also in 1989, the North American Wetlands Conservation Act (NAWCA) was authorized. Designed to provide matching funds to partners who were carrying out wetland conservation projects in the U.S., Canada, and Mexico, NAWCA provided a sorely needed source of funding to PPJV activities.

In 1990, The PPJV Steering Committee changed its name to the PPJV Management Board, to provide more uniformity within the NAWMP. The “Partnerships in Progress” PPJV Accomplishment Report (1987-1993), documented major progress by the PPJV. State and project planning efforts were well underway or finished; flagship projects had been established in each state; accomplishments in the protection, restoration, and enhancement of habitat were being measured; and numerous evaluation activities (from meeting waterfowl production goals, to intensive habitat management techniques, to surveys on shorebirds) were being completed. The PPJV recognized the importance of the Conservation Reserve Program, and issued a resolution calling for all Joint Ventures and the NAWMP U.S. Implementation Board to secure support for the CRP.

The NAWMP was updated in 1994 to reflect accomplishments and changing times on a continent-wide basis. The emphasis was on achieving waterfowl objectives and broadening the NAWMP to include the maintenance and enhancement of associated ecological values. Recognizing the need to review guidance from 1994 forward, the PPJV Management Board appointed a PPJV Implementation Plan

Update Committee to develop the 1995 PPJV Implementation Plan.

The 1995 Plan continued to recognize the importance of working with private landowners and USDA conservation programs. Habitat acreage objectives developed by the states were then still in the process of being refined. After a review of nesting success data and with use of the Mallard Model, the PPJV Waterfowl Modeling Committee concluded that a 50% nesting success rate (originally recommended by NAWMP) was unrealistic across the PPJV landscape. The Committee subsequently recommended adopting a goal of a 0.6 recruitment rate overall for the PPJV and a 0.49 recruitment rate (population maintenance level) for all managed areas.

Framers of the 1995 PPJV plan also recognized the need to increase knowledge about other bird species in the prairies. Several species of grassland birds endemic to the PPR were showing steep population declines. Information on waterbirds and shorebirds was lacking. The PPJV Management Board approved a second objective of stabilizing or increasing populations of declining wetland/grassland-associated non-waterfowl migratory birds. Because of the lack of basic information, no habitat or population objectives were set.

In 1995 the PPJV Management Board approved a second objective of stabilizing or increasing populations of declining wetland/grassland-associated non-waterfowl migratory birds.

Several organizational changes were made in 1995. A Technical Committee was created that brought together expertise in waterfowl and non-waterfowl migratory bird research and management. The Funding Committee was disbanded. The PPJV Management Board met with the Prairie Habitat Joint Venture Management Board to discuss common conservation issues and plan a joint technical exchange. Priority actions focused on planning and evaluation, legislation and regulation, fund raising, enhancing private lands management,

communications/education, organization, and supporting research and literature reviews regarding predator management.

The period of 1995-2000 saw explosive growth in the conservation and joint venture worlds. The size and scope of NAWCA grants increased. National plans for landbirds, waterbirds, and shorebirds were being developed. New tools became available for use in landscape planning and design. The NAWMP was updated in 1998, and in 1999, the PPJV Management Board asked the Coordinator and a working group of the Board to review the 1995 PPJV Implementation Plan to see if revisions were needed. The group concluded that the 1995 Plan was ahead of the curve (particularly in the non-waterfowl arena). The Management Board accepted the recommendation to continue on course.

In 2005, the NAWMP update was signed by Canada, Mexico, and the United States. Partners In Flight's Landbird Plan, the North American Waterbird Conservation Plan, and the U.S. Shorebird Conservation Plan were complete. Additionally, NAWCA required technical answers on waterfowl and wetland-associated migratory birds; the Neotropical Migratory Bird Conservation Act was in place; the North American Bird Conservation Initiative (NABCI) created a bird conservation forum; Joint Ventures built new budget requests to deliver conservation treatments for "all birds"; and Bird Conservation Coalitions were developed to seek funding. These activities stimulated a new wave of international cooperation. The PPJV's increasing role in international conservation is presented in Appendix B – International Collaboration.

In the PPJV, HAPET offices and partners used the latest GIS technologies to create models to target conservation actions on the landscape for waterfowl. Data were collected and similar models were being developed for shorebirds, grassland birds, and eventually, waterbirds. Evaluation and monitoring programs were implemented to refine models and guide management activities. The PPJV was looking beyond its boundaries, cooperating with the PHJV and other joint ventures in the U.S., and beginning to form linkages and connections with wintering sites in the Western Hemisphere that host birds that breed in the PPJV.

Thirty years of work in the PPJV has produced spectacular results on the landscape, in building a

scientific foundation, and in developing and maintaining partnerships. In a landscape of 118 million acres, the PPJV protected, restored, or enhanced nearly 6 million acres of habitat during the first 15 years of the partnership (1987-2002; PPJV 2003). Funding used to reach these accomplishments was derived through a combination of Migratory Bird Conservation Funds (MBCF), Land and Water Conservation Funds (LWCF), North American Wetlands Conservation Act (NAWCA), partner funding, and private donations. The PPJV has also benefited immensely from a number of U.S. Department of Agriculture conservation programs, most notably the Conservation Reserve Program (CRP), Wetland Reserve Program (WRP), and the successor programs under the Agriculture Conservation Easement Program (ACEP).

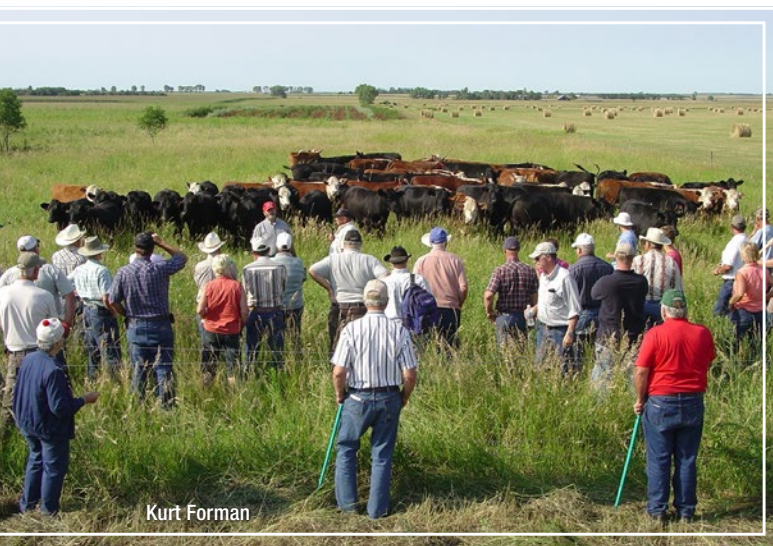
Thirty years of work in the PPJV has produced spectacular results...

However, the prairie pothole states continue to lose grasslands and wetlands at alarming rates, fueling serious declines in a wide range of bird species. In response, the U.S. Fish and Wildlife Service, with support of the Migratory Bird Conservation Commission increased the allocation of MBCF funds to be spent annually in the PPJV from 50% to 70%. This enhanced funding was for a time period of five years (2012-2017) in response to accelerating conversion rates of prairie and wetlands and was directed towards protecting "high quality waterfowl habitat at risk of conversion to agriculture." Although these additional funds helped address a backlog of landowners interested in conservation programs in many areas, an enormous amount of work remains to protect, restore and enhance the resiliency of the PPR ecosystem in the U.S. A waiting list for private landowners willing to sell conservation easements in the PPJV exists today.

Building on lessons learned over the past 30 years, and using the 2005 PPJV Implementation Plan as the foundation, the PPJV developed this 2017 PPJV Implementation Plan that strives to look ahead and anticipate future challenges.

CURRENT AND EMERGING ISSUES IN THE PPJV: CHALLENGES AND OPPORTUNITIES

The PPJV recognizes that the land and people of the U.S. PPR are inextricably intertwined. The hope and intent of the PPJV is that citizens, local, state, and federal agencies, and non-governmental organizations will work together toward sustainable land use, abundant wildlife populations, and vibrant rural communities. Important issues that are creating new conservation challenges and opportunities for the people and wildlife of the Prairie Pothole Region are reviewed below.



Kurt Forman

Agriculture and U.S. Farm Policy

Contemporary landscapes of the PPJV are shaped by agriculture making this JV one of the most anthropogenically influenced landscapes in the world. The nature of that agriculture is determined by individual producers who make land use decisions based on tradition, expertise, lifestyle choice, and economic profitability. There is a dynamic interplay among these factors. Individuals are generally reluctant to adopt new practices that differ radically from their past experience. A cattle rancher, for example, is unlikely to become a wheat farmer unless he is already a “mixed operator,” because he lacks the expertise and equipment to do so. The same can be said for a wheat farmer becoming a rancher. However, when land changes hands, the new owners may have the tradition and expertise to switch land use quickly. Typically, several factors weigh into that decision.

Changes in Crops and Technology - Changes in crop types and field sizes in the U.S. PPR have decreased the quantity and quality of farmland wildlife habitat. Row crops (i.e., corn and soybeans) that provide no habitat for upland nesting birds are replacing cereal crops (i.e., wheat and barley) that provide at least some—albeit marginal—nesting cover. The most evident change in crop types is the western expansion of soybeans into North and South Dakota, states that were considered too dry to grow soybeans just 60 years ago (Higgins et al. 2002). Shifts in crop acres may also have impacts on wetland watershed hydrology and subsequent wetland hydroperiods (McCauley et al. 2015). The use of genetically modified row crops is now predominant throughout the U.S. PPR (Krapu et al. 2004), and a current emphasis in crop research is to develop more drought-tolerant strains of corn and soybeans. New, herbicide-resistant crops, coupled with the low cost of herbicides, have been a major force behind the conversion of grassland to cropland.

Changes in Farm Equipment - Loss of native range-land and the decreasing number of farm families have coincided with changes in farm equipment that now enable fewer workers to more efficiently till, plant and harvest crops. Landowners today can manage many more corn and wheat acres in the same amount of time compared to past years. This equipment is also highly mobile, allowing producers to manage fields in different townships or counties. Changes in equipment have also led to “cleaner” farming practices where operators remove grass margins along fields and drain small wetlands that once served as important wildlife habitat, but are now perceived as “problem areas” that impede the movements of large machinery. Moreover, modern farming equipment and practices leaves less waste grain after harvest. Coupled with fewer unplanted areas that produce annual seeds, intensely cropped areas often have less forage available on the landscape as a whole. Recent advances in “precision farming technology,” such as GPS guided implements and GIS calibrated planting and fertilizing rates, will continue to enhance the efficiency of tillage agriculture and exert additional pressure

on wildlife habitats. Natural resource conservation planners will be challenged to develop programs that address the growing scale of farming yet make fiscal sense to landowners.

Changes in Rangeland and Livestock - Throughout U.S. PPR states, conversion of grassland to cropland has resulted in fewer cattle across the landscape. Data indicate that 600,000 acres of grassland were lost in the South Dakota PPR from 1997-2009 (Dahl 2014). North Dakota lost an additional 75,000 acres of grassland and Montana nearly 200,000 acres during the same period. Continued losses since 2009, much of it CRP, have resulted in a net loss of grasslands in every PPJV state.

Recent increases in animal size exacerbate poor range conditions because more forage must be produced on fewer acres to feed cattle that are 30% heavier now than 60 years ago (Higgins et al. 2002). These factors present an opportunity for U.S. PPR planners to promote grazing as a preferred land use while working with landowners to minimize adverse impacts of overgrazing. The recent growth of consumer interest in rangeland grassfed beef has caused scores of ranching operations throughout the PPR to tailor their operations to capitalize on this emerging market. Further, innovative ranching practices such as grassbanking allow property owners to lease land to ranchers at a discount in exchange for ranchers carrying out conservation-related projects on their pastures. The Nature Conservancy's 60,000 acre Matador Ranch in north central Montana uses grassbanking to leverage conservation practices on surrounding ranches, resulting in improved habitat across more than 250,000 acres. Continuation of these trends and practices could present an expanded opportunity for landowners and conservationists to forge partnerships that benefit both.

Profitability - Profitability is obviously an important factor affecting land use. Although commodity prices and input costs are considerations in the profitability equation, they have historically been overshadowed by the subsidy programs of the U.S. Farm Bill. Were it not for these subsidies and the financial safety net they provide, it is likely that land-use decisions made during the last two decades would have been very different, since evidence suggests that diversification leads to economic stability and viability (Gascoigne et al. 2013). The U.S. Government Accountability Office (2007) found that

U.S. Farm Bill subsidy payments were an important factor in private landowners' decisions to convert grasslands to cropland. As of the 2014 U.S. Farm Bill, direct subsidy payments were eliminated and replaced with other Title I commodity support programs, such as Agricultural Risk Coverage and Price Loss Coverage. Crop insurance is also subsidized and all support programs are linked to conservation compliance provisions.

OPPORTUNITIES

- » Expand PPJV Management Board to include private agricultural producer.
- » Explore opportunities with new agri-business conservation partners.
- » Collaborate with USDA partners on U.S. Farm Bill conservation policy.
- » Increase the application of perennial crops and cover crops for nesting birds.

Grassland Loss

Grassland loss within the PPJV continues and is accelerating. Recent high commodity prices and bio-fuel mandates for corn and soybeans drove a recent surge in grassland loss across the PPJV (Lark et al. 2015). Grassland loss rates across the majority of the PPJV have been documented as high as 5.4% annually, a conversion rate not seen since the early part of the 20th century (Wright and Wimberly 2013). Rates of conversion are highest in the eastern North and South Dakota portions of the PPJV, overlapping with areas of high duck pair density. Conversion of grass to soybean and corn production from 2006-2011 is estimated to be 671,000 acres across North and South Dakota alone (Wright and Wimberly 2013). Much of this grassland loss can be attributed to the loss of USDA CRP acres. Farm Bill programs like CRP have proven extremely valuable to supplementing duck production in the U.S. PPR for over 30 years. Reynolds et al. (2001) estimated that the CRP contributed 2.1 million ducks to the annual fall flight between 1992 and 1997. Additional analysis by the USFWS estimated that 25.7 million ducks were produced on CRP acres within the PPJV from 1992 to 2003 (Reynolds et al. 2006). Unfortunately, CRP acres are rapidly disappearing

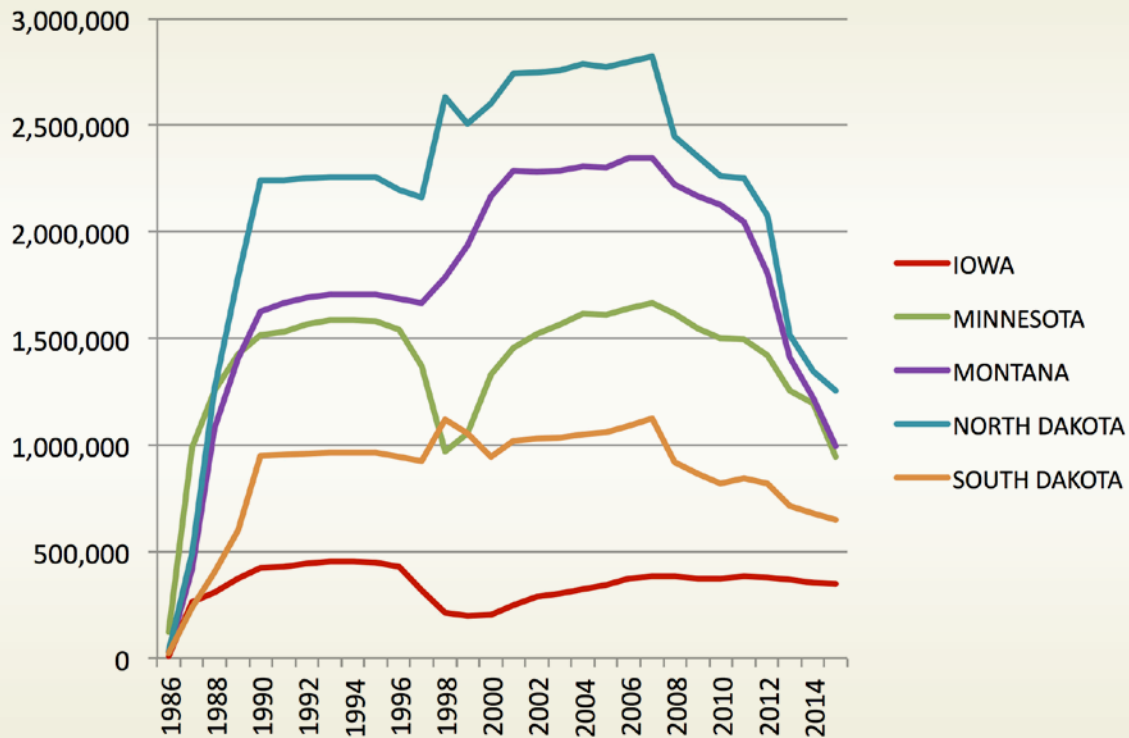


Figure 6. Conservation Reserve Program (CRP) acres for Prairie Pothole Joint Venture counties, 1986–2015. Acres include all CRP parcels for all Conservation Practice Types (USDA 2014, FSA unpublished data).

from the PPJV landscape. Acreage in the CRP reached its peak within the PPJV administrative area in 2007 with 8.35 million acres and had declined to 4.19 million acres in 2015, a reduction of 50% (USDA FSA 2014; Figure 6). The percentage of total grasslands comprised by CRP varies by state, and ranges from 11% in South Dakota to over 67% in Minnesota within the respective states of the PPJV (Doherty et al. 2013).

OPPORTUNITIES

- » Collaborate with USDA partners on the U.S. Farm Bill “Sodsaver” provision.
- » Engage private agricultural producers through grassland-based marketing campaigns.
- » Communicate grassland ecosystem service benefits on working agricultural lands.
- » Incorporate tillage conversion risk into grassland protection prioritization.

Wetland Loss/Wetland Consolidation

Along with grassland loss, wetland drainage and consolidation has escalated across the U.S. PPR. According to Dahl (2011) wetland losses across the PPJV administrative area can be attributed to “efforts to increase drainage on farm fields as a result of economic and climatic conditions”. Tile drainage is moving rapidly north and west into areas of the PPJV not historically impacted by this drainage technique. Additionally, increased surface ditching activity has been noted over the last decade. The USDA NRCS has been inundated by thousands of wetland determination requests relating to drainage. Estimates of loss vary by region with Oslund et al. (2010) estimating that 4.3% of remaining wetland habitats disappeared between 1980 and 2007 from the Minnesota PPJV, likely as a result of improved tile drainage. Johnston (2013) estimated an annual NWI wetland loss of 0.28% / year for the PPJV areas of North and South Dakota. Over time, these losses will impact the carrying capacity of the PPJV area to support breeding ducks and other wetland dependent birds, plants, and wildlife. Many areas within the PPJV experiencing intensification in wetland drainage also are undergoing significant wetland basin consolidation. Wetland consolidation occurs when smaller wetlands in areas with closed drainage patterns are drained



Chuck Loesch

into larger basins downhill. This artificial increase in wetland inflow due to drainage can have impacts on productivity for migratory birds and other wetland dependent wildlife by altering the frequency of drawdowns the basin experiences, reducing invertebrate populations, and impeding nutrient cycling (Anteau 2012). Consolidation drainage may also increase sedimentation and favor invasive aquatic species and permanency of fish, further degrading the value of larger wetlands and shallow lakes for waterfowl (Anteau 2012). Wetland consolidation also has dramatic impacts to water budgets within watersheds. Consolidation of water from many basins to few basins increases frequency of basin overflow and decreases evapotranspiration rates within watersheds decreasing overall capacity (Wiltermuth 2014, McCauly et al. 2015, Dumanski et al. 2015).

OPPORTUNITIES

- » Collaborate with USDA partners on the U.S. Farm Bill “Swampbuster” provision.
- » Communicate wetland ecosystem service benefits on working agricultural lands.
- » Invest PPJV resources into research investigating environmental and socio-economic impact of continued wetland drainage and consolidation.

Pesticides

Neonicotinoid insecticides are a relatively new class of insecticides now widely used across the entire PPR. Neonicotinoids are neurotoxins commonly used as a seed treatment and are extremely toxic to insects at low concentrations (Goulson 2013). By 2008, 80% of all treated seeds were coated with neonicotinoids (Jeschke and Nauen 2008) potentially having widespread impacts to wetlands and wildlife across the PPR. Recent concerns over the widespread use of these pesticides involve their persistence and mobility in the environment. Most neonicotinoids have long chemical half-lives and are water soluble. Main et al. (2014) found neonicotinoids in PPR wetlands located in cropped fields in prairie Canada with 91% of sampled wetlands containing neonicotinoid insecticides following spring runoff. Non-target effects of neonicotinoid insecticides on a landscape scale are not known; however, recent research has documented lethal and sub-lethal effects to quail (Tokumoto et al. 2013), and red-legged partridge (Lopez-Anita et al. 2013) including adult mortality, reduced egg size, and lowered chick survival.

OPPORTUNITIES

- » Invest PPJV resources into research investigating the levels of neonicotinoid contamination across the U.S. PPR and identify the ecological features that make PPR wetlands susceptible to neonicotinoid contamination.
- » Work with appropriate partners to assess impacts to pollinators.

Climate Change

Climate change is a natural phenomenon. In the last 10,000-13,000 years, the PPR was overlain by an ice sheet perhaps up to a mile thick. After the retreat of the ice, the area was dominated in progressive order by tundra, coniferous taiga, deciduous forest, and finally grassland. Each vegetation community was a product of climate and proximity to the retreating ice sheet. In historic times, a massive increase in the burning of fossil fuels, mainly for heating and transportation, has liberated deeply buried carbon deposited over hundreds of millions of years. The oxidation of wood, coal, and petroleum products yields carbon dioxide (CO₂), the major cause of historic climate change, to the atmosphere trapping heat that would otherwise been radiated into space. A suite of models developed by the North American Regional Climate Change Assessment Program (Mearns et al. 2009) generally converge on a few predictions for the U.S. PPR – colder winter temperatures, particularly in the west and north; more snow accumulation throughout the PPR, with the greatest increases in the south and east; warmer summer temperatures, increasing most in the south and west; and wetter summers, particularly in the southeastern PPR. In summary, these models seem to suggest wetland conditions will be affected by wetter early springs and hotter, wetter summers in the PPR (although summer precipitation may be offset by increased evaporation and evapotranspiration).



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While long-term variations in atmospheric CO₂ and climate have been a constant feature on earth, the current rate of climate change threatens the continued existence of historic natural communities and many species that comprise them. Subtle changes like a slightly higher frequency of spring frosts or summer drought can affect species by changing their survival or recruitment rates. Thus natural plant communities and agricultural crops are under constant pressure to change. As environmental conditions change, the current suite of birds and other wildlife of the PPR will have to adapt to changing climatic and subsequent habitat conditions or they will eventually decline and potentially disappear from the region.

As the climate changes, some species become less adapted and gradually disappear while other species are likely to move into the PPR and thrive. Often these species are introduced plants, insect pests, bacteria, or other pathogens on native species. Conservation planning in the U.S. PPR may have to include contingency plans to conserve historic native species, alter management practices, and control or manage a host of new habitats for migratory birds and other plants and wildlife.

One of the major challenges of addressing climate change effects on fish and wildlife is identifying and addressing uncertainty in our understanding of future climate change and how that change will affect ecological systems. For example, Johnson et al. (2010) suggested that waterfowl conservation be shifted away from currently important areas in the western and central portions of the U.S. PPR eastward to locations that climate models suggest may become more conducive for providing consistent wetland habitat for breeding ducks in the future. However, Loesch et al. (2012) assessed the biological risk of refocusing waterfowl conservation efforts eastward and found that maintaining the current focus of habitat protection appears to be the most cost-effective approach to conservation coupled with the uncertainty of climate change effects on waterfowl habitat distribution. To succeed in sustaining priority bird populations, PPJV plans and actions must realistically reflect the limitations and uncertainties in the understanding of climate change. Further exacerbating uncertainty, differences in regional climate model performance, variability in ecological responses to changing conditions, and

...the PPJV will continue to intensively monitor habitat and populations to detect change in habitat and concurrent responses. Coupled with conservation actions that increase resource security and resiliency, increased monitoring efforts will enable the PPJV to inform and adapt management and conservation efforts in an uncertain future.

changes in societal factors, such as economics, land-use, and environmental awareness, confound our ability to accurately predict future conditions.

Multiple lines of evidence suggest that the climate in much of the PPR is indeed changing. However, instead of getting drier as some simulations have suggested, much of the PPR is getting warmer and wetter. Forty years of data collected by the USFWS Waterfowl Breeding Population and Habitat Survey (WBPHS) indicate the numbers of May ponds significantly increased in 7 of 20 waterfowl survey strata in the PPR from 1974-2013 and declined in none; July pond numbers (1974-2003) declined in one stratum but increased in seven; and an index to hydroperiod (1974-2013) showed increasing trends in three strata and decreasing trends in no strata (Niemuth et al. 2014).

Warmer and wetter conditions are resulting in intensification of land use...

The direct effects of climate change on breeding bird populations and associated habitats may be overshadowed by indirect effects the U.S. PPR is already experiencing. Warmer and wetter conditions are resulting in intensification of land use, including plowing of grasslands, draining of wetlands, and increased planting of corn and soybeans (Laingen 2012, Wright and Wimberly 2013, Niemuth et al. 2014). Furthermore, these habitat losses negatively impact many other ecosystem services (Fargione et al. 2009) and may result in a long-term functional loss of resilience to weather extremes.

Given the variable hydrology and inconsistent wetland monitoring efforts, considerable uncertainty exists regarding trends of wetlands and land use in the U.S. PPR, which additional monitoring and

analysis could address (Conley and van der Kamp 2001, Niemuth et al. 2010, Loesch et al. 2012, Niemuth et al. 2014). Consistent with an adaptive management approach and the considerable uncertainty associated with climate change impacts, the PPJV will continue to intensively monitor habitat and populations to detect change in habitat and concurrent responses. Coupled with conservation actions that increase resource security and resiliency, increased monitoring efforts will enable the PPJV to inform and adapt management and conservation efforts in an uncertain future.

OPPORTUNITIES

- » Work closely with the U.S. Geological Survey Climate Centers to better understand current and proposed climate modeling for the U.S. PPR.
- » Strengthen existing long-term monitoring programs for priority species and associated habitats (e.g. Four-Square-Mile Breeding Waterfowl Survey).
- » Communicate the importance of conservation actions to mitigate the direct and indirect effects of climate change and strengthen landscape resiliency.
- » Assess the role Landscape Conservation Cooperatives (LCCs), namely the Plains & Prairie Pothole LCC, can provide to the PPJV with integration of climate models into conservation planning.
- » Assess and strengthen the current PPJV adaptive capacity to climate change.

Energy Development

Energy development had little overlap with high densities of breeding ducks in the United States prior to 2006. Since then, development of large wind energy installations in the Eastern Dakotas and intense oil and gas development in the Bakken Region has occurred.

Prairie Pothole Joint Venture states have a combined 3,167 GW of wind energy potential (Kiesecker et al. 2011). Production of energy from wind requires a large terrestrial footprint per unit of energy produced. Thus, substantial overlap between wind energy development and prairie/wetland communities is likely to occur, despite relatively small amounts of energy generated. Collisions of birds with wind towers and their associated powerlines are of concern, in addition to effects such as avoidance behavior, given the massive size of wind energy structures.

Placement of wind farms often coincides with pristine grasslands due to their topographical characteristics...

Gue et al. (2013) found survival rates of hen mallards and blue-winged teal did not differ in relation to proximity to wind farms. Similarly, Niemuth et al. (2013) determined no differences in presence of several species of wetland birds; however, in those same areas, Loesch et al. (2013) found that fewer breeding duck pairs (-21%) settled within wind farms as compared to similar surrounding habitats without wind turbines. Placement of wind farms often coincides with pristine grasslands due to their topographical characteristics and lower prices involved with obtaining access to surface rights. Grassland birds are often “area sensitive” species, showing avoidance of tall structures such as wind towers. One of very few long-term before-after-control-impact (BACI) design studies showed that 7 of 9 grassland species were displaced by wind towers, often up to 300m (Shaffer and Buhl 2015).

Oil and gas development has been intensifying in the Bakken Region of northwestern North Dakota and northeastern Montana since 2006. Drilling has increased at an exceptional pace, bringing the number

of oil producing wells in North Dakota from 3,363 in June 2006 to 12,470 in June 2015 (ND Dept. of Mineral Resources, personal comm.). It has been forecasted that 40,000 - 70,000 wells will be drilled in the Bakken Region of North Dakota in the next 20 years (ND Dept. Mineral Resources, personal comm.). Drilling in the Bakken Region is exclusively completed via horizontal fracking which requires massive amounts of fluids (approximately 3 million gallons of water plus 2 million pounds of frac sand/well) to be injected into well sites and well pads that are often several acres in size. Although horizontal fracking technology provides the potential to avoid certain areas by drilling under them from up to 2 miles away, wetlands have received little to no avoidance. Dyke et al. (2010) estimated that by 2020, an additional 10,330 (8 times the number prior to 2000) seasonal, semipermanent, and permanent wetlands in the PPR of ND will have a well pad within 100m. Moreover, the massive amounts of materials and liquids used in the drilling process translate into thousands of trips by large semi-trucks to each well site during drilling. Given that intense oil and gas development has never overlapped with high densities of breeding ducks, as it does in northwestern North Dakota, effects relating to breeding ducks and their reproductive output are largely unknown. Possible direct and indirect impacts from the drilling process consist of the following: traffic and noise, natural gas flaring activities, constant activity at well sites, impairment of wetlands by contaminants or well pad placement, and direct conversion of habitat from well pad construction.

OPPORTUNITIES

- » Work with appropriate industries for research support and possibly habitat mitigation opportunities.
- » Work with applicable industries to provide avoidance and minimization tools to help off-set potential impacts.
- » Continue to support research investigating the effects of oil and gas development, wind energy development, or biofuel expansion on priority species.



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Grassland Bird Conservation

North American grassland bird populations have been declining faster than any other avian guild over the last 40 years (Knopf 1994, Sauer et al. 2014). Large-scale conversion of grassland habitat to landscapes dedicated to producing food and energy are possibly the major contributing factor for grassland bird population declines. The Northern Great Plains – including the U.S. PPR – contains the highest diversity of grassland bird species on the continent (Peterjohn and Sauer 1999), including several populations of conservation concern. Four mixed-grass specialist species are of primary conservation concern due to their ongoing population declines (Sauer et al. 2014): Sprague’s Pipit, Baird’s Sparrow, McCown’s Longspur, and Chestnut-collared Longspur. Although these four species’ population declines are some of the most dramatic, several other species across the PPJV continue to decline (see Landbird Section). The PPJV will strive to be proactive instead of reactive in the face of declining grassland bird populations. Generally, little is known about the biological factors driving population

declines. Consequently, the PPJV will focus time, attention, and funding on reducing uncertainty and developing innovative conservation treatments.

OPPORTUNITIES

- » Establish a grassland bird subcommittee of the Technical Committee to develop and advance a conservation strategy focused on specific priority species.
- » Collaborate with partners in Canada on conservation actions targeted for priority grassland nesting bird species.
- » Explore opportunities with new conservation partners in the agri-business and energy sectors.
- » Invest PPJV resources in research to identify population limiting factors for priority grassland nesting bird species.
- » Seek new funding sources for priority grassland bird conservation.



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Ecosystem Services of Wetlands and Grasslands

Abundant and diverse bird communities in the U.S. PPR provide society with an array of benefits that include provisioning (food from harvested species), cultural (bird-watching), regulating (pest control), and supporting (nutrient cycling) ecosystem services. Ecosystem services are the benefits to people from nature. The prairie pothole wetlands and surrounding grassland habitats required by bird communities also provide a variety of ecological goods and services to the people living in the U.S. PPR and well beyond. For example, North Dakota and South Dakota are the number 1 and 2 states in the nation for production of honey (National Agricultural Statistics Service 2016). The contribution of natural ecosystems to these benefits is often unquantified and unmeasured, but the value of such benefits is gradually becoming more apparent as human populations grow and demand for natural resources increases.

In a PPR environment functioning as naturally designed, wetlands hold back runoff and recharge groundwater supplies, wetlands and grasslands slow down and remove impurities in runoff, and grasslands sequester immense amounts of carbon in their root systems despite frequent fires. Human changes to the ecosystem have created an integrated drainage network of tiles and ditches in many areas with streams and lakes as the outlets, virtually eliminated fire from the ecosystem as a revitalizing disturbance factor, and tilled up soil organic carbon releasing it to the atmosphere to exacerbate climate change.

The progressive degradation of the environment inevitably has negative economic consequences. Often these costs are deferred or hidden from plain view – reduced soil fertility, degraded water quality, increased water levels in remaining wetlands, and increased flood frequency and severity. Each has societal costs; for example, the Des Moines and Racoon Rivers in Iowa are the leading contributors of nitrates to the hypoxic zone in the Gulf of Mexico, affecting that ecosystem and people that rely on it for their livelihood. Moreover, cities that rely on these streams spend millions annually to reduce nitrates to safe consumption levels. Fortunately, most conservation actions that restore wildlife habitat have collateral environmental quality benefits that reduce these costs.

OPPORTUNITIES

- » Learn from partners' experiences (e.g., Ducks Unlimited Canada efforts on water quality) in efforts to highlight benefits from wetland and grassland conservation/restoration.
- » Increase public awareness of ecological services provided by U.S. PPR wetlands and grasslands in order to develop greater appreciation for conservation and to develop funding opportunities.
- » Increase contact with appropriate entities well outside the U.S. PPR to promote the linkage between their states and issues and the U.S. PPR.
- » Develop spatially explicit ecosystem services models for wetland and grassland resources at the landscape and site scales in the PPJV administrative area.

Societal Attitudes about Conservation

Conservation social sciences have focused considerable attention to understanding the relationship between humans and nature and to improving conservation outcomes. Human dimensions of conservation is a reference to the social attitudes, processes, and behaviors related to how people maintain, protect, enhance, and use natural resources. In light of the current habitat losses in the U.S. PPR, Doherty et al. (2013) emphasized the need to adapt the PPJV conservation delivery strategies to maintain high landowner interest and acceptance of conservation programs. Building and maintaining relationships with private landowners will be critical to conservation delivery, because the vast majority of lands within the PPJV area are privately owned.

Residents of the U.S. PPR have mixed views toward conservation, as do elected officials and organizations. In Minnesota and Iowa, several state funding sources have been developed to finance and promote habitat conservation and restoration. Conservation land securement and public access are generally encouraged. There are hundreds of lake associations in Minnesota, and in April 2005 there was a “rally for ducks and clean water” to highlight the need to restore quality waterfowl hunting through habitat restorations and clean aquatic environments. Likewise, water quality has become a front-page issue in Iowa, and their governor has made it one of his administration’s priorities.

In the Dakotas and Montana, conservation is viewed differently. For example, voters resoundingly defeated the 2014 North Dakota Clean Water, Wildlife and Parks Amendment (i.e., Measure 5), an initiative that would have redirected some of the state’s oil tax revenues to conservation efforts. Also, in North Dakota there are prohibitions on perpetual conservation easements and restrictions on land purchases for conservation. South Dakota and Montana have experienced recent legislative attempts to impose similar limitations.

In every PPJV state most conservation funding comes from state and federal wildlife agencies, with necessarily limited contributions from non-profit conservation organizations. Conservation potential in Minnesota has been enhanced by passage of the Lessard-Sams Outdoor Heritage Act which

provides over \$100 million for conservation each year. Recently, the smaller North Dakota Outdoor Heritage Fund has provided roughly \$5 million annually for “outdoor education and recreation-related” projects. In Iowa, a portion of future sales tax increases has been earmarked for conservation and only awaits passage of a bill to increase the state’s sales tax. Hunting and outdoor recreation are front page news, and the need to protect and restore the wetland and grassland resources upon which these endeavors depend are gaining public recognition.

For this Implementation Plan to be successful PPJV partners must build on the good programs and favorable attitudes where they exist, and help shape positive attitudes towards conservation wherever such programs are not viewed in a positive light. This will require the PPJV to develop the necessary knowledge and skills to educate the public and elected officials on the values of natural assets – not only to birds, but, to the quality of life for people as well. The PPJV must also advertise its successes and market its programs to the public to further gain their support and involvement. Such communications will be given high priority by the PPJV, and are further described in Appendix C – Communications Plan.

OPPORTUNITIES

- » Expand knowledge and use of the social sciences.
- » Explore opportunities to provide input (i.e., express our needs) in human dimensions research funded by the Plains and Prairie Potholes LCC.
- » Develop spatial models that link landowner decisions with biological outcomes.
- » Increase private landowner interest and acceptance in conservation programs.
- » Support efforts to better understand hunter and supporter attitudes (e.g., the NAWMP choice experiment)

INTEGRATED BIRD CONSERVATION

The PPJV is committed to addressing the conservation needs of all priority avian species that use the U.S. PPR. This is a daunting challenge, because each species occupies a unique ecological niche and may be subject to a unique set of limiting factors. Therefore, we use a strategic, science-based approach to conservation optimizing diverse partners, strategies, and tactics. 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 (NAWMP 2012; Section II), and its various derivatives specific to the Prairie Pothole Region. Shorebird conservation plans are derived from the U.S. Shorebird Conservation Plan (Brown et al. 2001; 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 (Kushlan et al. 2002; Section IV). Lastly, the North American Landbird Conservation Plan was the foundation for conservation planning for this diverse group of species (Rosenburg et al. 2016; 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. Mortality and natality are often further dissected into demographic subcomponents termed “vital rates” (e.g., female survival during nesting, nest survival, pre-fledging survival, etc.). 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.

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. This includes seasonal patterns of mortality for some species. Moreover, duck research has been better funded and ducks are large enough to tolerate the necessary mass of tracking devices. Tracking individuals provides unbiased estimates of recruitment rates and hen success. Most waterfowl even tolerate large, visual markers that use sophisticated techniques to determine vital statistics like “true” recruitment rates and philopatry. Finally, duck and goose nests are relatively easy to locate and can be monitored for survival.

In contrast, for many smaller birds that are not hunted, only gross population trends based on surveys that index populations are understood. While mark-recapture 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 more is learned.

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 science foundation on what we know or assume to be true.

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** reviews the 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 **Priority Species**. Priority Species are those that have: (1) a high level of conservation priority

because of declining status in the U.S. PPR, or (2) a high rate of occurrence in the U.S. PPR, constituting the core of the species breeding range, and (3) represent a habitat utilized by several other species of interest. The use of priority species helps make the scope and scale of 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 priority species. Often, **threats** relate more to the need to retain existing important 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 priority 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 U.S. 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.

Despite its superficial appearance, the U.S. PPR is remarkably diverse.

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 (i.e., number of individuals per unit area) that are implied indicators of habitat quality. Ecologists, however, have recognized that density may be a misleading indicator of habitat quality (Van Horne 1983), so such maps must be used with an awareness of that concern.

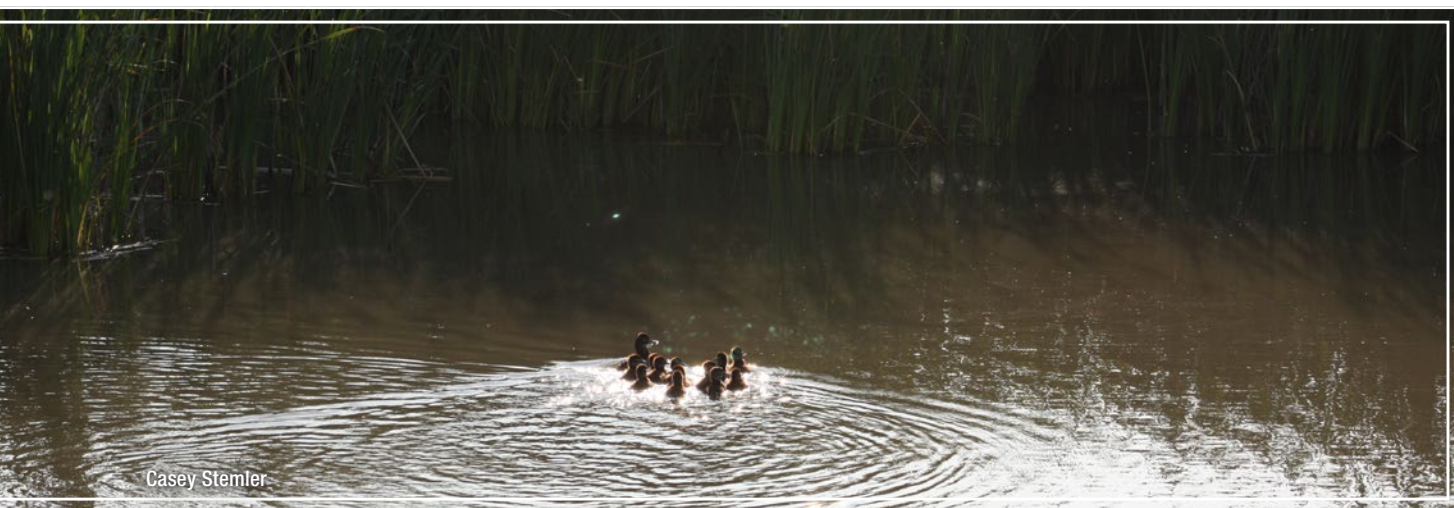
These limitations are offered as cautionary notes. Spatial models have great utility. However, users of these products must avoid thinking of them as maps that depict “the truth,” but rather as visual planning tools that approximate reality. Whenever possible, PPJV spatial models will attempt to quantify 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 184,000 square mile landscape.

Integrating Species Plans with Strategic Habitat Conservation

Spatial models developed for a suite of priority species will lead to **Programmatic Elements** (protection, restoration, or enhancement) that will compose PPJV conservation delivery. In many cases, a mix of all three may be warranted. Each PPJV state has developed a **Tactical Plan** that sets forth programs that best address conservation needs in particular landscapes. State Tactical Plans are included as supplements to this Implementation Plan.

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.

These ideas are not new; they are key components of any adaptive management or landscape-scale conservation strategy. Distilled, they are the five elements of Strategic Habitat Conservation (SHC; Figure 7): biological planning, conservation design, conservation delivery, outcome-based monitoring, and assumption-based research. SHC is an explicit, adaptive approach to conservation that originated in North American waterfowl management.



The flowchart illustrates the Conservation Planning Process, starting with identifying priority species and selecting a subset. It then moves to formulating population objectives and assessing the current state of species populations. This leads to identifying limiting factors and compiling models describing population-habitat relationships. The process then involves developing species habitat decision support tools and combining appropriate species decision support tools. The final steps are formulating habitat objectives, identifying program priority areas, and implementing conservation delivery. The process includes several feedback loops: one to assess net progress toward population objectives, another to evaluate program accomplishments, and a third to revise models accordingly. The process also includes a central cycle of Biological Planning, Monitoring and Research, Conservation Design, and Conservation Delivery.

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graph TD
    A[Identify Priority Species] --> B[Select Priority Subset]
    B --> C[Formulate Population Objectives]
    C --> D[Assess Current State of Species Populations]
    D --> E[Identify Limiting Factors]
    E --> F[Compile and Apply Models Describing Population-Habitat Relationships]
    F --> G[Develop Species Habitat Decision Support Tools]
    G --> H[Combine Appropriate Species Decision Support Tools]
    H --> I[Formulate Habitat Objectives]
    I --> J[Identify Program Priority Areas]
    J --> K[Conservation Delivery]
    K --> L[Monitor Effects Of Management Actions On Populations]
    L --> M[Feedback Loop: Assess Net Progress Toward Population Objectives]
    M --> C
    L --> N[Feedback Loop: Evaluate Program Accomplishments]
    N --> D
    L --> O[Revise Models Accordingly]
    O --> D
    L --> P[Revise Models Accordingly]
    P --> D
    L --> Q[Revise Models Accordingly]
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Monitoring Landscape Change and Evaluating Demographic Responses

limited to periodic snapshots in time (e.g., National Landcover Data is typically published every five years, and HAPET landcover products have been developed at similar time intervals) due to the cost and workload required to attain, process, and ground truth remotely sensed imagery. Thus snapshots of status and trends of landcover change, and their subsequent biological outcomes, are periodic and inherently retrospective. The periodic update of landcover data (every 5 years) will be used to re-evaluate the mix of programs and strategies needed for the future. The need exists to develop new methods and tools that will facilitate more frequent and accurate landcover updates. Demographic and spatial models will be used to relate landscape changes to anticipated demographic responses.

A photograph of a group of ducks swimming in a pond. The ducks are seen through the blurred, vertical stalks of tall grass in the foreground. The water is a calm, light blue, and the ducks have brown and grey mottled feathers. In the background, a dark, muddy shoreline is visible. A semi-transparent text box is located in the upper right corner of the image.

Strategic Habitat Conservation
is an explicit, adaptive
approach to conservation that
originated in North American
waterfowl management.

Chuck Loesch

Important Considerations for Integrated Bird Conservation

The integration process will ultimately allow us to designate priority areas 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 of the various species groups is considered. For example, there is extensive understanding of waterfowl (duck) population biology, distributions, vital rates, habitat selection, and ecology, which enables the development of very sophisticated models. Knowledge of other species groups is comparatively meager, therefore, models will be less sophisticated. If waterfowl planning was implemented under a common framework with other non-waterfowl species, it would require that planning is done 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.

The integration process will ultimately allow us to designate priority areas on the PPJV landscape where we can pool resources for the greatest benefit to multiple species.

“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 “adequate” 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. For example, in 2013 Montana PPJV partners conducted a conservation planning analysis in which 22 focal bird species were assessed to identify priority habitats for conservation actions. Only optimal, high quality habitats were used in the analysis to guard against this circumstance. Results allow partners to identify groups of species that mutually benefit from a specific conservation action (e.g., perpetual protection), as well as those species that are “loners” and prefer rare habitats (e.g., piping plover, golden eagle).

“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 administrative area, 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 Coordinator and Science Coordinator will lead and manage planning activities. 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, chaired by the Science Coordinator, needs to continue with planning by identifying priority 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 “State 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, Delta Waterfowl, 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 State 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 **State Tactical Plans** will be developed and executed using the integrated approach described above.

State Tactical Plans have been developed by groups of partners, and 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 and subcommittees (e.g., a Waterfowl Working Group, Grassland Bird Technical Subcommittee, etc.) that focus on species group 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.

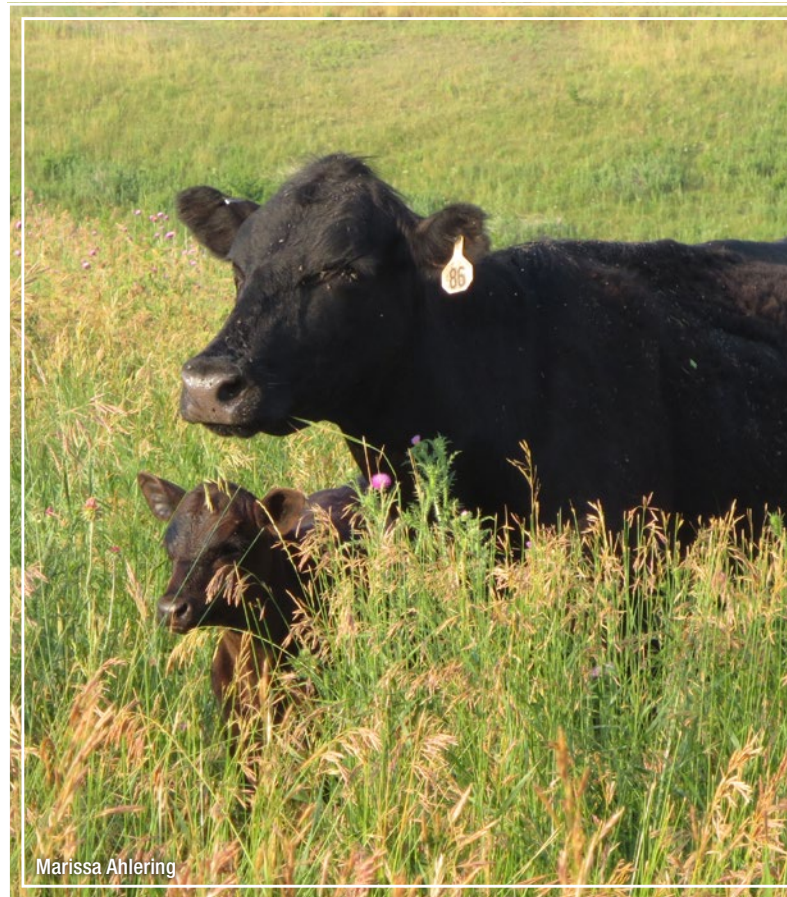
FUTURE DIRECTIONS FOR WETLAND AND GRASSLAND CONSERVATION IN THE PPJV

As habitat loss and degradation continue across the PPJV, current numbers of breeding waterfowl, grassland birds, shorebirds, waterbirds, and resident game birds cannot be sustained unless conservation efforts are accelerated. Protection of existing habitats and restoration of lost or degraded habitats are the two principal strategies of the PPJV. Providing habitats that are diverse in both structure and location will minimize effects of dry periods on breeding bird populations and their productivity, and increase the resiliency of the prairie landscape. The diversity of land use in the U.S. PPR necessitates multiple approaches to conservation, and diverse partners and tactics provide a mechanism to work in all important areas of the PPJV landscape.

Sustain Native Grassland and Wetland Habitats – Land use directly impacts the ecological integrity and social perception of wetlands in the U.S. PPR. Wetlands within a native prairie matrix have very high bird use and are valued by ranchers for stock water and forage. Thus, a central strategy for the PPJV is to work with landowners to find ways to protect native grasslands. In doing so, wetlands are also protected, because they are viewed by ranchers as valuable sources of water and hay. Effective techniques for conserving grassland and wetland habitat include a suite of short- and long-term stewardship programs and incentives for landowners. Conserving native rangeland directly benefits a host of waterfowl, shorebird, grassland bird, waterbird, and resident game bird species that nest over water or in grassland habitat adjacent to wetlands.

Restore Grassland and Wetland Habitats – In certain areas of the PPJV, habitat restoration will be essential to offset continuing habitat loss and to increase the productive capacity of landscapes for breeding birds. Wetlands in cropland are more likely to be drained than those in grassland unsuitable for cropping. Moreover, in most years the U.S. PPR has heterogeneous habitat quality – seldom is the entire region in good condition to support breeding waterfowl and other migratory birds. “Keeping the table set” waiting for periods of favorable wetland conditions does little good if the table is bare in areas with high annual precipitation. Even in the most altered

landscapes, some areas have higher conservation potential than others and it is a job of the PPJV to identify these landscapes with an awareness of the dynamic annual weather patterns characteristic of the U.S. PPR.



While perpetual protection of intact habitats is the number one priority, the second major conservation strategy for the PPJV is restoring historic grassland and wetland habitats. Fortunately, in addition to restoring habitat to add to the current population of wetland and grassland birds, habitat can be restored by a variety of state and federal programs seeking diverse natural resource and socio-economic benefits. Such benefits include enhanced water quality and floodwater retention capabilities that result from grassland and wetland restorations. The PPJV is committed to exploring new linkages with partners to deliver conservation programs that benefit public interests in multiple ways while remaining consistent with the priority goals of this plan.

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PLAN FOUNDATION APPENDIX A:

PRAIRIE POTHOLE JOINT VENTURE ORGANIZATION, ROLES AND RESPONSIBILITIES



Organizational Summary

The PPJV, established in 1987 as one of the original six, priority joint ventures of the U.S., is made up of a multi-state Management Board of agencies, organizations, and private landowners that share a common interest in the conservation of the wetland and grassland ecosystem of the Prairie Pothole Region. The PPJV also consists of a Joint Venture Coordinator, Science Coordinator, Habitat and Population Team Office (HAPET), Technical Committee, Policy Committee, and various other Ad Hoc Committees or working groups of partners that address other relevant conservation issues pertaining to the prairies.

Participation in the PPJV involves multi-level representation from a wide cross-section including landowners, conservation organizations, Federal and State agencies, and other stakeholders interested in non-regulatory and voluntary wildlife and land conservation.

The boundaries of the PPJV include the Prairie Pothole Region of Minnesota, Iowa, North Dakota, South Dakota, and Montana,

The PPJV is an informally-constituted partnership dedicated to bird habitat conservation and is not a legal entity.

The PPJV employs some key elements that make it a successful vehicle for conservation in the prairies:

- » The PPJV is popular with landowners because participation is voluntary and programs are non-regulatory.
- » The PPJV fosters innovative partnerships among Federal, State and local governments, conservation organizations, the business community, Tribal governments, and private landowners. Some of these partners provide funding, technical expertise, equipment, personnel, and land access.
- » The PPJV leverages resources through pooling funding, information, and personnel, accomplishing more in a coordinated process than what would be accomplished individually.
- » The PPJV works regionally in the Prairie Pothole Region, but sees the need and opportunity to address larger issues of bird conservation on an international basis in the Western Hemisphere, sharing expertise and technical assistance with other joint ventures in the U.S. and Canada and with international conservation partners.
- » PPJV partners work on both public and private lands. Public lands, such as National Wildlife Refuges and State lands act as cornerstones for PPJV activities. However, they do not provide sufficient habitat to sustain an abundance of prairie wildlife. Consequently the main thrust of the PPJV is in working with private landowners.
- » The PPJV is well recognized for its scientific rigor and spatial planning tools that help PPJV partners strategically target conservation efforts for the greatest impact and best use of limited habitat conservation funding.
- » PPJV partners provide critical leadership in the development and implementation of conservation provisions in the U.S. Department of Agriculture Farm Bill.

During its existence, the PPJV (1987-2017), partners protected, restored, or enhanced millions of acres of habitat through a combination of partner funding and private contributions. However, the prairie pothole states continue to lose grasslands and wetlands at alarming rates, potentially fueling serious declines in a wide range of bird and other

wildlife species. Success of the PPJV requires the continued coordinated commitment of all partners and steady funding from participating private organizations and State and Federal agencies.

Roles and Responsibilities

The Prairie Pothole Joint Venture is a dynamic partnership that functions as a network, not as a hierarchy. Free and open information exchange, willingness to partner at the local, regional and national/international level, emphasis on including scientists, resource managers, researchers, policy makers, administrators, communicators, private landowners, and on constantly seeking additional needed talent characterize the PPJV.

THE PPJV MANAGEMENT BOARD CONSISTS OF THE FOLLOWING AGENCIES AND ORGANIZATIONS:

- » Bureau of Land Management
- » Delta Waterfowl Foundation
- » Ducks Unlimited, Inc.
- » Farm Service Agency
- » Iowa Department of Natural Resources
- » Minnesota Department of Natural Resources
- » Montana Department of Fish,
Wildlife and Parks
- » National Audubon Society
- » Natural Resources Conservation Service
- » North Dakota Game and Fish Department
- » North Dakota Natural Resources Trust
- » Pheasants Forever
- » South Dakota Department of
Game, Fish and Parks
- » The National Wildlife Refuge Association
- » The Nature Conservancy
- » U.S. Fish and Wildlife Service
- » Private Landowners



MANAGEMENT BOARD members will have the following attributes: represents a conservation organization, agency, corporate/business entity, or a private landowner with a conservation interest; holds an executive leadership position that allows for the commitment of personnel and funding; commits to actively pursuing partner activities on behalf of the PPJV; seeks support for the PPJV with both internal and external audiences; and participates in a leadership role at meetings and in other PPJV activities. While Management Board members represent their agencies and organizations, as Management Board members they are also responsible for decision-making that benefits the *PPJV as a whole*.

The Management Board provides general oversight and guidance for the Joint Venture. Primarily, the Board oversees the implementation of the goals and objectives set forth in the PPJV Implementation Plan. The Board is also a broad policy making group that interprets pertinent policies, such as Farm Bill programs, into direction and guidance for the PPJV.

The Management Board works closely with the Joint Venture Coordinator, with other members of the Management Board in partner/funding activities, and within their respective organization or agency to ensure support for the PPJV and related programs. The Management Board receives regular updates from the Science Coordinator and from the HAPET offices, as well as updates from the respective membership. Management Board members are regularly requested by the Coordinator to participate in a variety of external audience activities that are pertinent to the overall success of the PPJV.

The primary responsibility of the Board is to provide policy and financial support for PPJV programs and activities.

Additional responsibilities include:

- » Represent your position, but consider the collective strength of PPJV and take actions beneficial to the larger partnership.
- » Influence and take action on national policy, legislative, and funding issues which pertain to the PPJV, especially USDA Farm Bill conservation provisions.
- » Determine policy and guide implementation of PPJV activities.
- » Ensure communication and problem resolution among PPJV partners.
- » Review and take action on committee recommendations.
- » Conduct periodic reviews and assessments of accomplishments in coordination, biological planning, monitoring and evaluation, communications and outreach, and project implementation.
- » Seek increased cooperation and collaboration with other entities that will result in mutual opportunity and benefit.

The Management Board will meet in person twice annually, but may also meet as needed for pressing business as determined by the Board Chair. The Board will hold two teleconferences, as necessary, on dates between the in person meetings. The U.S. Fish and Wildlife Service Regional Directors for Region 6 and Region 3 serve as co-chairs of the Board, with either serving as the primary Chair.

The Management Board may be queried on a biennial basis as to whether or not they wish to see a change in the Board Chair(s). If so, the Chairmanship shall be rotated as determined by the Board membership.

The Management Board will consist of no more than 20 members and new Board members may be added at any time up to the cap. The Board will review an application or petition for membership and give its approval or disapproval. The Board may decide that in the interests of the PPJV partnership, new members representing different sectors not already on the Board are required. In this case, the Board may appoint an ad-hoc subcommittee to find needed representation.



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BOARD PROCEDURES are as follows:

In most matters the PPJV Board will operate by consensus.

On issues where consensus cannot be reached, a simple majority is all that is required for decisions.

In matters of public policy, the PPJV Management Board will require a vote. Two-thirds of the Board members present (or their officially designated representative) must vote in favor of a motion for the action to proceed.

Board members (or their representatives) must be present at the meeting to vote.

The same procedures will apply for decision-making by e-mail or phone.

The *CO-CHAIRS of the BOARD* are responsible for conducting regular meetings of the Board and ensuring regular evaluations and assessments of Joint Venture activities and progress. The Chair coordinates, facilitates and participates in the decision-making process of the Board. The Chair functions as a spokesperson for the PPJV in public relations efforts, particularly at high-level meetings and other public gatherings. The Chair serves on and participates in the Association of Joint Venture Management Board activities. The Chair may appoint an alternate or designee to function as a spokesperson in any JV activities, subject to approval by the Management Board.

BOARD members are responsible for participating on working committees as required, as well as reviewing PPJV initiatives and projects, and assessing JV accomplishments within their respective organizations. Members assist in bringing new initiatives to the Board, ensure good internal communications of PPJV matters in their respective organizations or working circles, provide external communications and information on PPJV funding needs to key contacts in the agricultural policy sector, the various bird initiatives, and funding sources, corporate entities, and foundations. Board members ensure that the PPJV is successful through their individual actions and commitment.

The **JOINT VENTURE COORDINATOR** is responsible for coordinating and facilitating the overall development and implementation of PPJV activities. The JV Coordinator assists the Management Board in the development of leadership and vision for the

PPJV, facilitates the development of PPJV partnerships at all levels, ensures the coordination and administration of FWS appropriated administrative funding, and oversees the administration of day-to-day operations of the PPJV.

The JV Coordinator serves as a primary link between members of the Management Board, Science Coordinator, other working Committees, HAPET offices, and coordinators of the various bird initiatives and other joint ventures for day-to-day operations.

The JV Coordinator provides overall policy and informational guidance and recommendations to the Management Board, HAPET and other elements of the PPJV organization and facilitates all functional elements of Joint Venture operations. The Coordinator facilitates biological planning, monitoring and evaluation, strategic planning, and conservation delivery in the PPJV.

The JV Coordinator serves as primary staff for the Board Chair. The Coordinator is responsible for coordinating all aspects of NAWCA projects for the PPJV and provides the Board with a draft recommended ranking for approval. The Coordinator serves as a member in all standing committees established by the Management Board.

The **PPJV SCIENCE COORDINATOR** is responsible for coordinating and facilitating the overall PPJV science and technical activities. The JV Science Coordinator chairs the PPJV Technical Committee and serves as the primary link between the Technical Committee and the Management Board. The JV Science Coordinator provides regular updates on overall science and technical activities to the Management Board and serves as a member on all technical subcommittees.

The JV Science Coordinator works with partners to effectively align and coordinate conservation delivery programs, provide technical guidance, identify needed research, and assist in the identification and development of federal, state, and private grant proposals supporting the conservation goals and objectives of the PPJV.

The JV Science Coordinator represents the PPJV partnership at national and international meetings and in the broader science arena with respect to national and international bird conservation initiatives.

PPJV STANDING AND AD HOC COMMITTEES are constituted and approved by the Management Board and their charges are determined with the assistance of the Board and the JV Coordinator. Standing Committees have specific goals and assignments as determined by the Management Board. Additional committees may be formed as the need arises. Committee Chairmen are designated by the Committee and maintain a close working relationship with the JV Coordinator on all Committee issues. Committee chairs make regular reports to the PPJV Management Board. Current PPJV Committees include but are not limited to:

■ STANDING COMMITTEES:

Technical Committee:

- » Composed of 14 technical experts representing PPJV partner organizations with knowledge in breeding bird biology, adaptive resource management, prairie ecology, agricultural issues, management decision making, and prairie wetland and grassland issues.
- » The Technical Committee will work with ad hoc working groups on a variety of PPJV issues. The Technical Committee will also develop a network of PPJV affiliated science peers which can be recruited for assistance. The Technical Committee will work with State Wildlife Grant contacts and other similar contacts to develop coordinated planning where appropriate.
- » Representatives will work in a team, and are proactive in identifying the needs of the PPJV and in recognizing opportunities to advance PPJV objectives. They think strategically, and they consider broad impacts and issues as well as specific questions. They further knowledge and development of the biological foundations of the PPJV.

Responsibilities include:

- » Review, evaluate and refine habitat and population objectives.
- » Ensure that critical assumptions and questions are being addressed through scientific research.
- » Conduct periodic evaluations and assessments of PPJV objectives, strategies and accomplishments, and their effects on bird populations.
- » Assist in prioritizing management strategies and activities including targeting landscapes and areas for recommended management practices.

- » Provide recommendations of biological information needs with accompanying costs and potential results where appropriate.
- » Facilitate a unified working process between all states; and between PPJV and PHJV. Ensure information exchange among PPJV partners.
- » Review PPJV Implementation Plan for timeliness concurrent with NAWMP and other Bird Initiative Plan Updates and update PPJV Implementation Plan as needed for Management Board review and approval.
- » Deliver technical and science-based information and recommendations to the Board in a timely and proactive manner for consideration.
- » Develop, if needed, sub-committees for certain aspects of PPJV work, such as a waterfowl sub-committee, shorebird sub-committee, landbird sub-committee, or waterbird sub-committee.

Farm Bill Committee:

- » Composed of representatives of the Management Board with specific interest or connections to Farm Bill issues and concerns. Representatives will ensure timely and up-to-date communications with members of the agricultural community and other Farm Bill working groups.

Responsibilities include:

- » Provide regular updates to the Board on agricultural policy issues affecting the prairies.
- » Develop action items for the Board regarding regional and national legislative and policy issues affecting the PPJV.

Communications Committee:

- » Composed of Management Board members and communications contacts in or associated with the PPJV. Members will have an interest and some background or expertise in communications.

Responsibilities include:

- » Guide and assist the planning, development, implementation, and evaluation of a communications/education program (including development of such materials as accomplishment reports, newsletters, and surveys for internal and external audiences of the PPJV).

Policy Committee:

- » Composed of Management Board members, partners, and landowners interested in Federal and State agency policy development and Congressional operations and communications. Members will have some background or expertise in policy making at various levels.

Responsibilities may include:

- » Discuss and strategize approaches to policy actions with potential impact on the prairies, wetlands, grasslands, or other related topics.
- » Develop recommended courses of action for Board discussion and decision.

■ AD HOC COMMITTEES:

Awards Committee:

- » Composed of Management Board members.
- » Solicits and receives award nominations, and recommends worthy recipients to the Management Board.
- » Recognizes partnerships (Group or Organization), land managers (Stewardship), professionals (Professional), communications and outreach (Communication), and most active Board member of the year (Board).

STATE ACTION GROUPS/STEERING COMMITTEES/ALL-BIRD WORKING GROUPS are broad-based groups whose members support the various bird initiatives (NAWMP, PIF, NAWCP, and USSCP), NAWCA, and the PPJV within their particular state. Membership includes key partners with a wide array of interests and perspectives.

The Action Group/Committee/Working Group's primary role is to provide state-wide coordination for planning and implementation of PPJV objectives and activities. Specific activities include:

- » Coordinate planning, monitoring and evaluation, research, and project development to avoid duplication and determine how programs can complement each other.
- » Coordinate all Joint Venture activities when there is more than one Joint Venture in the State.
- » Coordinate NAWCA projects for timely submissions and avoidance of in-state competition.
- » Facilitate communications on PPJV activities and needs between partners, the media, legislators, and other local and regional officials.

- » Provide information, ideas, recommendations, and suggestions to the PPJV on strategic planning, monitoring and evaluation, and accomplishment reporting.

Joint Venture Management Board members or Technical Committee members in each State who participate in these working groups will be responsible for facilitating the group in their work and for communication on a regular basis with the Joint Venture Coordinator on the activities of the group.

Habitat and Population Evaluation Team (HAPET)

HAPET offices in Regions 3 and 6 were established in 1989 by the U.S. Fish and Wildlife Service at the request of the PPJV Management Board. In 2013, the two offices underwent a thorough review of program functions. Input received during the review from both Service and PPJV partners clearly revealed the offices played an integral role in conservation delivery within and beyond that of the Prairie Pothole Region, but identified a need for improved efficiency. The two offices were consolidated under one office in 2015 with a project leader and core staff concentrated in a centralized location (Bismarck, ND) and other staff collocated to ensure PPJV priorities were met across the PPR.

Originally, the primary functions of the HAPET's were to coordinate a waterfowl population and production survey (Four-Square Mile Survey) and use computer models to assist in developing waterfowl management plans for Wetland Management Districts (WMDs) in the PPJV. In 1990, HAPET offices were tasked by their respective Regions with acquiring needed biological information to "feed" models and develop computer techniques and procedures which would enhance wildlife management capabilities and assess progress in meeting management objectives.

With the adoption of wetland/grassland-associated non-waterfowl migratory bird objectives in 1995 by the PPJV Management Board, HAPET expanded its role to include these other bird groups (e.g., grassland birds, shorebirds, marshbirds) as continental planning initiatives were developed for these birds. Use of cutting edge Geographic Information System (GIS) technology is being employed as a routine part of all aspects of HAPET projects and process to improve biological knowledge integrate planning for strategic habitat conservation of all PPJV focal migratory birds.

The mission of HAPET is to provide partners with technical assistance and information to aid in achieving the goals and objectives of the PPJV and the various migratory bird plans including NAWMP, PIF, USSCP, and NAWCP. The office serves as the lead team for biological planning, and monitoring and evaluation within the joint venture. HAPET personnel gather, analyze, and assemble pertinent information that provides managers with the critical biological foundation necessary for management decisions relating to waterfowl, other migratory birds, and wetland/grassland habitat. Cooperative efforts with partners and an adaptive management approach are integral to HAPET operations.



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Principle activities of HAPET include: biological planning (Mallard Model), monitoring waterfowl populations and habitat, Breeding Birds Survey analysis, breeding marsh bird and shorebird surveys, assessment of USDA programs including Conservation Reserve Program and impacts of “Swampbuster” protection, restorable wetland inventory, and implementation of numerous GIS projects and evaluation projects.

It is expected that significant work will continue to occur in building the information base necessary to understand and manage bird populations in the prairies, and that technology will continue to

advance, particularly with modeling capabilities. Evaluation, monitoring and research as part of the HAPET office’s mission will continue to evolve and provide information that will enhance the Joint Venture’s conservation delivery objectives for the region.

HAPET personnel participate in the PPJV Technical Committee, and represent the PPJV on various regional and national scale biological planning and assessment teams. HAPET office personnel work closely with the PPJV Coordinator on overall planning, monitoring and evaluation activities and with the many PPJV partners in the acquisition of digital data, development of spatially explicit models, and production of GIS products.

In building a scientific foundation, PPJV partners are critical to the overall mission and success of the joint venture. As a partnership, the PPJV is collaborative and cooperative in meeting the goals of the joint venture, yet it is recognized that each partner maintains its own mission and agenda. In the case of building a scientific foundation, numerous partners work in cooperation. Some, such as the Ducks Unlimited’s Great Plains Regional Office, maintain a research and development section and GIS laboratory. Others, such as the Northern Prairie Wildlife Research Center and the Mid-Continent Science Center, have numerous scientists on staff and various laboratories. Each of the State agencies has a cadre of scientists and various scientific capabilities. Cooperative Wildlife Research Units and Universities in the PPJV have staff and equipment as do various Federal agencies such as the Bureau of Reclamation, the Bureau of Land Management, the Corps of Engineers, and the U.S. Department of Agriculture.

HAPET and the PPJV Technical Committee seek to leverage scientific information and scarce financial resources to avoid duplication of effort and thereby maximize the conservation capabilities of the Joint Venture to meet conservation objectives.

It is the policy of the PPJV to seek partnerships in order to create capacities for landscape-level planning and assessment, including decision support models, conservation planning guides and potential web-based population monitoring programs.

ROLES AND RESPONSIBILITIES OF PRAIRIE POTHOLE JOINT VENTURE BOARD MEMBER ORGANIZATIONS

AUDUBON

Audubon is committed to the ongoing protection, enhancement and restoration of the unparalleled wetland complexes in the Prairie Pothole Region to benefit the myriad of waterfowl and other avian species that are dependent upon the region. As such, participation in the Prairie Pothole Joint Venture (PPJV) through ongoing work with the Management Board, the Farm Bill subcommittee, and other avenues as appropriate is a high priority for Audubon.

Audubon is committed to building capacity to assist the PPJV partnership in the implementation of integrated conservation strategies for all migratory birds, with emphasis on declining species that coincide with Audubon's bird conservation priorities. As the designated U.S. partner for Birdlife International, Audubon's bird conservation priorities are established based on the IUCN/Birdlife Red List of globally threatened species and the Audubon WatchList of avian species at risk. The WatchList is formulated based on independent assessments published by BirdLife International, Wetlands International, Partners in Flight, the U.S. Shorebird Council, and Waterbirds for the Americas.

Audubon is actively implementing the Important Bird Areas (IBA) Program across the U.S. to foster stewardship and conservation of essential wildlife habitat in 46 states. Through a science-based process of site identification, prioritization, outreach and education, and monitoring, Audubon's IBA program lays the groundwork for community-based conservation. Audubon will work through the IBA program to benefit the PPJV in the identification of new stakeholders, including policy-makers, private landowners, government agencies, and volunteers for monitoring, to promote and implement land-management practices that recognize the ecological importance of these lands for birds consistent with the PPJV implementation plan. Audubon will work to expand the potential partners for the Joint Venture as they implement a state-based IBA program. The expertise, experience, and spatial data

housed within the PPJV will be essential in an evolving IBA program.

Audubon's partnership with Birdlife International also provides a potential opportunity for the PPJV to increase the effectiveness of bird conservation beyond the borders of the PPR. Audubon's work with the international bird conservation community has potential to link the PPJV with the Southern Cone Grasslands Bird Conservation Initiative, which includes Southern Brazil, Argentina, Paraguay, and Uruguay.

In addition, Audubon will continue to be an active advocate at the national and state level for the PPJV and for the policies and programs that fund and/or facilitate on-the-ground avian conservation. This includes funding for Joint Ventures, NAWCA, and the Neotropical Migratory Bird Conservation Act, lobbying for the Conservation Title of Farm Bill 2007, and other programmatic and fiscal program needs.

BUREAU OF LAND MANAGEMENT

The Bureau of Land Management (BLM) supports the PPJV Board member roles and responsibilities as outlined in the 2017 Implementation Plan. BLM's niche in the PPJV is characterized by both routine management and proactive activities. BLM administers significant surface and "split" (private surface, federal mineral) estate acres in the western PPJV. BLM's land management (through law, policy, and guidance) contributes to the achievement of general habitat goals and objectives. BLM also funds and conducts proactive activities to implement and monitor wetland and upland habitat improvements.

Proposed actions on BLM administered lands (both surface and split estate) are subject to Endangered Species Act consultation, site-specific environmental analysis, compliance with the Migratory Bird Treaty Act, and conformance to BLM's Special Status Species policies. For PPJV, this is particularly important as energy development has been identified as having the potential to impact various priority species. Interest in federal oil and gas leasing and exploration continues to grow throughout the

region. A new wind energy facility has recently been proposed on private and BLM-administered lands near Glasgow, MT.

The BLM is systematically assessing BLM-administered lands to evaluate whether they are meeting land health standards and guidelines for grazing management. This process includes watershed and wildlife habitat assessments.



The Partners in Flight Land Bird Conservation Plan (2016) specified noxious weed infestations as a threat to birds breeding in the U.S. PPR. BLM Montana/Dakotas plays a regional leadership role and has a proactive Integrated Weed Management program, working in partnership with counties, state, and other federal agencies in cooperative efforts to prevent and treat weed infestations.

In summary, the PPJV Implementation Plan will be an important source of information for the BLM to evaluate RMP level management alternatives, analyze site-specific proposed actions, and determine whether lands are meeting land health standards. These are the mechanisms by which BLM will integrate the goals of the PPJV into programmatic and site-specific management decisions. Additionally, BLM is an active partner in NAWCA grants and MT Wetlands Legacy, and conducts inventory, habitat improvement, and monitoring through base funding and Challenge Cost Share partnerships.

DELTA WATERFOWL FOUNDATION

Delta Waterfowl continues to be a committed member of the Prairie Pothole Joint Venture and its Board, Technical Committee, and Policy Committee as the partnership is in close alignment with Delta Waterfowl's mission, strategic plan, and geographic focus.

We believe the whole spectrum of the PPJV's work (from research and evaluation, direct delivery to engagement in public policy) represents the best hope to maintain and enhance breeding duck carrying capacity while maintaining and enhancing duck recruitment.

Delta Waterfowl's role within the PPJV will be the following:

- » **Deliver intensive management treatments (predator management and Hen Houses) to increase incremental duck production in those landscapes where duck recruitment is below desired levels.**
- » **Work collaboratively with the partners to conduct high quality research and evaluation.**
- » **Broaden our historic biological research to include new, value added disciplines to include human dimensions, policy evaluation and economic analysis as these topics are of increasing importance to the PPJV and our partners.**
- » **Work to create landscape scale solutions via the Farm Bill and other policy venues to positively impact duck carrying capacity and recruitment.**
- » **Engage with our state and NGO partners to enhance hunter recruitment via dedicated programming and capacity to address the decline of waterfowl hunters in the PPJV program area and beyond.**

DUCKS UNLIMITED, INC.

Ducks Unlimited, Inc. (DU) endorses the PPJV Implementation Plan, and is fully supportive of its goals and objectives. DU believes that the PPJV is integral to the success of the North American Waterfowl Management Plan (NAWMP), and therefore is central to the mission of Ducks Unlimited.

DU will continue to actively participate on the PPJV Management Board and Technical Committee, as well as offer assistance on special projects as warranted. Many elements of the PPJV Implementation Plan are also reflected in DU's "Preserve Our Prairies" Initiative plan; therefore, we envision opportunities to collaborate in many areas. Our focus will be on programs that are most beneficial to waterfowl populations, and our investments will be prioritized towards projects that provide perpetual or long-term benefits to the most valuable and at-risk habitats for waterfowl.

DU's overarching priority for the PPJV is to conserve current duck production capacity. Purchased easements, fee title acquisitions, and effective public

policies—especially conservation compliance provisions and conservation title funding in the U.S. Farm Bill and conservation funding in the Department of Interior budget—will be our primary approaches to securing the habitat base. We will continue to dedicate significant staff and financial resources to these endeavors. Moreover we will continue to use our non-federal funds, including private donations, as match for NAWCA and other programs.

In addition to habitat protection, DU offers expertise in wetland and upland restoration and enhancement. Our staff of biologists, surveyors, engineers, and construction managers will continue to work in partnership with other agencies and organizations on projects that provide meaningful benefits to waterfowl and other birds. We also realize that the waterfowl population goals of the PPJV will not be achieved by traditional habitat protection and restoration programs alone. We need to find new ways to work with farmers and ranchers to conserve wetlands and provide alternative nesting habitat. Our staff of biologists and agronomists will collaborate with universities, organizations, and agencies on innovative approaches to sustainability that include restoring and retaining shallow wetlands throughout the PPJV landscape in the Dakotas and Montana.

DU's Bismarck office is also staffed with researchers and GIS analysts who conduct original research and analyses in support of programs of mutual interest to DU and the PPJV. We look forward to continuing our collaboration with scientists at the HAPET Offices, Northern Prairie Wildlife Research Center, as well as faculty and researchers at various universities.

Effective communications and marketing will be important to the success of the PPJV. Ducks Unlimited employs professional communications staff at both the Bismarck office and our national headquarters who are willing and able to assist the PPJV in these endeavors. We believe garnering increased financial and policy support for conservation will require greater public discussion and awareness of the ecological goods and services of wetlands and grasslands. We look forward to collaborating with the PPJV to propagate these values across the prairie landscape.

FARM SERVICE AGENCY

The Farm Service Agency (FSA) administers the Conservation Reserve Program (CRP), America's largest conservation program. CRP compensates

landowners who volunteer to place cropland into conservation covers for 10 to 15 years. Currently, over 4 million acres are enrolled in CRP in Iowa, Minnesota, Montana, North Dakota, and South Dakota. Of these lands over 1 million acres are in wetlands or wetland buffers, while most of the remaining CRP land is planted to grass.

An intent of FSA is to administer the CRP in a manner that conserves natural resources and enhances the environment. Because this goal is fully consistent with the mission of the PPJV, and because cooperation and communication will help us enhance the populations of prairie avian populations, and the sustainability of both the prairie ecosystems and rural communities, FSA views participation in the PPJV as an opportunity to enhance the benefits from the CRP.

As a member of the PPJV, FSA will participate in the preparation and review of PPJV documents, share data whenever disclosure rules permit, and participate in analysis of conservation options. FSA will attend PPJV meetings whenever possible. If conflicts or budgets prohibit attendance, FSA will assure participation through correspondence.

IOWA

The Iowa Department of Natural Resources (IDNR) has placed a high priority on the responsibilities and opportunities afforded our agency and the state of Iowa through the Prairie Pothole Joint Venture (PPJV). We are pleased to have this opportunity to re-affirm our commitment to the PPR through the goals and objectives of the PPJV.

The PPJV has stimulated significant and impressive wetland and prairie restoration efforts in the Prairie Pothole Region (PPR) of Iowa. The key to our past success has been cooperation and coordination with other conservation organizations, NGOs, private business and industry, local groups, and individual citizens and landowners. IDNR has worked with partners to identify priority areas for restoration of wetland/grassland complexes, and has made significant progress toward those objectives. Since 1987, 42,656 acres have been acquired by IDNR and the U.S. Fish & Wildlife Service as WMAs or WPAs. All of these acres are managed by IDNR. This represents 35% of the total public acres managed by the IDNR wildlife bureau within the PPR.

Iowa supports the PPJV region-wide planning approach and agrees with the conservation priority placed on the Missouri and Prairie Coteaus. However, IDNR also recognizes the importance of wetland protection, restoration, and enhancement of wetland habitats in the eastern portion of the PPJV, and takes responsibility for coordinating these efforts within the PPR of Iowa. Conservation of existing habitats, alone, will not lead to the accomplishments of PPJV bird conservation objectives. To meet objectives, we must place additional habitats on the landscape through a combination of public land acquisition and effective delivery of USDA conservation programs.

In Iowa, we are successfully implementing wetland restoration programs in the most intensively modified part of the PPR and reversing the trend of continued habitat loss. The resulting landscape could impact how row-crop agriculture eventually impacts wetland habitats in other states. IDNR is working to stop, and hopefully reverse, trends in breeding range contraction of many species of migratory birds. IDNR values the opportunity to participate in PPR research and monitoring efforts, and to evaluate the impacts of Iowa wetland restoration and enhancement accomplishments on migratory bird populations.

Our goal is to integrate wetland/grassland complexes into the agricultural landscape. It is important for both rural and urban communities to be able to observe how agriculture and wetlands can co-exist to the mutual benefit of all people. Our success is evident from the broad base of support that currently exists for wetland restoration activities in Iowa. The extent to which wetland conservation and restoration is identified as part of the water quality solution has huge implications for the future of wildlife habitat across the PPR.

MINNESOTA

The Minnesota Department of Natural Resources' (DNR) Division of Fish and Wildlife (FAW) supports the roles and responsibilities of the Prairie Pothole Joint Venture (PPJV) Board members as outlined in the 2017 Implementation Plan. FAW's ongoing and proactive management activities fit into and support the plan.

The DNR launched the first North American "Save the Wetlands" program in 1951, which marked the beginning of Minnesota's Wildlife Management Area (WMA) system. The DNR currently manages 624,850 acres on 1,279 WMAs and 7,930 acres on 766 Aquatic Management Areas (AMA) in the PPJV region of the state. The USFWS manages 1,131 Waterfowl Production Areas (WPA) totaling 211,010 acres and eight National Wildlife Refuges totaling 150,580 acres. The Board of Water and Soil Resources (BWSR) manages 6,087 permanent conservation easements totaling 253,000 acres. The DNR assists and supports other agencies on wildlife habitat efforts through law, policy, guidance, and political support, including influencing U.S. Department of Agriculture farm programs.

**Our goal is to integrate
wetland/grassland complexes
into the agricultural landscape.**

The shallow lakes program began in 1985 with one full-time employee and has since expanded to 9.5 full-time positions. The goals of the program are to facilitate the management of shallow lakes through habitat assessments, identify management needs and document management results, and provide technical support to Area Wildlife Managers. The DNR also makes significant contributions to the multi-agency/NGO Farm Bill Assistance Program (FBAP) in Minnesota, placing a FB biologist in almost every county in the farmland region of the state.

In 2008, Minnesota voters passed the Clean Water Land and Legacy Act which annually contributes

100 million dollars to the Outdoor Heritage Fund (OHF) to restore, protect, and enhance wildlife habitat. Minnesota conservation partners shortly thereafter drafted the Minnesota Prairie Conservation Plan to help guide conservation efforts across western Minnesota. The majority of OHF projects and dollars have been expended in the PPJV counties targeted at specific landscapes where we feel we can have the greatest wildlife and habitat benefits with limited resources. In 2015, the DNR led another multi-agency/NGO effort to develop the Pheasant Summit Action Plan. This plan also identifies target landscapes to focus both protection and enhancement/ restoration work, and fits perfectly into the Prairie Conservation Plan.

However, we are still losing ground. Since 2007, Minnesota has lost 770,000 acres of CRP and is scheduled to lose another 400,000 acres over the next three years. Between 1997 and 2009, Minnesota lost 18% of the state's wetland basins, ranking highest among PPJV states.

In summary, the goals and objectives of the FAW are closely aligned with those of the PPJV plan. Accomplishments will contribute substantially to PPJV goals and objectives. This agency will work in broad partnerships that include federal, state, and local government, non-governmental organizations, and public and private land managers on a larger-than-past scale.

MONTANA

Montana Fish, Wildlife and Parks (FWP) is responsible to provide a representative to the PPJV Management Board, assist with the content and conduct of meetings, review and comment on plans, review, and comment on and rank NAWCA projects from the PPJV. In partnership with the USFWS and other state and federal agencies and conservation organizations, FWP helps identify and coordinate conservation needs and implement migratory bird and wetland conservation projects throughout the PPJV area of Montana.

FWP will provide both a Board representative and, as funding is available, a technical representative to assist the PPJV in conducting its activities. It will also assist in writing and reviewing plans, monitoring joint venture progress within the state, encouraging new partnerships, and facilitating NAWCA project proposal development. It will also work with

a broad partnership, including PPJV Board member organizations, to collaborate on activities as directed or needed by the Board, the PPJV Technical Committee, the PPJV Implementation Plan and the state action plan. FWP will coordinate with the Montana BLM state office, USFWS personnel in Montana, and other key conservation partners to host PPJV meetings periodically and to assist the Board and PPJV as needed.

FWP will provide funds for PPJV field personnel activities, NAWCA projects, and other wetland/ migratory bird-related projects from the Montana Migratory Bird Wetland Program and other sources.

NATURAL RESOURCES CONSERVATION SERVICE

Natural Resources Conservation Service's (NRCS) role is to be involved and participate in the discussions of the Prairie Pothole Joint Venture (PPJV) and provide input in coordination with the President's wetland agenda of one million acres each of wetlands created, restored, and protected for a total of three million acres.

NRCS responsibilities are to provide an open dialog with the PPJV offering science-based information and ideas in regard to NRCS programs and technical resources science-based.

NRCS will contribute the most current data through the National Resources Inventory (NRI). This data was used in identifying wetlands nationwide and is the basis by which the President's wetland agenda was decided. NRCS offers the NRI data for use by the PPJV as an educational tool in communicating ideas.

THE NATURE CONSERVANCY

The Nature Conservancy (TNC) is fully supportive of the objectives and actions identified in the 2017 PPJV Implementation Plan. To assist in the attainment of these objectives, TNC will participate as appropriate in the following ways.

Direct land conservation – Consistent with TNC Ecoregional Plans, TNC will acquire key tracts, hold or transfer these tracts to other conservation organizations, manage lands that are retained for their native biological diversity, and work with other landowners to optimize land management for biodiversity. TNC has 7 field offices in the PPJV region, and owns more than 50,000 acres of land there for

conservation purposes. These land acquisition and management activities will be largely in support of PPJV Implementation Plan goals, and will continue and accelerate in future years.

Government relations – TNC employs a staff of government relations specialists that work closely with legislation and elected officials to achieve policy goals and funding for government partners in support of conservation. These employees are found both in regional locations (e.g., Minneapolis for MN, SD, ND) and in worldwide headquarters in Arlington, VA. They are highly effective at working through legislative processes to secure funds and policy initiatives (e.g., funding for Northern Tallgrass NWR, MN CREP, etc.). A key activity in the next several years will be development and promotion of a new Farm Bill—this is the single most important issue facing the PPJV today.

Science and planning – TNC has staff capacity to address relevant scientific issues, identify key conservation landscapes, and produce spatially-explicit models and maps to prioritize conservation efforts. These staff and tools are regularly used in support of TNC field activities, and can be easily merged with other partner efforts to optimize collaboration.

Collaboration and leverage – TNC collaborates with many other PPJV partners to achieve conservation goals, and will continue to do so in the future. In some cases, TNC non-federal expenditures have been used to provide match for NAWCA funds to other partners. We expect to continue that in the future, and look for other creative ways to provide funding for conservation – especially in the Dakotas.

Marketing – TNC also maintains a staff of specialists in marketing and public relations. While their primary responsibilities are to ensure communication needs of TNC are met, where participation in marketing of PPJV accomplishments is relevant, their expertise can be used.

We look with great excitement to a renewed effort on behalf of PPJV partners in achieving ambitious goals.

In summary, TNC has a sincere and compelling interest in conservation across the PPJV. We are committed to collaborating with other conservation partners to advance conservation in the region consistent with the goals of the Implementation Plan. We look with great excitement to a renewed effort on behalf of PPJV partners in achieving ambitious goals.

NORTH DAKOTA

The North Dakota Game and Fish Department (NDGFD) has been involved in the development and implementation of the North American Waterfowl Management Plan and Prairie Pothole Joint Venture from their inception. NDGFD is responsible for integrating the needs, concerns of and benefits to the State into the planning and actions of the PPJV in North Dakota. NDGFD is also responsible in large part for informing citizens, legislators, and other interests in North Dakota relative to waterfowl conservation needs and opportunities in ND, and to the purposes of the NAWMP and PPJV. NDGFD has had a major role in organizing and supporting the PPJV and promoting the partnerships, coordination and cooperation needed to make the objectives and actions of the PPJV compatible with other needs and interests of the State, and thus acceptable to the people of North Dakota.

NDGFD provides substantial personnel and waterfowl management expertise to assist with a wide variety of Central Flyway, National Flyway Council, and PPJV endeavors and committees.

NDGFD serves an important role in the delivery and implementation of NAWMP and PPJV actions through its Private Land Initiative (PLI). The PLI is delivered through nine private land biologists across the state who work with a suite of habitat and public access programs for private landowners. Programs such as the Habitat Plot program provide annual or upfront lease payments and cost share to establish or protect grasslands, wetlands and other habitats as well as providing public access for walk in hunting. Other programs, such as the CRP Access program, provide cost share to landowners for establishing herbaceous cover on USDA CRP contracts and payments for walk in hunting access. Another program, the Working Lands program, provides a multi-year payment for maintaining conservation practices, habitat features and habitat management activities that have a positive impact on wildlife, while also

allowing public access. Private land biologists also work with other partners, such as USDA-Farm Service Agency, USDA-Natural Resources Conservation Service, USFWS-Partners for Fish and Wildlife, various NGOs and others to ensure private landowners are aware of all available options.

In support of the PPJV, NDGFD has provided, since 1990, a full-time position to lead and coordinate the state steering committee for the NAWMP/PPJV – The North Dakota Action Group (NDAG). The major functions of the NDAG and the coordinator have been:

- » **Foster the development, maintenance, and implementation of a waterfowl conservation plan for North Dakota that “steps down” the NAWMP and PPJV plans**
- » **Provide forums for coordination, cooperation, and information exchanges among the North Dakota partner/members supporting the PPJV**
- » **Develop and submit grant proposals for funding under the North American Wetlands Conservation Act (NAWCA)**
- » **Monitor and input to the Farm Bill and other federal and state legislation impacting wetland and waterfowl conservation**

NDGFD has had the opportunity to represent the PPJV and the Central Flyway on the North American Wetlands Conservation Council and to provide a staff person for the Council from 1995 to the present. NDGFD has played, and will continue to play, a major role in both developing NAWCA funding and in guiding the NA Wetlands Conservation Council toward policies that accommodate the interests of the NAWMP and PPJV in administration of the NAWCA.

NORTH DAKOTA NATURAL RESOURCES TRUST

The North Dakota Natural Resources Trust (NDNRT) has played an active role in the Prairie Pothole Joint Venture (PPJV) since its inception, and has been represented on the management board since 2001. As a non-governmental organization (NGO), the NDNRT brings a variety of capabilities to the PPJV.

The NDNRT works cooperatively with PPJV partners and other conservation and agricultural partners outside the PPJV to deliver on-the-ground conservation projects and provides small grants to others to do both on-the-ground and educational projects. In addition, the NDNRT plays a key communications

role in interacting with agricultural groups and elected and appointed policy makers. As an NGO, the NDNRT brings a flexibility and autonomy to the PPJV that can help the organization deliver both its conservation products and its conservation message.

All dollars spent by the NDNRT are non-federal, and thus provide much needed “match” dollars for NAWCA projects all across North Dakota. As a North Dakota based NGO, the NDNRT can only engage directly in on-the-ground work within the confines of that state, but can and does assist with planning, education and policy level contacts and discussions that benefit the entire PPJV area.

The NDNRT has been an integral partner in preparing and implementing all aspects of the PPJV’s strategic plan. In keeping with that involvement, the NDNRT keeps PPJV needs in mind as it develops its own strategic and operational plans, conducts its own projects and provides grants to other partnership organizations.

In summary, the NDNRT views implementation of the North American Waterfowl Management Plan, in the current context of an all-bird initiative, and delivered through the PPJV, as a corollary to its own mission. The funding, effective partnerships, and real on-the-ground accomplishments, combined with opportunities to work directly with farmers and ranchers to deliver meaningful conservation, set this effort and this delivery mechanism apart. The NDNRT is proud to be a part of this successful and groundbreaking conservation effort.

PHEASANTS FOREVER

Pheasants Forever, Inc. (PF) is a non-profit conservation organization that has a significant footprint in the PPJV. The PPJV is home to some of the best pheasant country in the world, and thus some of the strongest regions for the organization. PF’s unique structure empowers its grassroots chapters to make a difference for wildlife locally, and this locally led effort is often critically important for the successful implementation of projects. The mission of Pheasants Forever is the conservation of pheasants, quail and other wildlife through habitat improvements, public awareness, education, and land management policies and programs.

PF is heavily engaged in Farm Bill policy, technical assistance to private landowners, permanent habitat

protection, habitat restoration and enhancement, education, and outreach. PF works with private landowners across the U.S. PPR on approaches to address the modern challenges of wildlife habitat, clean water, and pollinator declines. PF also partners with agriculture on innovative approaches utilizing precision agriculture to improve farm operations and natural resources. PF is a proud PPJV partner and looks forward to helping landowners and partners achieve PPJV Implementation Plan goals for wildlife, natural resources, and the people of the PPJV. www.pheasantsforever.org

SOUTH DAKOTA

South Dakota Game, Fish and Parks (SDGFP) Wildlife Division staff intends to participate fully in all PPJV activities. We will attend, participate in and remain an active member of the PPJV Management Board and its various working committees as assigned. We will host meetings when it is our turn in the rotation. SDGFP is an original member of the PPJV Management Board and will continue its history of strong support and participation in the PPJV partnership and activities as outlined in the 2017 Implementation Plan.

The SDGFP Wildlife Division recognizes our unique geographic role in helping to ensure success of the North American Waterfowl Management Plan. Our agency is committed to the protection, restoration, establishment and management of waterfowl habitat in South Dakota. We place a high value on our game and non-game bird resources and are especially proud of our role in managing habitats for upland nesting birds. We have a longstanding, strong tradition of waterfowl management in South Dakota. We will continue to play an active leadership role in all aspects of waterfowl habitat, management and regulations. Our staff will continue their assertive efforts to improve grassland and wetland habitats on both private and public lands. SDGFP staff will also continue its involvement in the NAWCA grant program by providing important matching contributions to project partners, or when appropriate, seeking grant funds for specific department sponsored projects.

SDGFP recognizes the critical role of USDA conservation programs in the success of attaining and maintaining our PPJV habitat goals. We will continue to play a role in the development and implementation of these conservation programs. Our vision is to

make full use of these conservation provisions and use them to provide upland nesting cover on a landscape scale in South Dakota. It will remain a high priority for us that all USDA programs continue to provide protection of our remaining wetland habitat base, as well as provide options for willing landowners to restore wetlands through programs such as WRP and CRP.

Finally, we look forward to working with our neighboring states, federal agency partners and NGO friends as a team to achieve the goals of the PPJV Implementation Plan.

THE NATIONAL WILDLIFE REFUGE ASSOCIATION

The National Wildlife Refuge Association is a non-profit organization exclusively focused on protecting and promoting the 850 million-acre National Wildlife Refuge System, the world's largest network of lands and waters set aside for wildlife conservation.

Founded in 1975, the Refuge Association's mission is to conserve America's wildlife for future generations through programs that protect, enhance, and expand the National Wildlife Refuge System and the landscapes beyond its boundaries.

We rally together refuge friends groups and volunteers, birders, hunters, anglers, ranchers, students, and other conservation nonprofits to create a collective voice for the Refuge System. And, we cooperate with the U.S. Fish and Wildlife Service to help staff efficiently and effectively accomplish an ambitious conservation mission for the benefit of the American public protecting endangered species, biological diversity, and all the wildlife that call the Refuge System home.

Our goals include building a strong constituency for wildlife and giving wildlife a voice on Capitol Hill. Our strategic approach to landscape conservation also seeks to safeguard open space, rural ways of life, and a healthy environment while ensuring that our wildlife heritage is protected for generations.

The high density of National Wildlife Refuges and Wetland Management Districts in the Prairie Pothole Region alone would justify enthusiasm and cooperation for the objectives and actions identified in the PPJV Implementation Plan. But it is also the recognition that refuges alone cannot sustain appropriate populations of waterfowl and other birds; a much

broader regional approach towards crucial wetlands and grasslands is necessary. For more information, see: <http://refugeassociation.org/about/about-nwra/>

PRIVATE LANDOWNERS

Two to four private landowners serve on the PPJV Management Board. These landowners represent their experience and perspectives as individuals and as representative of locally led landowner-based organizations. They provide perspectives on private land conservation/conservation programs (i.e. Farm Bill, NAWCA, State private land programs, etc.); risks to grass-based agricultural communities; connect the PPJV to other landowner leaders and serve as champions for rural ranching communities; participate in legislative and congressional communications beneficial to PPJV goals; and provide a unique voice both to the PPJV and the Association of Joint Venture Management Boards.

Currently, the PPJV Management Board includes two landowners/ranchers one each from ND and SD. They individually represent the North Dakota Grazing Lands Coalition and the South Dakota Grasslands Coalition, in addition to their respective ranches. The North Dakota Grazing Lands Coalition tag line is: “Promoting the health and regeneration of North Dakota Grasslands” and their value statement reads: “Coalition members believe in: learning from the trials and experiences of peers; opening doors to grass management expertise; sharing alternatives and different perspectives; discovering common goals and objectives and generating new ideas.” The mission of the South Dakota Grasslands Coalition is: “To improve stewardship of grasslands through sustainable and profitable management.”

U.S. FISH AND WILDLIFE SERVICE

The Regional Directors (Regions 3 and 6) of the U.S. Fish and Wildlife Service (USFWS), as members and Co-chairs of the PPJV Management Board, agree with and support the roles and responsibilities as described in the 2005 PPJV Implementation Plan.

Region 6 will continue to support and maintain the PPJV Coordinator and its responsibilities as the lead USFWS region for the PPJV. The Coordinator will be responsible for ensuring the full implementation, partnership development, and successful advances of the PPJV as a whole. To the maximum extent possible,

the Region 3 Joint Venture (JV) Office will assist the PPJV Coordinator (USFWS Region 6, Denver, CO) and the PPJV Management Board in a manner that is consistent with accomplishing the goals and objectives identified in the 2005 Implementation Plan.

The USFWS will continue to serve in a leadership role and to strongly support, promote, and facilitate all PPJV activities. USFWS Region 3 and Region 6 program areas (i.e., Refuges, Private Lands, Realty, Migratory Birds and State Programs, Ecological Services and Fisheries) will work (within their respective program priorities) with the PPJV in developing and implementing partnerships and on-the-ground projects. Protection, restoration and enhancement of PPJV landscapes will continue to be a priority in both regions. Program areas and personnel will collaborate and coordinate across regional boundaries where feasible and where opportunities and partnerships can be developed.

USFWS (R3 and 6, respectively) will continue to provide major funding support for the Habitat and Population Evaluation Team (HAPET) offices in Fergus Falls, Minnesota and in Bismarck, North Dakota, to ensure development of strategic planning efforts, development and use of spatial analysis and Geographic Information System technology, and development of decision support tools to address landscape level habitat and population problems for PPJV partners. Recognizing that the differing portions of the PPR often require different conservation strategies and actions, the two HAPET offices will regularly coordinate and cooperate on PPJV/PPR-wide conservation issues including planning, monitoring, and cooperative research.

USFWS (R3 and 6) is pleased to continue its support of the North American Waterfowl Management Plan and of the new migratory bird conservation initiatives including the Partners In Flight Landbird Plan, the U.S. Shorebird Conservation Plan and the Waterbird Conservation for the Americas Plan. The USFWS (R3 and 6) strongly supports the PPJV partnership in its continued focus on waterfowl and in its leadership role in developing the biological foundations for integrated bird conservation.

USFWS (R3 and 6) is proud of the PPJV’s successful conservation record and looks forward to continuing their role as integral partners under the 2017 Implementation Plan.

PLAN FOUNDATION APPENDIX B:

INTERNATIONAL COLLABORATION

Background

In 1986, with the signature of the North American Waterfowl Management Plan, a truly international collaborative effort that involved Canada, the U.S., and Mexico was initiated on behalf of waterfowl. The Plan's vision included strategies for coordinated planning and cooperative management of habitat, with Joint Ventures as the major delivery system.

Since then, there has been increasing interest in developing cooperative strategies for conservation of migratory birds in the Western Hemisphere. The Partners In Flight North American Landbird Conservation Plan recognized migration across international boundaries and strengthened its international component in the 2016 revision; the U.S. and Canadian Shorebird Conservation Plans recognize the importance of hemispheric conservation; and the North American Waterbird Conservation Plan encourages international conservation of waterbirds throughout the Americas. In 2009, the Mexican National Shorebird Conservation Strategy was published.

In 2004, the Western Hemisphere Migratory Bird Conference was held in Chile. Heads of wildlife conservation for 25 countries re-affirmed the need to work together to conserve migratory birds of the Americas. The Canadian-based Boreal Songbird Initiative observes that one of every four birds in North America depend on the boreal forests of Canada and interior Alaska.

The U.S. and Canada have long history of collaboration, largely through existing partnerships for waterfowl, shared language, and to some extent, shared economies. Many active conservation partnerships have also long existed in Latin America and the Caribbean. In recent years, recognition of our shared migratory bird resources and the tremendous importance of Latin America and the Caribbean to global biological diversity have grown significantly. Countries such as Mexico, Venezuela, Colombia, Peru, and Brazil provide habitat for hundreds of migratory and endemic species. In the U.S.,

over 300 bird species are migratory, nesting in the U.S. or Canada and flying to Mexico, the Caribbean, and Central and South America for the non-breeding season. These migrants include waterfowl to Mexico, the Caribbean, and northern South America; shorebirds to Mexico, Central and South America; grassland birds to Central and Northern Mexico; and thrushes and warblers and many other landbirds to the tropics.

It is clear that many of the species that breed in the Prairie Pothole Region spend the non-breeding season outside the U.S. The hard work, energy, and money that goes into conserving breeding and migration habitat in the U.S. and Canada may be for naught if bird populations face limiting factors on the wintering grounds or during migration. Human population growth, habitat loss, and other threats are increasing much faster in Latin American than in the U.S. Indeed, threats in the Western Hemisphere are similar from Canada to Argentina: fragmentation and loss of forests, grasslands and wetlands, invasive species, human population growth, urbanization, and energy development. Citizens of the Western Hemisphere highly value birds. The millions of dollars we invest in bird conservation here at home can be lost if a species' needs outside the U.S. are not met. Fortunately, there is increasing recognition within the bird conservation community that it must increase work across entire bird ranges through conservation at the landscape scale via effective conservation partnerships.

Activities to Date

Partners in the Prairie Pothole Joint Venture have recognized that conservation activities in the prairies are paramount to meeting the goals of the NAWMP and other bird plans. PPJV partners have also recognized that teaming on an international level is needed and will contribute to successful conservation in the U.S. and Canada, as well as on a broader scale. Teaming internationally brings positive benefits to the partners of the PPJV. Capability and organizational capacity for conservation action

is enhanced; the scientific and ecological basis for priority bird conservation is strengthened; and skills, experience, personal education, and growth of PPJV partners are expanded through international contact and communication.

Recently, a group of PPJV and PHJV researchers investigated the spatial and temporal variation in breeding waterfowl population size and distribution relative to habitat quantity and quality throughout the majority of the North American PPR (see Doherty et al. 2015). This was the first work to develop seamless spatial data that transcends state, provincial, and international borders to inform conservation planning in the PPR. Much of the data were further developed to inform cross-border conservation planning for the Sprague's Pipit, a grassland passerine of conservation concern (see Lipsey et al. 2015). The collaboration developed for these research projects will need to be continued to address cross-border avian conservation issues.

The PPJV has been active in working with Canada's Prairie Habitat Joint Venture (PHJV) in development and exchange of biological and technical information and in assisting the PHJV in crafting agricultural legislation that will positively impact birds of Canada's prairie provinces. The PPJV historically worked with Mexico, assisting in the presentation of workshops on shorebird management, in shorebird research, and in helping develop organizational models and experience for joint venture-like organizations with Mexican partners. Further, the PPJV historically assisted in the development of organizational models and landscape approaches to conservation of grasslands in the Southern Cone of South America.

Action Items

The PPJV strives to deliver all-bird conservation as outlined in national and international plans. However, PPJV financial resources and partner efforts will be devoted primarily to meeting various plan goals for conservation in the PPJV. Nevertheless, the PPJV also recognizes the need for and benefits of international cooperation to attain collective conservation objectives. In the Prairie Pothole Region, a collaborative approach with the PHJV has benefited both joint ventures and has contributed to a more coordinated approach in prairie conservation.

The following are international activities in which the PPJV will play a role when partnership opportunities exist and/or when requested:

- » **Develop "border free" landscape planning tools.** The PPJV and the PHJV have jointly identified the merit of developing a standardized landscape model of the entire Prairie Pothole Region. Over the past decade the PPJV and PHJV have independently developed impressive suites of landscape assessment, planning, and modeling tools for their respective sides of the border. Immediate needs consist of standardizing wetland and grassland mapping conventions and developing seamless GIS coverage that transcend state, provincial, and international borders. With this information, the PPJV and the PHJV can jointly monitor and model the temporal and spatial shifts that occur in prairie bird populations as they respond to the dynamic landscape and climate changes so common to the region. Doherty et al. (2015) and Lipsey et al. (2015) made the initial steps to standardize and integrate these products.
- » **Work with respective Joint Ventures conducting grassland conservation activities in Canada and Mexico.** Where appropriate and when deemed a priority, the PPJV will work beyond these countries on migratory bird conservation efforts.

The PPJV has a tremendous wealth of information, experience, resources and energy to enhance international bird conservation. Goals for conservation in the PPJV alone are daunting. However, the PPJV is aware of its position in the larger context of shared threats to birds in the Western Hemisphere and of its unique ability to contribute to conservation partnerships. Although assistance will have a cost, the PPJV recognizes that teaming internationally is part of its vision and operation. By partnering with support and assistance where requested and possible, the PPJV will be truly helping achieve the broad-based goals not only of the PPJV but of all-bird conservation.

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SUMMARY OF THE COMMUNICATIONS PLAN

Following a strategic communications planning approach, the PPJV developed a Strategic Communications Plan for 2013-2017. This plan will guide the communications efforts of the PPJV staff and communications contractors or new staff. It also aims to support activities by the PPJV Technical Committee, Management Board, and other partners.

Five goals are highlighted for the PPJV that form the basis for communications campaigns.

- » **Build and strengthen the partnership**
- » **Ensure funding for conservation in the U.S. Prairie Pothole Region**
- » **Ensure effective landowner conservation programs/tools through policy at various levels**
- » **Integrate conservation into working lands**
- » **Link conservation activities to societal benefits**

Audiences are identified as those whose actions will influence achievement of a goal. These audiences are largely partner groups and require two-way communication efforts. Twenty-two audiences were prioritized for communications efforts.

Communications objectives are provided for each of the goals, grouped by segments of the audience that are similar. In order to achieve behavioral objectives, knowledge, attitudes, and skills objectives must be achieved. These communications objectives

are written simply and can be applied to serve as the basis for messaging. Additionally, several over-arching messages are provided for each goal.

Tactics and tools are recommended for each of the goals and sets of communications objectives and their associated audiences. The tactics and tools span a variety of approaches to engaging audiences, including educational, informational, organizational, and scientific communications. Recommendations for how to design and deliver the tactics and tools, as well as timelines and who is responsible, are provided.

Evaluation allows for determination of whether communications objectives have been met and offers feedback for adapting further communications to be more effective. The evaluation metrics and evaluation tools for primary tactics and tools are outlined and should be developed in concert with the tactics and tools.

The full plan can be found on the PPJV website:

http://ppjv.org/assets/docs/resources/ppjv_comms_plan.pdf



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GLOSSARY OF TERMS AND ABBREVIATIONS

Adaptive Management - A management plan designed from the outset to encompass “learning by doing,” and to actively test hypotheses, and adjust treatments as new information becomes available.

ACEP – Agricultural Conservation Easement Program

BCR – Bird Conservation Region

CRP – Conservation Reserve Program

CREP – Conservation Reserve Enhancement Program

Farm Bill – The major agricultural legislation in the U.S., which expires every four or five years. The Farm Bill outlines provisions on commodity programs, trade, conservation, credit, agricultural research, food stamps, and marketing.

GBCA – Grassland Bird Conservation Area

GIS – Geographic Information System

HAPET – Habitat and Population Evaluation Team

Habitat Niche – The portion of the environment that an animal occupies.

Human Dimensions – The science of systematically determining the attitudes, beliefs, opinions, and desires of people.

Integrated Bird Conservation – Conservation activities that are planned and executed in a systematic way so as to benefit multiple bird species.

Key Uncertainties – Those uncertainties that are most critical to the scientific foundation of a program or central to a scientific hypothesis.

Landbird – A species that nests and rears its young in upland habitats and obtains most of its food and other resources from terrestrial (non-wetland) sources.

Landscape Design – The spatial configuration of habitat features intended to benefit an array of bird species.

Landscape Level Planning and Assessment – The planning of habitat features at broad spatial scales, and the evaluation of their effectiveness for conservation.

Limiting Factors – Chemical or physical factors that limit the existence, growth, abundance, or distribution of an organism.

MBCF – Migratory Bird Conservation Fund (the “Duck Stamp” provides it with funding)

Mallard Model – A computer simulation model that predicts how mallard ducks will situate their nests in prairie-nesting habitat and then predicts their subsequent recruitment rates (see <https://pubs.er.usgs.gov/publication/1001541>).

Managed Areas – Locations at which actions are taken to achieve conservation objectives.

Measures of Performance – Quantitative metrics used to gauge the efficacy of a conservation action.

NABC – North American Bird Conservation Initiative.

NALCP – North American Landbird Conservation Plan.

NAWCA – North American Wetlands Conservation Act.

NAWCP – North American Waterbird Conservation Plan.

NAWMP – North American Waterfowl Management Plan.

NGPJV – Northern Great Plains Joint Venture

NPWRC – USGS Northern Prairie Wildlife Research Center

PIF – Partners In Flight.

Patch Size – The physical dimensions of a habitat feature.

PHJV – Prairie Habitat Joint Venture

PPJV – Prairie Pothole Joint Venture

PPR – Prairie Pothole Region

Priority Species – A species that is the focus of conservation effort.

Programmatic Decomposition – A process whereby one decides on the mix of conservation actions to apply.

Riparian Woodlands – Habitats located along water courses and dominated by trees and large shrubs.

Spatial Prioritization – The process of selecting the most important parts of the landscape on which to work.

Spatially-Explicit GIS/Habitat Models – Quantitative, map-like products developed using Geographic Information Systems software and used to target locations where conservation programs will be implemented.

Sustainable Land Use – Uses of the land that can be maintained in perpetuity without depleting natural resources.

USDA – United States Department of Agriculture

USSCP – United States Shorebird Conservation Plan.

Vital Rates – Metrics of population dynamics that are components of the survival and recruitment processes (e.g., nesting success).

WHSRN – Western Hemisphere Shorebird Reserve Network.

WRE – Wetland Reserve Easement

WRP – Wetland Reserve Program

WMA – Wildlife Management Area

WMD – Wetland Management District

WPA – Waterfowl Production Area

WBPHS – Waterfowl Breeding Population and Habitat Survey