IOWA STATE TACTICAL PLAN

A supplement to the 2017 Prairie Pothole Joint Venture **Implementation Plan**

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Photo: Shawn May

EXECUTIVE SUMMARY

The Prairie Pothole Joint Venture (PPJV), including north central Iowa, was established in 1989 as one of the six original priority conservation areas under the North American Waterfowl Management Plan (NAWMP, 1986; Figure 1). Using rigorous science and robust spatial planning tools, the PPJV partnership strategically restores and conserves high priority wetlands and grasslands that help sustain priority migratory bird populations by protecting remnant habitat and landscapes. Moreover, the PPJV is committed to continually strengthening its science by evaluating its foundational assumptions in different landscapes. A renewed commitment to the idea that the PPJV area is a diverse, heterogeneous region requiring multiple conservation approaches, and to the idea that the strength of a partnership lies in individuals looking beyond the issues unique to their state, and lending their expertise and resources to implement strategic conservation elsewhere in the joint venture adds value to partners. This added value will insure that the PPJV remains a vibrant partnership into the future.

In the early years of the PPJV, as the NAWMP rallied supporters and built brand recognition, a focus on the best remaining waterfowl habitat that inspired waterfowl enthusiasts was prudent. Today, in intensively farmed parts of the PPJV like Iowa, southern Minnesota, and even parts of North and South Dakota, the PPJV faces the challenge of strategic habitat restoration for breeding and migration of priority birds and other environmental functions. The 2012 NAWMP Update embraced the concept of a supportive public, based on the ecosystem services provided by waterfowl and grassland bird habitat; public valuation of migratory birds, including maintaining the tradition of waterfowl hunting, clean water; and the socio-economic value of healthy and diverse landscapes to rural economies.

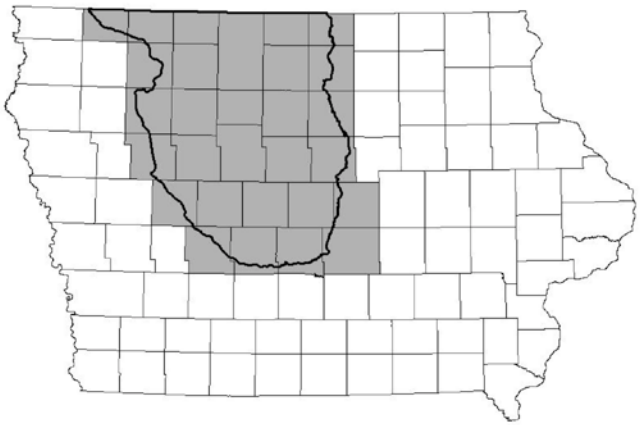

Figure 1. The Iowa Prairie Pohole Joint Venture administrative area (grey) and the Des Moines Lobe (black outline) of late Wisconsin glaciation.

Each of the bird conservation plans (waterfowl, waterbird, shorebird, and landbird) identifies habitat loss in the PPR as a primary cause of population declines for species of concern in that geography. Once a vast grassland ecosystem characterized by millions of wetland depressions, the U.S. Prairie Pothole Region (PPR) is now an agrarian system dominated by cropland through much of the landscape. In general, intensive agricultural land use resulting in wetland drainage and grassland conversion to cropland has been detrimental to the migratory bird populations that use the PPR. Greater than 50% of U.S. PPR grasslands and wetlands have been converted to cropland; however, in Iowa losses have been much more extensive. Roughly 95% of wetlands and 99% of grassland in the Iowa PPR have been tilled and drained making the conservation of species endemic to Iowa exceedingly challenging (Iowa Department of Natural Resources Wildlife Action Plan 2012).

The 2017 PPJV Implementation Plan provides the framework for delivering integrated bird conservation but it does not provide details such as specific

Using rigorous science and robust spatial planning tools, the PPJV partnership strategically restores and conserves high priority wetlands and grasslands that help sustain priority migratory bird populations by protecting remnant habitat and landscapes.

tactics to be employed and associated acreage objectives, costs, and partner responsibilities. The purpose of the Iowa State Tactical Plan is to provide a cohesive and science-based foundation for conservation actions directed at priority species of concern within the timeline of the Implementation Plan. Attainment of the objectives and fulfillment of the responsibilities in each PPJV State Technical Plan included in the 2017 Implementation Plan is, of course, contingent on future funding to state agencies, and unforeseen opportunities to double down on the ecological services of habitat such as water quality and pollinators, farm commodity prices and ethanol subsidies, and changes in the upcoming Farm Bill. Nevertheless, restoration and protection targeting strategies will remain valid beyond the life of this implementation plan. Partners are working towards the following 5-year goals and objectives within the Iowa PPJV area.

Five-year Goals and Objectives

1. Restore sufficient grassland habitat in appropriate configurations, patch sizes and connectivity to meet Iowa habitat goals for PPR wildlife in kilometers-wide landscapes called focal areas;

   Objective 1 – Restore and protect 405,000 acres of grassland in Iowa PPJV focal areas.

2. Restore sufficient wetlands with appropriate diversity and proximity to focal areas to meet Iowa's goals for PPR wildlife;

   Objective 2 – Restore and protect 27,000 acres of wetlands associated with priority grasslands in Iowa PPJV focal areas.

3. Rehabilitate and restore oak savannah on sites where it historically occurred. Savannah was locally abundant but iconic part of the Iowa PPR, particularly in the northeast PPR. It dictated where native and European settlements developed, and had its own unique guild of wildlife;

   Objective 3 – Enhance, restore and protect 20% of bur oak savannah on historic savannah sites in the PPJV.

4. Create sufficient outdoor recreation opportunities in every PPJV county to meet the demand for non-consumptive and consumptive outdoor recreation including waterfowl hunting quality that stimulates a long-term increase in the number of waterfowl hunters, non-consumptive users and proponents of wetland and grassland restoration and protection;

   Objective 4 – Restore and protect 40,500 acres of wetland and grassland with public access for hunting and non-consumptive wildlife recreation.

5. Increase outreach to the public that results in the recruitment of new non-consumptive and consumptive users of habitat, wildlife and native plants;

   Objective 5 – Sustain the 20-year average number of duck hunters, adjusted for mid-continent duck populations if appropriate, at 30,000/year

6. Institute more efficient and reliable management based on explicit site-scale management objectives, innovative management techniques and monitoring their outcomes, and efficiently evaluating the assumptions that underlie all standard management techniques.

   Objective 6 – Implement elements of strategic habitat conservation and adaptive management to habitat management practices.


Casey Stemler

INTRODUCTION

The Prairie Pothole Joint Venture (PPJV) is a voluntary, non-regulatory, self-directed partnership involving federal and state agencies, non-governmental conservation groups, private landowners, scientists, universities, policy makers, and others interested in prairie habitat conservation. PPJV partners realize they can achieve more through collaboration than by acting alone. The PPJV was established in 1989 as one of the six original priority joint ventures under the North American Waterfowl Management Plan (NAWMP 1986). Using rigorous science and robust spatial planning tools, the PPJV partnership strategically conserves, restores and enhances high priority wetland and grassland habitat to help sustain priority migratory bird populations with collateral benefits to other wildlife, ecological services and rural communities.

The PPJV is committed to addressing the conservation needs of all migratory bird species that use the U.S. portion of the PPR. This is a daunting task, because each species occupies a unique ecological niche and may be subject to a unique set of limiting factors. Effective conservation requires a strategic, science-based approach. The 2017 PPJV Implementation Plan addresses the conservation needs of four species groups: waterfowl, shorebirds, waterbirds, and landbirds. For waterfowl, planning relies on tenants of the North American Waterfowl Management Plan and models specific to the Prairie Pothole Region. Shorebird conservation plans devolve from the United States Shorebird Conservation Plan. Waterbird conservation is stepped down from the North American Waterbird Conservation Plan and the derivative Northern Prairie and Parkland Waterbird Conservation Plan. Lastly, the North American Landbird Conservation Plan was the foundation for conservation planning for upland migratory bird species. Each of these bird conservation plans identifies habitat loss in the PPR as a primary cause of population decline for species of concern.

Once a vast grassland ecosystem characterized by millions of wetland depressions, the Iowa PPR is now an agrarian system dominated by a two-crop rotation of corn and soybeans. Landscape diversity, including farmland diversity, has steadily declined for at least 75 years. Although habitat is abundant in other parts of the state, the vast majority of wildlife habitat in the north central Iowa PPR is relegated to the <2% of the region owned outright by the Iowa DNR (IDNR), USFWS, or County Conservation Boards (CCB) or protected by easements chiefly held by USDA. Loss of landscape diversity and intensive agriculture has been extremely detrimental to migratory birds and other wildlife, fish and plants that inhabit the PPR; water quality which impacts reaching the Gulf of Mexico (Goolsby 1999); and local rural economies and whole counties experiencing outmigration (Gasgoigne et al. 2013).

THE HISTORIC IOWA PPR

Iowa has been covered to varying degrees by 4 major glacial advances and retreats during the last 2.6 million years known as the Pleistocene geologic epoch. Each major glacial advance and retreat covers or alters evidence of previous ice sheets because glaciers are depositional events. In between ice sheets erosion occurs. Thus, the northeastern corner of Iowa, often called the Driftless Region, has highly dissected terrain cut by stream valleys because it has not been covered by ice for 500,000 years. Every other physiographic region in Iowa owes its modern land form and soil characteristics to more recent glaciation – either the advance and retreat of ice, or the deposition of thick deposits of fine wind-blown sediment called loess picked up and redistributed from glacial outwash plains and river valleys (Figure 2).

The Des Moines Lobe in Iowa covers 12,200 mi^2 and represents the southern-most advance of the last Wisconsin glacier that created the PPR (Figure 3). Glaciers advance when the weight of ice and snow in the accumulation zone press downward and outward. In the Western Hemisphere during the late Wisconsin glaciation, the accumulation zone was located near Hudson Bay. Glacial retreat is actually a misnomer since "retreat" really means that the glacier is melting at the margin faster than it is being pushed outward by the weight of the accumulation zone. As they advance, glaciers scour up rocks and soils, called till. This till is continually being deposited at the base of the ice sheet. For example, in many glacial landforms, granite boulders are very common and some are quite large. These were transported from the Canadian Shield and deposited by melting in the U.S. PPR.

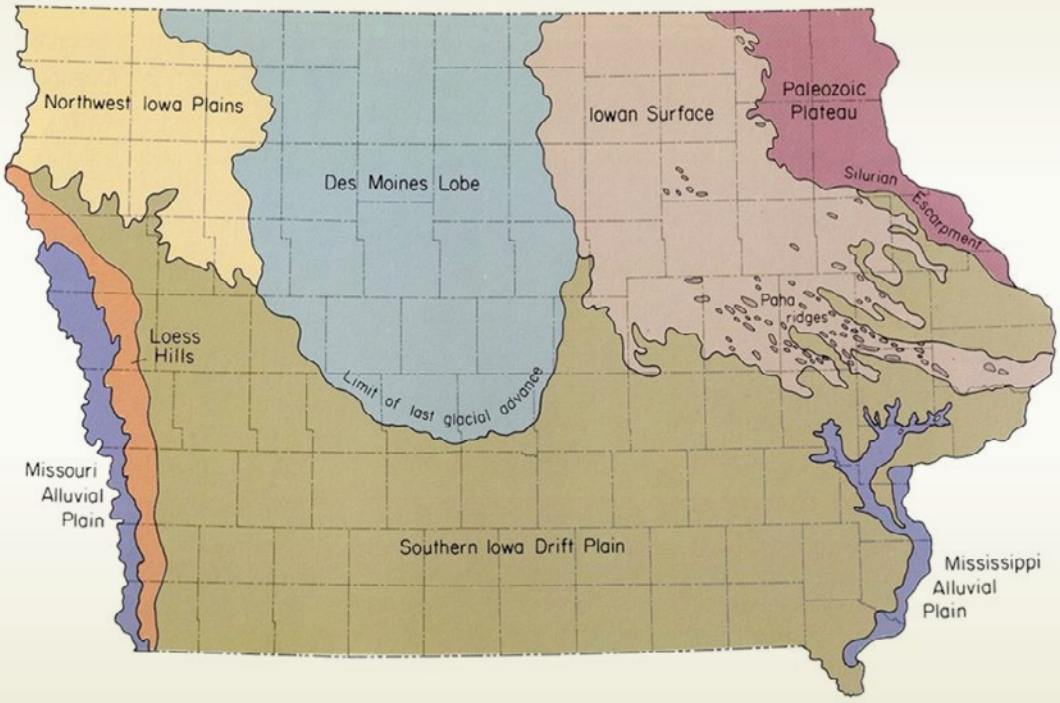

Figure 2. Physiographic regions of Iowa.

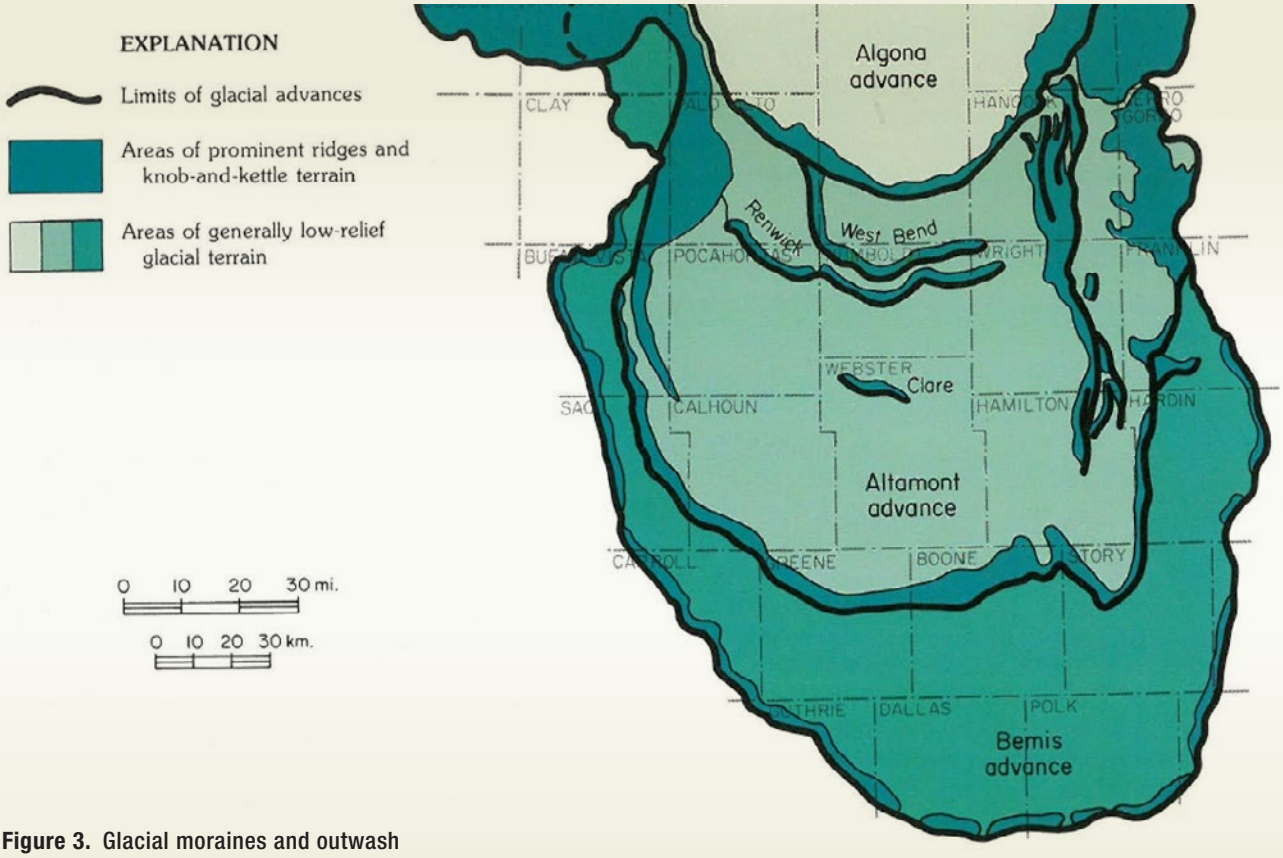

Figure 3. Glacial moraines and outwash plains of the Des Moines Lobe.

Thus, a glacier is like a giant conveyor belt, constantly moving material scoured up from the earth southward where it is deposited by melting. Contrary to common belief, most glacial landforms are deposited during periods of ice sheet stagnation or retreat (Johnson and Higgins 1997).

About 13,000 years ago, the climate had warmed sufficiently that glacial melting in Iowa exceeded glacial advance nearly every year, and the continental ice sheet slowly retreated from the state. By 10,000 years ago, the glacial ice sheet was gone from Iowa. At the base of the retreating glacier, a series of different plant communities developed, beginning with spruce-dominated forests, followed by deciduous forest with numerous oak trees. By 8,500 years ago, tallgrass prairie was the dominant plant community, with oaks reinvading as oak savannah about 4-5,000 years ago. Thus, for over 8,000 years, the Iowa PPR was dominated by a sea of grasslands, with hilltops and lands in the lee of lakes covered by oak savannah (Figure 4).

The other outstanding features of the Iowa PPR were prairie potholes which may have been more numerous in Iowa at the time of European settlement than anywhere else in the U.S. PPR, comprising over 18-34% of the total land area of the Des Moines Lobe. Ironically, potholes were so numerous, they were almost never described or even explicitly mentioned in the historical accounts of settlers.

Most prairie potholes formed when ice blocks broke off of the retreating ice sheet and were buried in glacial till. Over hundreds or sometimes thousands of years the ice blocks melted and the till above slumped down leaving a depression that we know today as a prairie pothole. However, the characteristics of prairie potholes (i.e., their plant and animal communities, biological functions, and hydrology), vary with their permanence (water regime) and size. Prairie potholes, as wetlands, are transitional

between deep water habitats (lakes) and upland. For most, size can vary greatly from year to year, depending on snow or rainfall, as can their permanence. In some years a pothole may be ponded for 1-2 months in the spring and the next year from spring through fall.

Prairie potholes are generally classified by their water regime – the length of time they pond water during the growing season after spring snow melt. The characteristics of potholes with different water regimes are discussed elsewhere in this implementation plan and in Johnson and Higgins (1997). It is worth noting, however, that the relative abundance of different types of potholes varies by the glacial landforms in which they exist. In Iowa, glacial moraines (Figure 3) developed where glaciers virtually stopped in one place during their long-term retreat. Rocks and smaller till were brought to the face of the ice sheet where they accumulated, often deeply burying detached ice blocks. Today, these moraines appear as ranges of low hills with rolling or "knob and kettle" terrain. When ice blocks that were deeply buried melted, they left behind steep sided, relatively deep wetlands, mixed in with shallow wetlands where ice blocks were smaller or buried nearer the surface. Most of Iowa's natural lakes and large, deep wetlands are found in landscapes made up of moraines.

Between moraines, the glacier retreated (melted) faster, and vast quantities of till washed out of the base of the melting ice sheet. This till, forming outwash plains, tended to created relatively flat landscapes with shallow, albeit sometimes very large wetlands. These flat landscapes were some of the wettest in Iowa at one time, but were relatively easy to drain with early technology and public subsidies, compared to moraines.

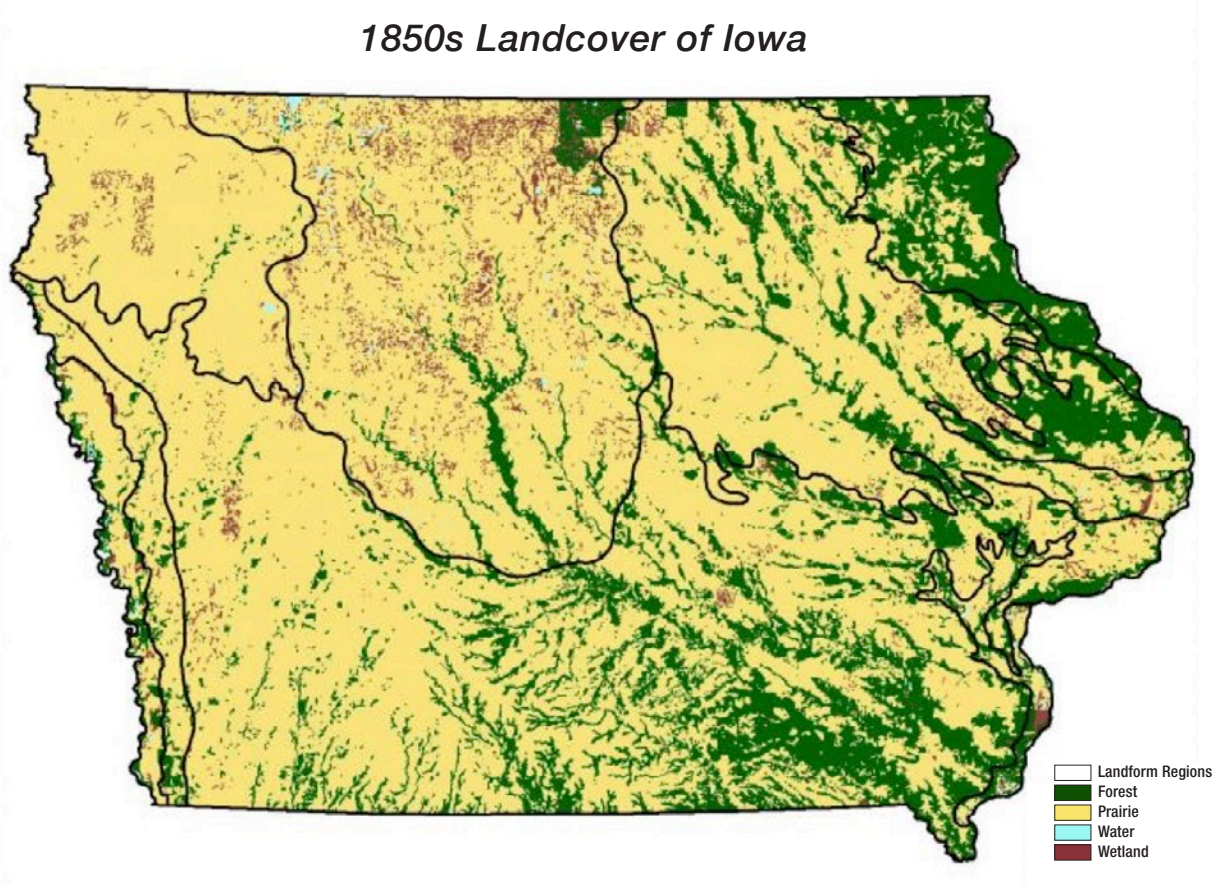

Figure 4. Land cover at the time of European settlement.

THE MODERN IOWA PPR

Prairie: Most prairie in Iowa occurs in regions covered by the thick mantle of loess, wind deposited fine sediments created by glaciers as they advanced and retreated, grinding rock into a fine flour-like texture that flowed out of the base of melting glaciers, picked up by prevailing westward winds and deposited over most of Iowa except the northeast from 10-12,000 years ago. Due to accumulation of loess and organic matter, parts of the North American tallgrass prairie in Iowa had the deepest topsoil ever recorded. Tallgrass prairie flourished in areas with moderate precipitation of around 30 to 35 inches per year. The combination of rich topsoil and abundant precipitation made the tallgrass prairie ecosystem some of the most lucrative farmland in the world.

Early pioneers, emerging from the eastern deciduous forest, often likened tallgrass prairie to an ocean of grass, with scattered savanna or woodlands along streams like a distant shoreline on the horizon. Some found the light and openness of the prairie invigorating, others found it oppressive, accustomed as they were to woodlands, where trees were a symbol of soil fertility. Early farmers tended to settle close to timber for building materials and fuel. By 1875 when most of the Iowa prairie had been settled, woodland acres sold for $35/ac while prairie land, thought to be less fertile, went for $5/ac. As late as 1867, in Marshall County Iowa, good timbered land was selling for up to $50/ac while prairie brought a paltry $3/ac (Madson 1995).

Early attempts to farm the prairies were frustrated by its thick sod and loamy soils which brought special problems early settlers were unaccustomed to. On the open prairie, huge breaking plows and teams of oxen were required to prepare the land for farming, requiring a major capital investment. If a farmer lacked such equipment he had to pay someone to do it for him for as much as $600/quarter section, a staggering sum. Once broken, other problems were encountered. The wooden or cast iron plows that

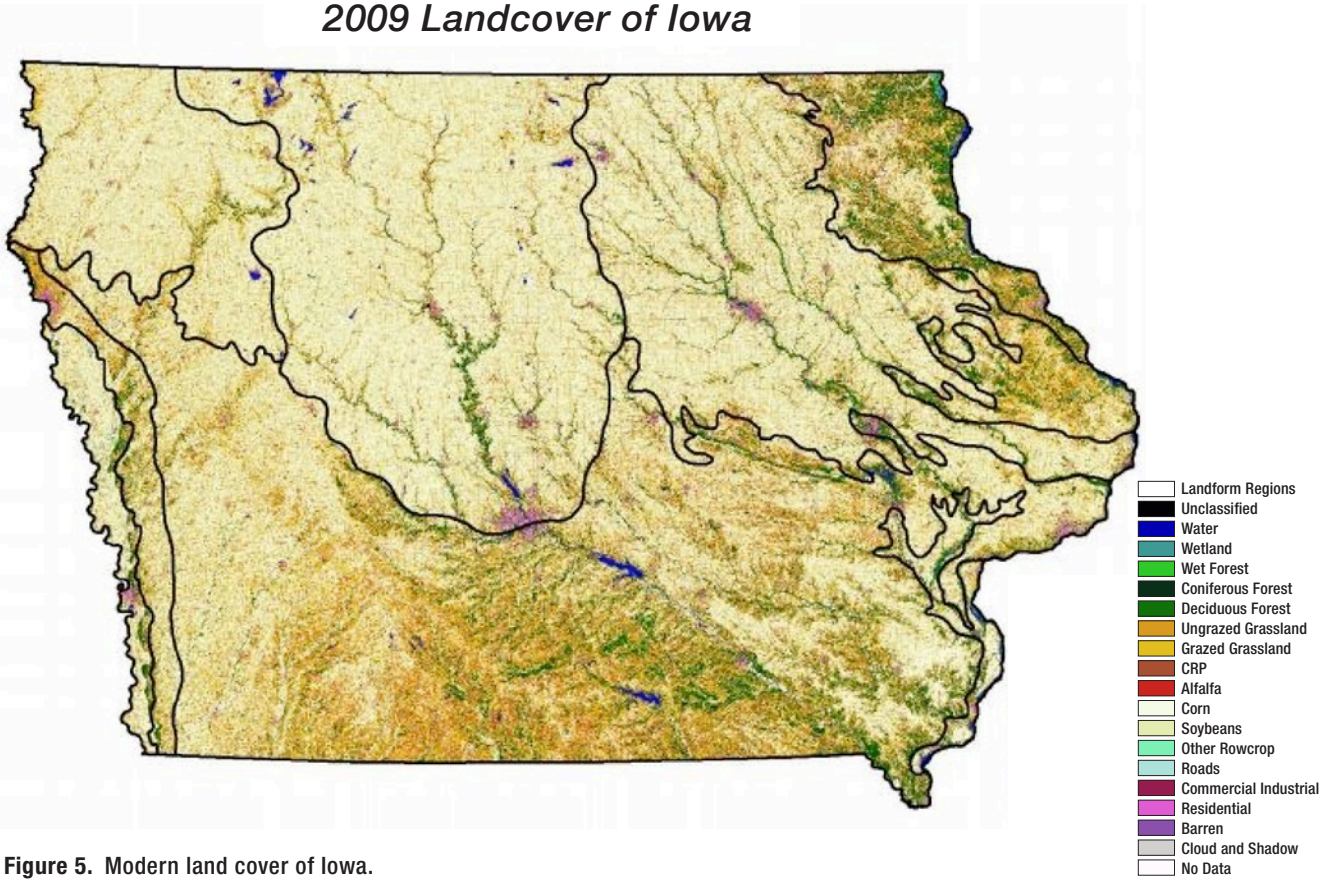

Figure 5. Modern land cover of Iowa.

The Iowa portion of the PPJV had over one million acres of grassland, including about 900,000 acres of CRP, remaining in 2009. By 2015 the area of CRP had declined to 315,000 ac.

worked well in the eastern woodlands worked poorly on the prairies because the prairie loam tended to stick to the moldboards and had to be laboriously scoured off. In 1833, John Lane of Lockport, Illinois began making self-scouring polished steel plows from used sawmill blades until the supply was exhausted. The polished steel cut through prairie soils without allowing the soil to stick. Lane failed to patent his invention, and by 1837, a blacksmith named John Deere began copying it, ordering rolled steel from New England and creating thousands of the new steel plows each year, which he peddled throughout the country. This was the beginning of a revolution in farming the prairies. By 1910, most of Iowa's native prairie had been plowed under.

Today, over 99% of Iowa's tallgrass prairie has been converted to agriculture (Figure 5). Within the Des Moines Lobe, less than 0.1% of the historic tallgrass prairie is estimated to remain, making it arguably the most endangered large ecosystem on earth (IDNR 2013). It often persists, ignored in nooks and crannies of old cemeteries, untended road ditches, railroad right-of-ways, and in prairie remnants deliberately preserved on public and private land. On closer inspection, prairie may also persist in more extensive pastures, where most species characteristic of prairie wait to be released from the pressures of season-long grazing and a dynamic disturbance like alternating rest and fire.

The agricultural conversion of prairie and pasture in Iowa persists. Wright and Wimberly (2013) reported that Iowa had lost 376,000 acres of grass statewide from 2006-2011. However, Dahl (2014) reported that in the Des Moines Lobe, Iowa gained approximately 100,000 acres of grassland from 1997-2009. These differences undoubtedly reflect variability across the state in grassland conversion rates, as well as short-term restoration of grassland due to general Conservation Reserve Program (CRP) enrollments. These term restorations are a highly transient means of restoring habitat. Nearly 1.3 million acres of CRP are scheduled to expire in Iowa in the next 10 years, and their reenrollment depends on the continued existence of the program, the program cap, program payments relative to rental rates, farming subsidies (including those for biofuels), and crop prices.

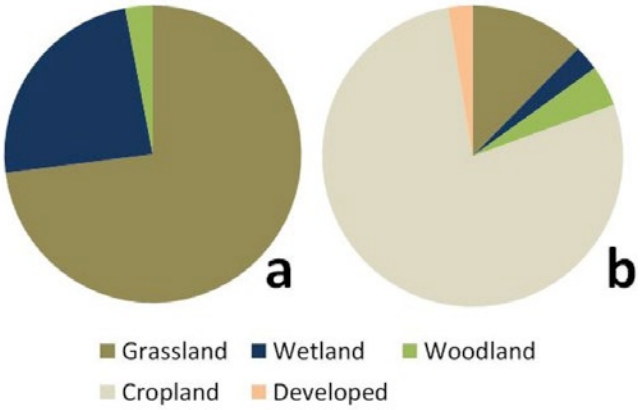

Figure 6. 1850 (a) and 2009 (b) land cover of the Iowa PPR.

Wetlands: In the late 1830s, Iowa's human population began to boom. Between 1836 and 1840 there was nearly a four-fold increase in the population and by 1860 most of the potential farmland had been claimed. In 1849, the first Swampland Act was passed which authorized the federal government to transfer land and the revenue from the sale of those lands to states that agreed to drain it for agricultural production (Johnson and Higgins 1997). Drainage at this time was limited to individual farmers digging ditches to nearby creeks or other wetlands. By 1872, complaints about farmers diverting water on neighboring land stimulated the Iowa legislature to pass a law establishing drainage districts with the power to create public drainage networks paid for by taxing the citizens in the district. Today there are over 3,000 drainage districts in Iowa and they retain the right to arbitrate drainage issues, establish policy, and tax all residents in the drainage district for drainage maintenance, not just farmers.

The tallgrass prairie biome is the most endangered ecosystem in North American.

The first public drainage ways were created using a scraper called a "Swamp Angle" pulled by a long team of oxen. By 1880, steam-powered dredges, and by the early 1900s, gasoline excavators were at work (Register 2016). Following both World Wars, the mechanization of farms increased with new technology, giving farmers greater ability to do their own on-farm drainage. By 1930, virtually all wetlands on the Des Moines were at least partially drained. At the close of WWII, the U.S. declared its intent to "feed the world" and in the 1950s and 1960s Federal agencies were providing technical assistance and cost share for drainage. Drainage became more effective. The trend of increasing drainage effectiveness and moving more and more water off the land continues today.

Today drainage focuses on eliminating the vestiges of partially drained basins and establishing whole field drainage (pattern tiling). Enhancement of drainage systems makes the eventual restoration of a portion of these lands less likely each year. As farmers make a capital investment in increased drainage effectiveness, especially whole field drainage, the chances of ever restoring that land decreases dramatically. The PPJV has traditionally focused on habitat protection; however, the renewed emphasis on drainage in the southern PPR makes restoration as imperative as protection in intensively farmed region of the Joint Venture.

From 1996-2009, Iowa lost 14% of its remaining wetland basins. Virtually all of the drained basins were temporary wetlands (Dahl 2014). This statistic reflects the renewed emphasis on drainage because, overall since 1970, Iowa partners have increased the area of PPR wetlands by 125,000 ac, or 4.1% per year.

More than 1.1 million acres of wetlands, and possibly as much as 3.4 million acres, have been drained in the Iowa PPR. A total of 172,000 acres of depressional wetlands, of which 77,400 acres are lakes, and 49,600 acres of riverine wetlands, remain in the Des Moines Lobe (Table 1).

Table 1. Number and area of wetland basins by water regime in the Des Moines Lobe of Iowa

Water Regime	Number of Basins	Area of Basins (acres)
Temporary	12,226	26,411
Seasonal	14,425	37,829
Semipermanent	5,055	28,093
Lakes	4,425	77,379
Riverine Wetlands	NA	49,629
Prior Converted Basins (drained)[1]	>154,301	1,107,855 (to 3,440,000)

[1]The lower number is from LiDAR-based drained wetland delineation. The upper is mathematically derived from remaining wetlands and estimated loss rates. The actual number falls in between.

Impacts on Wildlife: Iowa's virtually unparalleled production of trophy whitetail deer and turkeys, bobwhite quail populations that are booming with new habitat management strategies, and other wildlife that are abundant in nearly every part of the state except the PPR point to the impacts of habitat degradation in the PPR. Towns named Mallard, Plover, and Curlew in northwest Iowa, and a railroad spur line from Des Moines, named the "Duck Special", that ended in the middle of them speak to the waterfowl and shorebird hunting heritage of the region. It is widely believed Iowa's wetlands and prairies may have been on average more productive than other parts of the PPR which are more drought prone and have less fertile soils.

One resident of Kossuth County in the northcentral Iowa PPR lamented in 1904, that he thought there were 10,000 geese and 100,000 ducks nesting in the county in the 1860s. Regardless of how accurate his estimates, this early resident clearly thought that waterfowl were tremendously abundant when the area was settled and had greatly declined in the 40 years since. Market hunters clearly took a toll, particularly in the area around Spirit Lake. A seven man team in the area hunted from August 15 to freeze-up and averaged about 14,000 ducks per year. Another area hunter killed 3,000 ducks in a single year, and a pair of hunters killed 485 in a day on Spirit Lake and a few years later filled a 10-ft

wagon bed with 232 green-winged teal at Christopherson Slough just east of Spirit Lake. Prices ranged from $1.50 to $12.00/dozen for a mixed bag but were considerably higher for mallards, redheads and particularly canvasbacks (Dinsmore 1994).

Sport hunters killed their share in the potholes, shallow lakes and river bottoms. One shot 82 mallards in an afternoon at Big Marsh in 1874 and five hunters killed 267 at a pass on Spirit Lake in 1878. The Des Moines and Skunk River bottoms farther south yielded terrific bags, particularly for late season mallards (Dinsmore 1994).

"As a kid I painted houses in the summers and did farm work spring and fall and trapped civit cats [spotted skunks] to buy shells. My favorite slough was just a half mile north of the house [in Ames]. My brother and I would shoot about 25 ducks apiece before school and sell them around town after school. That was the way we lived. That was in about 1918 and the war was still on."

Frank McLaughlin
[the author's grandfather], pers. comm., 1964

Long-billed Curlew reportedly nested everywhere on the prairies of northwestern Iowa as late as 1882. In 1889, the going price for curlew was 10 cents a bird. Flocks of thousands of Eskimo Curlew were observed near Algona and other parts of the PPR from 1866-1870. So many were shot during spring migration in the PPR and elsewhere on the Great Plains that they are one of the rarest North American birds today.

Perhaps no bird was harvested during migration in Iowa as intensively as the American Golden Plover. Prices ranged from $1.50 to $3.00/dozen. One hunter from Spirit Lake said he killed thousands, more than any other species. One spring he shot over 2,000 shorebirds in a month including golden plover, Upland Sandpiper, godwit, snipe and yellowlegs (Dinsmore 1994).


Neal & MJ Mishler

Clearly, after 1860, market and sport hunting must have been affecting the local abundance of a number of waterfowl and shorebird species, but the real threat was wetland drainage. Wetlands were drained because they were inconvenient to farm around, took up potentially productive land, and because drainage was considered good land stewardship by the ethics of the day. By 1906, less than 1 million acres of wetlands remained statewide.

Numerous breeding migratory birds and resident wildlife species that once inhabited the Iowa PPR are now extirpated – gone entirely or relegated to occasional migrant status. Ten federally-listed threatened or endangered species occur in the Iowa portion of the PPJV and an additional 41 state-listed threatened and endangered species and another 60 species of migratory birds of greatest conservation need (SGCN) inhabit the Iowa PPR (Appendix A). The condition of the upland has such a profound influence on stream species that no effort to separate the two groups has been made. Species which once occurred in Iowa and are extirpated during breeding and non-breeding seasons are not listed.

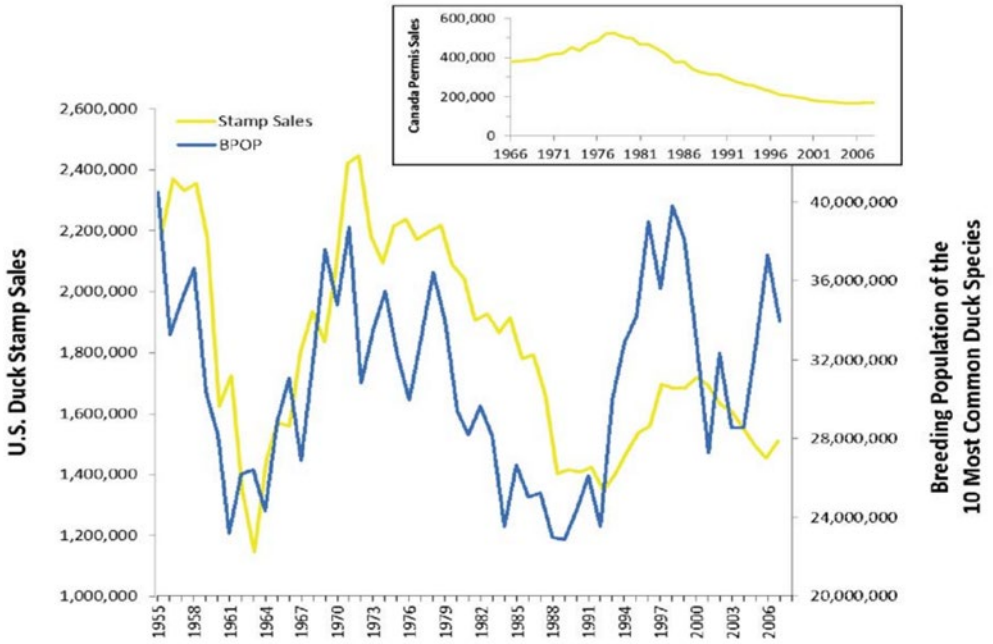

Figure 7. National duck stamp sales and continental duck populations (NAWMP 2012).

Impacts on Waterfowl Hunting: One impact of the conversion of grassland and wetland has been the loss of access to places to hunt. Until the 1990s, duck stamp sales closely tracked estimated continental duck breeding populations. By the early 1990s, the relationship between the two variables seemed to be much weaker (NAWMP 2012, Figure 7). Success in restoring other species like whitetail deer may cause hunters with limited time for recreation to choose to hunt one species versus another and have likely caused some reduction in waterfowl hunter numbers; however, hunter surveys, including several conducted by the IDNR and one conducted for the SDGF&P in 1996-97 (R. Johnson, South Dakota State University, unpubl.) indicate that a perceived lack of access to good places to hunt is consistently one of the most important factors reducing the number of duck hunters. Iowa has been and remains at a critical juncture in retaining its waterfowling tradition because of a lack of access to wetlands, as well as having other wetlands that provide sanctuary in the early season when hunting pressure is greatest (Figure 8.) To emphasize this trend, between 1961 and 2013, the number of adult waterfowl hunters declined 55% and average days afield declined 65% (IDNR archives). The NAWMP assumption that increasing the average continental breeding population will stabilize or increase the number of U.S. duck hunters may no longer be true.

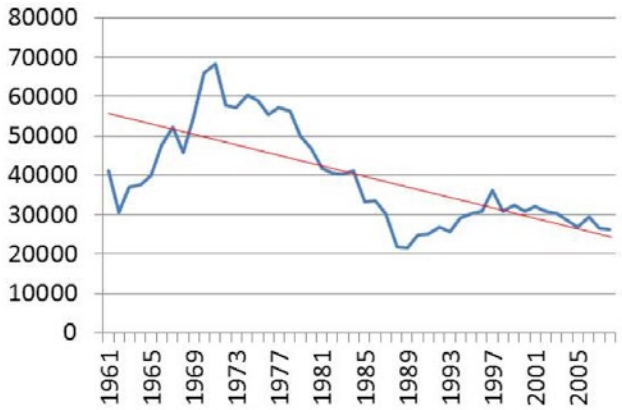

Figure 8. Iowa annual Duck Stamp sales and trend, 1961-2008.

Impacts on Water Quality: The value of wetland functions is difficult to quantify but their importance to enhancing water quality, reducing flooding, and providing wildlife habitat as well as other functions is well known. Surveys of Iowa residents show that water quality is their top environmental concern. Linking the multiple benefits of wetland restoration to water quality and other environmental factors is critical.

According to the U.S. Geological Survey, more than 43% of the total nitrogen (N) entering the Gulf of Mexico and creating the hypoxic zone at the mouth of the Mississippi River originates above Cairo, Illinois, and the two states yielding the highest amounts of

Success in restoring other species like whitetail deer may cause hunters with limited time for recreation to choose to hunt one species versus another and have likely caused some reduction in waterfowl hunter numbers...

Chuck Loesch

N are Illinois and Iowa (Figure 9.) The Gulf Hypoxia Action Plan (2008) established a goal of a 45% reduction of N and phosphorous (P) in the Mississippi River and its tributary streams (Mississippi River/Gulf of Mexico Watershed Nutrient Reduction Task Force 2008). The state of Iowa adopted this goal in the Iowa Nutrient Reduction Strategy (Iowa Dept. of Agriculture and Land Stewardship [IDALS] et al. 2014).

Both N and P concentrations increase with flow volume (Mississippi River/Gulf of Mexico Watershed Nutrient Reduction Task Force 2004, Schilling and Wolter 2005, Iowa Dept. of Agriculture and Land Stewardship et al. 2014). Therefore, reducing Gulf hypoxia and enhancing stream health in the Mississippi River and Gulf of Mexico Watershed is a question of both nutrient retention and reducing the magnitude and frequency of high stream flow events. The primary causes of water quality degradation and increased severity and frequency of flooding in Iowa (and the rest of the upper Mississippi River Watershed) have been the removal of perennial grasslands for crop production with associated fertilizer application, and tile drainage of wetlands and wet mesic uplands that historically soaked up and impounded precipitation.

The most effective means of reducing nutrient loading in stream flow in the Iowa PPR is the restoration and protection of grasslands and wetlands

The most effective means of reducing nutrient loading in stream flow in the Iowa PPR is the restoration and protection of grasslands and wetlands (Table 2). Presently, a focus on enhancing water quality seems to be the most effective means to achieve the PPJV goals presented below. Wildlife in the Iowa PPJV is becoming a secondary objective to water quality for an increasingly concerned public.

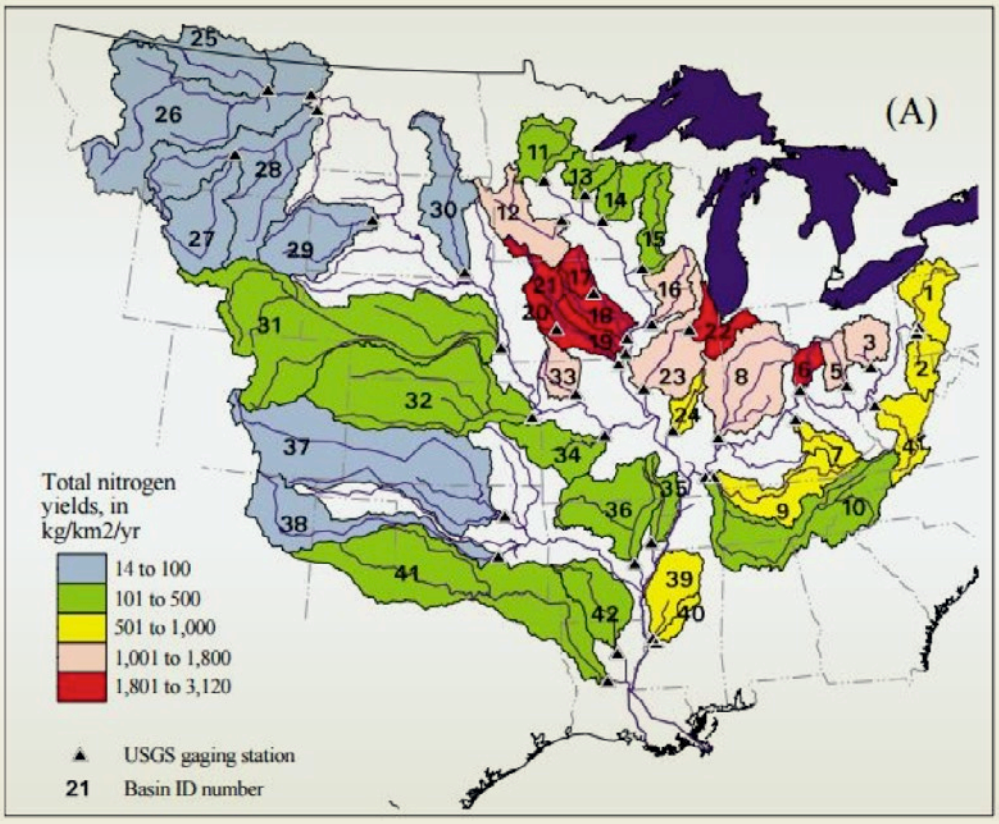

Figure 9. Total N loss in drainage tile outflows are worse in central Iowa, including the Des Moines Lobe than anywhere else in the Mississippi River watershed except the Chicago metropolitan area (Goolsby et al. 1999). Numbers within HUCs refer to 42 small watersheds used for nutrient yield and flux estimation by the authors.

Table 2. Nitrate-N reduction from general conservation practices. Mean effects and minimum and maximum impacts are reported from field trials. More detailed information on practices and outcomes are available in IDALS (2014).

General Practice	Specific Practice	N Reduction Average[1]	Min[2]/Max
Nitrogen Management	Timing	4-7%	-95/25%
	Source	-3-4%	-32/25%
	Application Rate	10%	0/27%
	Cover Crops – Oats/Rye	28-31%	-10-94%
Land Cover Changes	Energy Crops	72%	26-98%
	Land Retirement	85%	67-98%
	Extended Rotation (2 years alfalfa in a 4-5 year rotation)	42%	24-62%
	Grazed Pasture	85%	
Edge of Field	Wetland Restoration	52%	11-92%

[1]Percent nitrate-N reduction in field outflow.

[2]A negative number means an increase in Nitrate-N runoff from field.

Impacts on People, Rural Communities and Economics: The demographics of Iowa are changing. For the first time, Iowa is now classified as an urban state with more people living in or adjacent to cities with populations of at least 50,000 than in rural areas. The outmigration of rural counties that are dependent on agriculture as an economic base is well known across the Midwest and Great Plains (Figure 10). Outmigration in Iowa is most pronounced in counties that are the most agricultural. This phenomenon is due to several factors including increasing farm size and decreasing farm numbers, a perceived lack of cultural and recreational amenities, and a lack of alternative careers or jobs that supplement on-farm income. Recent research indicates that the agricultural economy is becoming more dependent on the local rural economy. The average off-farm share of total household income increased from 50% in 1960 to 80% after 2000 (Gascoigne et al. 2013).

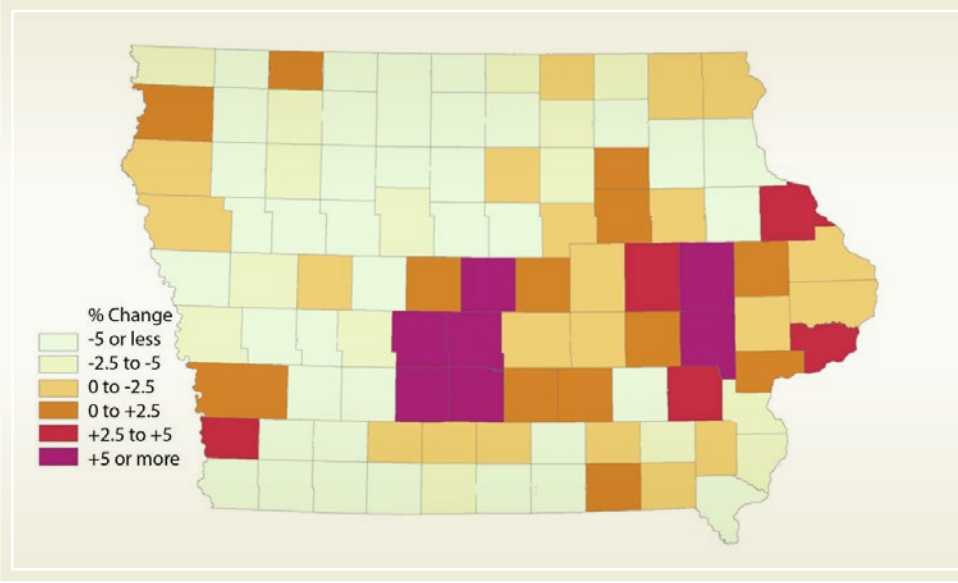

Figure 10. Except the Des Moines Metropolitan area in the extreme south, and Dickinson County (the Iowa "Great Lakes") in the northwest, every Iowa PPR county lost population from 2000 – 2008.

Continued conversion of grasslands and wetlands not only pose environmental threats but also threaten rural economies and their potential development (Center for Rural Affairs 2012). Approximately 22% of Iowans in the PPR are >65 years old, while the national average is just 12%. Despite this fact, declining rural populations make local health care facilities unaffordable in most PPR communities so health care becomes continually less accessable.

Empirical research has shown that jobs follow people as much as or more often than people follow jobs, and as people move to rural communties they create additional demand for goods and services that leads to additional business and employment opportunities. Policy makers must focus on attracting employers to their communities but also on


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attracting and retainings workers. Research shows the importance of natural amenities and outdoor recreation to residents and potenetial migrants. The current generation entering the workforce tends to emphasize these 'non-economic' variables as much or more than income. As McGranham and Sullivan (2005) reported, "Young adults with children (or older adults in retirement) tend to move to rural areas for a high quality of life, including schools, a sense of community, and pleasant landscapes,including opportunities for outdoor recreation."

Although an emphasis on conservation easements is increasing, some land in Iowa will continue to be protected through fee-title purchase. A common complaint is taking land off the tax roles and reducing county income. This is a myth in Iowa. State agencies and NGOs pay property taxes and these are the only entities currently buying land for conservation in Iowa. Generally, conservation lands require fewer county services than private land, so the net effect on county revenues may be positive. During a recent survey of County Commissioners about challenges rural counties face, one was quick to point out the declining road and bridge infrastructure and how it was progressively being overburdened by increased traffic by heavily loaded semi-trailers and large farming machinery that the roads and bridges were not designed to carry or support (Gascoigne et al. 2013).

Research indicates that an increased amount of conservation land, especially when available for recreation is good for wildlife, water quality and rural community vitality.

The Iowa PPR is systemically more unhealthy than it was 30 years ago when the first Farm Bill was passed, despite pumping tens of billions of Federal funds into the region as an agricultural safety net. Although some individuals have benefited immensly, the experiment is done and it is clear that farming subsidies have failed to preserve small farms, rural communities, water quality or wildlife. It is time for a new strategy based on diversified landscapes and sustainable farming practices including an increased emphasis on conservation and healthy landscapes. Iowa's conservation strategies and objectives in the PPJV reflect this philosophy.

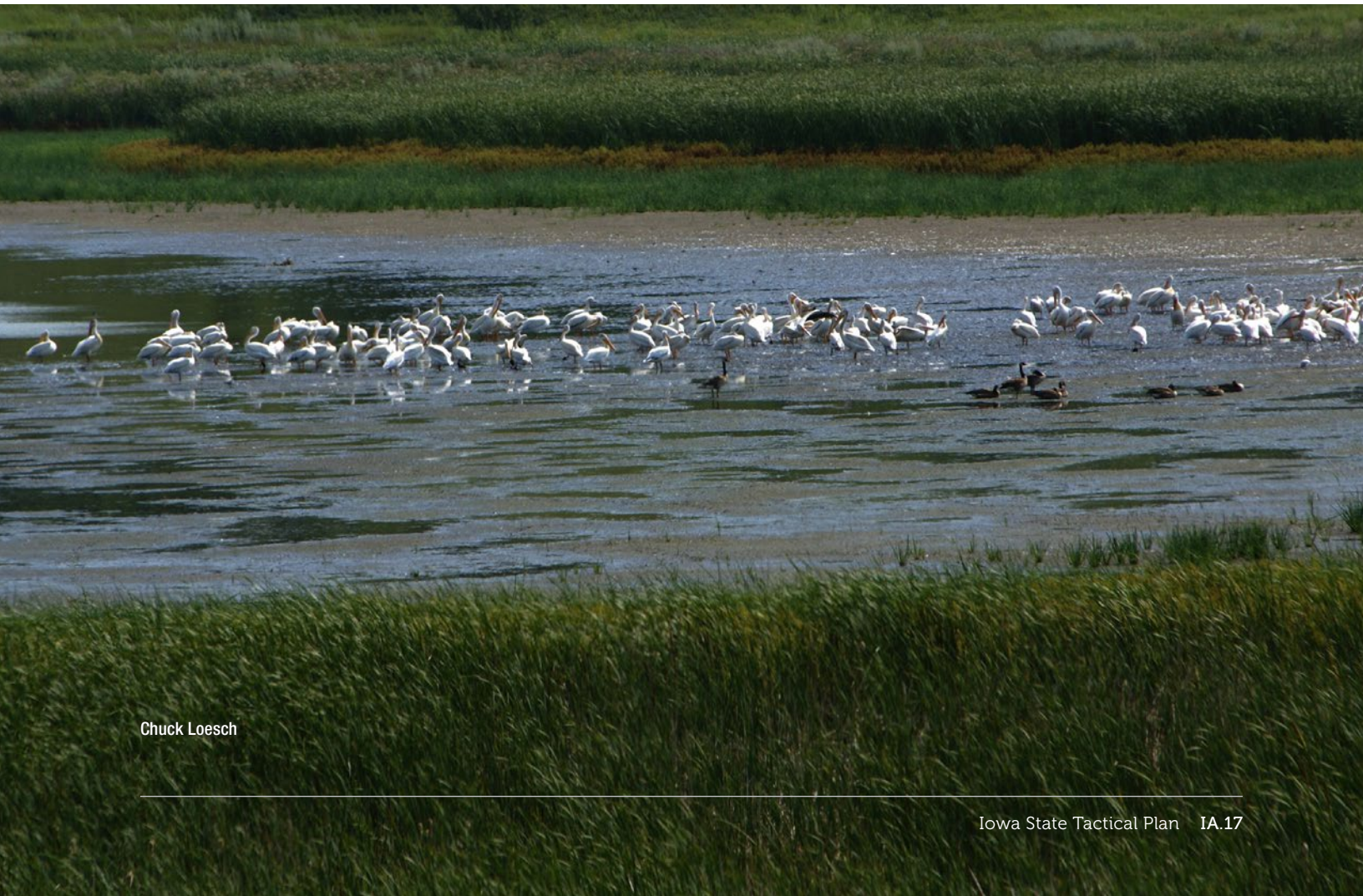
GOALS, OBJECTIVES AND STRATEGIES

The Iowa PPJV working group interprets goals to be statements of long-term intent, versus objectives which are specific means of achieving goals. Obviously, habitats like grassland and wetland with complimentary functions for priority species will be juxtaposed in the following section despite having separate objectives for each.

Iowa PPJV priorities: 1) populations of migratory and resident wildlife, 2) water quality and quantity, 3) native grasslands, savannahs and wetlands, and 4) rural socio-economics.

Iowa PPJV Goals

1. Restore sufficient grassland habitat in appropriate configurations, patch sizes and connectivity to meet Iowa habitat goals for PPR wildlife in kilometers-wide landscapes called focal areas;
2. Restore sufficient wetlands with appropriate diversity and proximity to focal areas to meet Iowa's goals for PPR wildlife;
3. Rehabilitate and restore oak savannah on sites where it historically occurred. Savannah was locally abundant but iconic part of the Iowa PPR, particularly in the northeast PPR. It dictated where native and European settlements developed, and had its own unique guild of wildlife.
4. Create sufficient outdoor recreation opportunities in every PPJV county to meet the demand for non-consumptive and consumptive outdoor recreation including waterfowl hunting quality that stimulates a long-term increase in the number of waterfowl hunters, non-consumptive users and proponents of wetland and grassland restoration and protection;
5. Increase outreach to the public that results in the recruitment of new non-consumptive and consumptive users of habitat, wildlife and native plants; and
6. Institute more efficient and reliable management based on explicit site-scale management objectives, innovative management techniques and monitoring their outcomes, and efficiently evaluating the assumptions that underlie all standard management techniques.



Chuck Loesch

Objectives

Conservation objectives are sometimes assigned a finite time frame to increase accountability. However, when conservation is opportunistic, either in terms of program funding or landowner willingness to engage in conservation, both of which are essentially uncontrollable variables, full accountability is difficult to enforce. Conservation organizations face a dilemma in the modern political climate. On one hand, politicians, government regulators, and granting organizations want greater accountability; on the other, annual funding for conservation programs may have never been less certain from year to year. Out of a desire to increase accountability, authors of the 2017 PPJV Implementation Plan have stated their objectives in terms of what they hope to accomplish in five years.

Goal 1 – Restore sufficient grassland habitat in appropriate configurations, patch sizes and connectivity to meet Iowa habitat goals for PPR wildlife in kilometers-wide landscapes called focal areas.

Objective 1 – Restore and protect 405,000 acres of grassland in Iowa PPJV focal areas.

Sub-objective 1: Restore and protect 395,000 acres of grassland through USDA and FWS easements.

Strategy A – Establish a USFWS National Wildlife Refuge System (NWRS) easement program in Iowa.

Strategy B – Enroll 10,000 grassland acres in USDA ACEP perpetual easements.

Strategy C – Ensure that pollinator habitat is restored in blocky configurations.

Strategy D – Encourage FSA and the Iowa legislative delegation to raise the cap on CRP for pollinators, water quality and rural communities in the 2018 Farm Bill.

Strategy E – Enroll 350,000 acres of grassland with a blocky configuration under CP42 and future general CRP enrollments for pollinators, grassland birds and other wildlife.

Strategy F – Develop new heuristics for delineating Grassland Bird Conservation Areas suited to the southern PPR where oak savannah and wooded riparian corridors were historic features of the natural landscape and were important to native species.

Strategy G – Enhance and provide term protection for 2,000 acres of grassland through the USFWS Partners for Fish and Wildlife Program and the IDNR Private Lands Program.

Strategy H – Implement the Iowa Nutrient Reduction Plan by enrolling 30,000 acres of grassland in the PPJV.

Strategy I – Provide technical assistance for all of the above programs through the IDNR Private Lands Program.

Strategy J – Enroll 5,000 acres of grassland in the CCRP SAFE Program, Iowa Habitat and Access Program (IHAP), Conservation Stewardship Program (CSP) and Environmental Quality Incentive Program (EQIP) (included in Strategy H).

Sub-objective 2: Protect 10,000 acres of existing and restored grassland through fee-title acquisitions in PPJV focal areas using a variety of funding sources including the approved Iowa's Water and Land Legacy initiative (I-WILL) simply awaiting a general sales tax increase, MBCF, and the Northern Tallgrass Prairie Habitat Preservation Initiative funded with the Land and Water Conservation Fund.

Strategy A – Secure I-WILL funding and protect the funding formula that increases resources for wildlife conservation.

Strategy B – Restore MBCF funding to Iowa. Possibly initiate an independent peer review of the MBCF allocation method and develop independent recommendations for changes to submit to the USFWS.

Strategy C – Secure fee-title protection of 10,000 acres of grasslands restored and protected under Sub-objective 1 using state funds, partner funds, MBCF and donations.

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Goal 2 – Restore sufficient wetlands with appropriate diversity and proximity to focal areas to meet Iowa's goals for PPR wildlife.

Objective 2 – Restore and protect 27,000 acres of wetlands associated with priority grasslands in PPJV focal areas.

Sub-objective 1: Restore and protect 25,250 acres of wetland through USDA and FWS easements.

Strategy A – Establish a USFWS National Wildlife Refuge System (NWRS) easement program in Iowa.

Strategy B – Enroll 20,000 wetland acres in USDA ACEP perpetual easements.

Strategy C – Ensure that restoration of wildlife habitat is recognized as one of the most efficient means of enhancing water quality.

Strategy D – Encourage the Iowa legislative delegation to raise the cap on general CRP for water quality and prioritize enrollment in Iowa watersheds that are the greatest contributors of N and P in the country to hypoxia in the Gulf of Mexico.

Strategy E – Restore wetlands in any blocky grasslands restored under CP42 and new general CRP enrollments for pollinators, other wildlife, and water quality.

Strategy F – Protect 250 acres of wetland through the USFWS Partners for Fish and Wildlife Program and the IDNR Private Lands Program.

Strategy G – Implement the Iowa Nutrient Reduction Plan by enrolling 25,000 acres of wetland in the PPJV (utilizing other strategies under this objective).

Strategy H – Provide technical assistance for all of the above programs through the IDNR Private Lands Program.

Strategy I – Enroll 5,000 acres of wetland in the CCRP SAFE Program, Iowa Habitat and Access Program (IHAP), Conservation Stewardship Program (CSP) and Environmental Quality Incentive Program (EQIP).

Sub-objective 2: Protect 10,000 acres of existing and restored wetland through fee-title acquisitions in PPJV focal areas using a variety of state, federal and partner funding sources.

Strategy A – Secure I-WILL funding and protect the funding formula that increases resources for wildlife conservation.

Strategy B – Restore MBCF funding to Iowa. Continue to review and revise the MBCF allocation methods.

Strategy C – Secure fee-title protection of 10,000 acres of wetlands restored and protected under Sub-objective 1 using state funds, partner funds, MBCF and donations.

Goal 3 – Rehabilitate and restore oak savannah on sites where it historically occurred in PPJV focal areas.

Objective 3 – Enhance, restore and protect 20% of bur oak savannah on historic savannah sites in the PPJV.

Sub-objective 1: Enhance 15% of oak savannah on public lands in the PPJV.

Strategy A – Identify candidate sites for savannah restoration based on the historic presence of oak savannah.

Strategy B – Secure I-WILL to increase funding for management of IDNR fee-title owned tracts.

Strategy C – Develop savannah restoration and enhancement techniques consisting of cutting large invasive trees, burning, grazing, and reseeding, and combinations of these techniques to restore the oak canopy and grassland understory at sites where savannah was a major feature of the environment.

Sub-Objective 2: Enhance 5% of existing oak stands on private lands and develop management plans to maintain and protect them in PPJV focal areas.

Strategy A – Secure I-WILL to increase funding for management and technical assistance by IDNR Private Lands staff.

Strategy B – Develop savannah restoration and enhancement techniques consisting of cutting large invasive trees, burning, grazing, and reseeding, and combinations of these techniques to restore the oak canopy and grassland understory at sites where savannah was a major feature of the environment.

Strategy C – The USFWS Partners for Fish and Wildlife Program will provide technical assistance and cost share to enhance 100 acres of existing oak stands on private lands and develop management plans to maintain and protect them.

Chuck Loesch

Goal 4 – Create sufficient outdoor recreation opportunities in every PPJV county to meet the demand for non-consumptive and consumptive outdoor recreation including waterfowl hunting quality that stimulates a long-term increase in the number of waterfowl hunters, non-consumptive users and proponents of wetland and grassland restoration and protection.

Objective 4 – Restore and protect 40,500 acres of wetland and grassland with public access for hunting and non-consumptive wildlife recreation.

Sub-Objective 1: Increase the number of sites with public access for waterfowl hunting, other hunting, and non-consumptive wildlife recreation by 36,500 acres in the PPJV.

Strategy A – Increase the number of Iowa Habitat and Access Program (IHAP) sites with waterfowl and upland hunting habitat by 100% over 2015 enrollments.

Strategy B – Develop a Conservation Reserve Enhancement Program (CREP) for wetlands and grasslands, modeled after the IHAP, with terms that are acceptable to landowners and attractive to state legislators. Enroll 25,000 acres of term leases for conservation and public access in the PPJV.

Strategy C – Acquire 5,000 acres of new Wildlife Management Areas (WMA) in the PPJV.

Strategy D – Acquire 1,500 acres of new Waterfowl Productions Areas (WPA) within the PPJV.

Sub-Objective 2: Increase the abundance of migrating waterfowl habitat in Iowa.

Strategy A – Create complexes of waterfowl migration habitat by acquiring closely juxtaposed WMAs and other habitat within and outside the PPJV.

Strategy B – Increase the number of shallow lake/large marsh restorations by 50% (roughly 4,000 acres).

Strategy C – Evaluate the feasibility and desirability of more intensive management by creating shallow marsh management units/aggregates of cells and managing them using moist soil management or planting waterfowl-attractive agricultural crops.

Strategy D – Increase the early and regular season waterfowl bag by 20% and 10%, respectively, adjusted for daily bag limit and season length.

Strategy E – Evaluate the value and alternative means of creating refuging habitat in Iowa. Implement a strategy of creating refuging habitat if deemed valuable and practical.

Strategy F – Institute an annual index of the number of ducks weekly/bi-weekly at a subset of major migration staging areas.

Goal 5 – Increase outreach to the public that results in the recruitment of new non-consumptive and consumptive users of habitat, wildlife and native plants.

Objective 5 – Sustain the 20-year average number of duck hunters, adjusted for mid-continent duck populations if appropriate, at 30,000/year

Sub-Objective 1: Develop web-based and social media tools on the status of duck populations and the status of waterfowl and wetland/grassland bird habitat in the state seasonally or more frequently.

Sub-Objective 2: Recruit young duck hunters (<30 years-old) at a rate equal to average permanent attrition.

Strategy A – Maintain the youth waterfowl season and expand it to include adults that have never hunted waterfowl.

Strategy B – Develop state-sponsored training and waterfowl hunting mentoring program for participants in Strategy A.

Strategy C – Reduce the age for general hunting privileges from 12 to 10 with adult supervision.

Goal 6 – Institute more efficient and reliable management based on explicit site-scale management objectives, innovative management techniques and monitoring their outcomes, and efficiently evaluating the assumptions that underlie all standard management techniques.

Objective 6 – Implement elements of strategic habitat conservation and adaptive management to habitat management practices.

Sub-Objective 1: Institutionalize monitoring by management staff to assess outcomes relative to outcomes

Strategy A – Begin the process of mandating standardized monitoring of management outcomes (e.g., shallow lake monitoring).

Strategy B – Encourage managers to experiment with alternative management approaches and evaluate outcomes relative to conventional approaches. Research staff can assist with management and monitoring design (i.e., active adaptive management).

Sub-Objective 2: Institutionalize recognition of management assumptions and the reliability of these assumptions.

Strategy A – Focus cooperative research with state universities on mission-critical, assumption-based research.

Conservation Strategies

Iowa's PPJV Focal Areas: Focal areas are the discrete landscapes where all habitat conservation occurs in the Iowa PPJV (Figure 11). The intent for focal areas is two-fold: 1) restore sufficient habitat so that landscape connectivity (i.e., integrity) for at least all vertebrate species and at least more mobile invertebrates is insured; and 2) restore enough habitat with State, Federal and NGO funds that private individuals begin acquiring land and restoring habitat for themselves.

There are presently 112 PPJV focal areas in Iowa totaling 897,455 acres or 11.5% of the Iowa PPR (Figure 12). All MBCF, PPJV and NAWCA funding submitted through the PPJV is spent in PPJV focal areas. PPJV focal areas were originally delineated

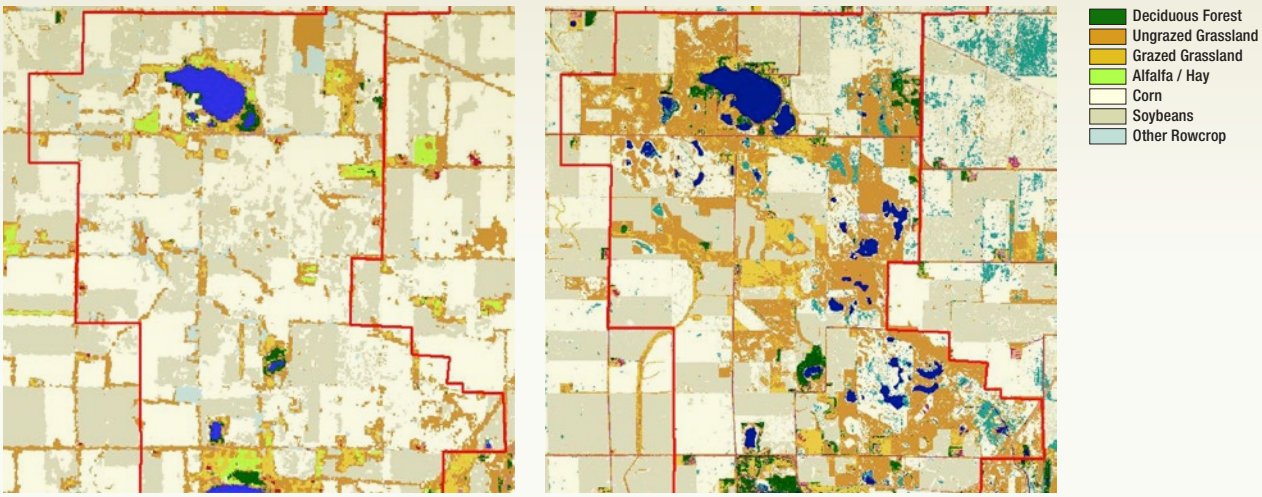


Figure 11. A portion of the Lower Morris Focal Area, left – 1985, and right – 2009.

based on expert local manager opinion on wetland and grassland restoration potential and opportunity. Later these focal areas were altered slightly by spatial analysis of terrain relief, soils, proximity to conservation lands, existing grassland and wetland density, and other factors.

Iowa has always been heavily dependent on USDA programs to restore habitat within PPJV focal areas. Programs like general CRP, certain continuous CRP practices, and WRP have almost always been oversubscribed. The Iowa DNR has been able to purchase a number of these tracts in fee-title for a discounted residual value (on average roughly $1,150/ac statewide). The relationship with USDA has been so important that IDNR Private Lands Biologists and related Pheasants Forever Farm Bill Biologists are all based in NRCS offices across the state.

As new programs are established (e.g., water quality practices or pollinator habitat of which Iowa has 50% of the nation's currently enrolled total) that may be implemented in ways that are consistent with PPJV goals for migratory birds, new focal areas may be established. For example, since 2013, the IDNR has developed partnerships and submitted fully matched water quality funding proposals for grassland and wetland restoration and protection in the PPJV totaling $32 million to the NRCS Regional Conservation Partnership Program (RCPP) and the USFWS Healthy Gulf of Mexico Watershed program.

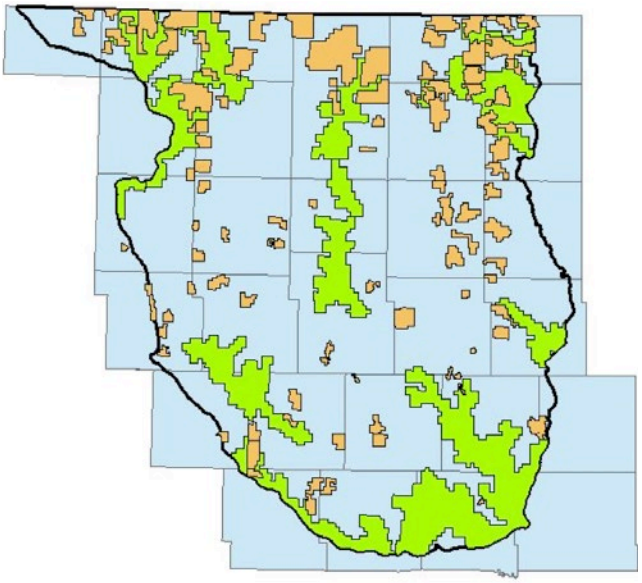


Figure 12. The PPJV in Iowa (light blue), the Des Moines Lobe (heavy black line), PPJV focal areas (tan) and Northern Tallgrass Prairie HPA priority areas (green).

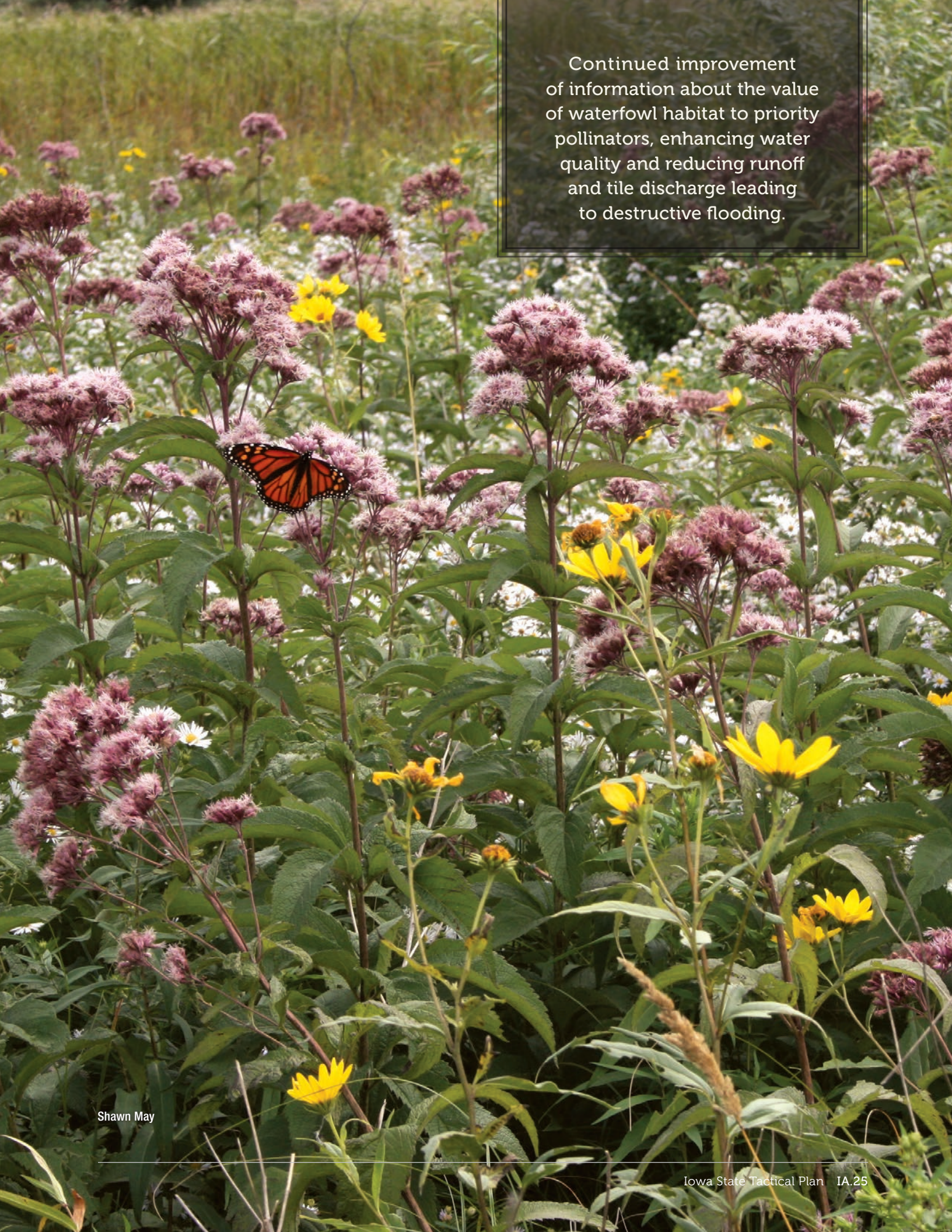
Neal & MJ Mishler

FUNDING NEEDS

1. Assess and address any existing funding deficiencies in the IDNR Fish and Wildlife Trust Fund to avoid staff reductions and increase funding for partnership-based management projects and critical research needs.
2. Adjust the Iowa sales tax, and preserve I-WILL funding for fish and wildlife conservation as originally intended.
3. Evaluate interest in establishing an Iowa Wetland Conservation Foundation to facilitate funding for wetland restoration, protection and management, independent of state or federal agencies, but functioning to support their objectives and strategies in Iowa.
4. Evaluate the value of restoring MBCF to Iowa using peer-reviewed methods that reflect USFWS Science Policy.
5. Increase USDA conservation funding in the 2018 Farm Bill, including the cap on CRP and funding for WRE and ALE under ACEP, and insure that Iowa is a national conservation priority area for pollinators, migratory birds, water quality and quantity and preservation of soil capability. Scoring for program enrollment should include variables for water quality and quantity, loss of soil quality, pollinators, migratory birds, T&E species, SGCNs and extirpated species that could be restored to the state.
6. Farm Bill programs that currently require cost sharing should include the potential to exempt the cost share requirement in national conservation priority areas like Iowa, e.g., the RCPP program should require no partner contributions in Iowa because of the importance of conservation in the state to national conservation concerns like water quality.
7. Establish a CREP for Iowa that includes farming-compatible habitat restoration that incorporates provisions for public access for hunting and non-consumptive wildlife recreation (much like the existing IHAP Program).

FUTURE INFORMATION NEEDS

1. Review the reliability of the Four-square-mile Breeding Waterfowl Survey (FSMS) sample of wetlands in Iowa and annual duck BPOP estimates from the USGS population models for ducks and evaluate an independent sample and regression relating duck pairs to natural wetlands by ownership that better answer questions about the effectiveness of management approaches in Iowa.
2. Insure that a proper cohort of wetlands is being sampled in Iowa for the inferences being made from FSMS estimates in the PPJV administrative area.
3. Work with other states and USFWS to update parameter estimates in recruitment models in different landscape types and different parts of the PPJV administrative area.
4. Weekly information on spring and fall migrating duck abundance, and a monitoring protocol and heuristics that relate duck use to the characteristics and condition of migration habitat. Information on average duck turnover rates (by species) and factors that stimulate migration into and out of the state will be important.
5. Develop a strategy for habitat restoration for migrating waterfowl in Iowa that has the potential to restore historic migration corridors and potentially waterfowl fitness during migration.
6. Continued improvement of information about the value of waterfowl habitat to priority pollinators, enhancing water quality and reducing runoff and tile discharge leading to destructive flooding.
7. Additional research on the effects of habitat restoration on rural social and economic health (rural renewal), job creation, county tax bases, out-migration rates versus population retention and immigration, and perceived quality of life.
8. More effective means of communicating the value of habitat to the above factors, and means of stimulating public dialog on the future ecological state of Iowa.



Continued improvement of information about the value of waterfowl habitat to priority pollinators, enhancing water quality and reducing runoff and tile discharge leading to destructive flooding.

Shawn May

POLICY AND LEGISLATION IN IOWA AND THE PPJV[1]

Policy priorities for PPJV partners in Iowa during the next five years primarily reflect the dearth of funding in Iowa for conservation or environmental quality issues. These issues include, but in the future are unlikely to be limited to:

1. Fixing the funding deficiency in the Iowa DNR Fish and Wildlife Trust Fund to preserve and increase the capability of the Iowa DNR to be the lead conservation agency in Iowa;
2. Secure I-WILL funding for wildlife conservation as originally envisioned by its sponsors in the state legislature;
3. Peer review the MBCF allocation method in the PPR and apply recommendations to the fund allocation method;
4. Recognize Iowa as a one of the most critical national conservation priority areas for USDA and other Federal agencies charged with preserving environmental health because of its significance to monarch butterflies, native bees and other pollinators, deteriorating rural economies and communities, and critically poor water quality as the leading contributor to nitrogen and phosphorous to hypoxia in the Gulf of Mexico;

CRP represents one the most successful conservation programs ever implemented in the United States. Migratory birds and resident wildlife have thrived in response to CRP. This includes the beginning of a resurgence of some species thought to be extirpated or nearly so in the state like spotted skunks and white-tailed jackrabbits. Furthermore, CRP will undoubtedly play a pre-eminent role in the restoration of populations of monarchs and other pollinators in states with little other grassland and with increasingly hostile cropland for these essential species.

5. Outcomes of acknowledging Iowa as a critical national conservation priority area should include:
   A. Raising national CRP acreage cap and allocating the additional acres among these national conservation priority areas where multiple environmental issues may be addressed;
   B. Introduce CRP Policy Changes, including:
      1) Use CRP to encourage greater economic stability through agricultural diversification such as a resurgence of cattle production in the Midwest. For example:
         a) Develop better means to target CRP in Iowa;
         b) Allow producers to graze appropriate CRP grassland and wetland practices to enhance value to wildlife and the producer. A producer would work with NRCS to set a stocking rate that will achieve wildlife management goals.
         c) Allow producers to keep the residue from the management practice of clipping or mowing while taking a 25% reduction in that years payment. On fields 40 acres (16 ha) or larger the activity would be limited to 50% of the field over a 2-year period.
      2) The interseeding of forbs should be a cost share option for established seedings and a requirement for new contracts;
      3) When light disking or harrowing is the selected practice, allow producer to clip or mow the grass without taking the 25% payment reduction;
         - » Light disking or harrowing does little good when there is thick residue covering the soil;
         - » Allows the producer to keep the hay while performing 2 management practices;
         - » Light disking or harrowing is an excellent way to encourage early successional plant growth like milkweed; and
         - » Allow interseeding of forbs as a cost share companion practice to further encourage early successional habitat.

1 *The views and positions of the Prairie Pothole Joint Venture may not represent the official policy of the individual organizations and agencies.*

4) Provide the option to do midterm management practices on CRP wetland acres;
    - » Clipping, mowing, or grazing would benefit most wetlands.
    - » This will provide open water areas for waterfowl in the spring and early successional habitat for pheasants when wetlands do not contain water;
6. Maintain the link between Conservation Compliance and Crop Insurance Premium Subsidies;
7. Create an enforcement department of USDA for Swampbuster and Sodsaver;
8. Increase funding for ACEP, especially WRE;
9. Increase funding and the acreage cap for CP42 for pollinators;
10. Change Iowa Property tax to be assessed based on actual use instead of highest & best use, or recognize habitat for wildlife and soil and water health as a highest and best use;
11. Require perennial vegetation buffers around lakes, river, streams, and wetlands to enhance water quality;
12. New programing via NRCS/FSA to conserve small "at risk" wetlands;
13. New mechanisms via NRCS/FSA that establish or retain nesting cover (both planted cover as well as cover crops which may aid ground nesting birds);
14. Restore/maintain LWCF funding; and
15. Maintain/increase NAWCA funding.

Neal & MJ Mishler

EVALUATION AND MONITORING

A basic principle of conservation is that our understanding of ecological systems and management consequences is never perfect. The Iowa PPJV partnership endorses the strategic habitat conservation approach to conservation planning and evaluation. On one hand, the overall process is a systematic means of expressing what is believed about how populations relate to their habitats and management at local and landscape-scales. However, science is primarily a means of learning. The scientific method is founded on articulating assumptions in the planning process and then evaluating the assumptions through monitoring and research. Without monitoring and research about explicit management assumptions, conservation is not an iterative process by which managers learn and increase their effectiveness. For example, several competing hypotheses about the relationship between nesting success and percent grassland in the landscape are illustrated in Figure 13.

Each leads to a different strategy for grassland conservation. If HAa is correct, it does not matter where you restore or protect grassland, the effect on nesting success will be the same. If HAb is the more accurate, then protecting non-fragmented landscapes is the best strategy. If HAc is the most accurate, then concentrating grassland conservation in intensively farmed landscapes until 30% of the landscape is conserved and then moving elsewhere yields the greatest benefit in increased regional nesting success. A truly robust conservation strategy includes all 3 strategies and uses monitoring and evaluation to weight each competing hypothesis until one stands out clearly from the others. This is especially true in the different landscape types found in the PPJV. For example, Reynolds et al. (2001) found support for HAa in the Dakotas but studies in Minnesota and Iowa and in the Prairie Habitat Joint Venture did not support this hypothesis so considerable uncertainty remains.

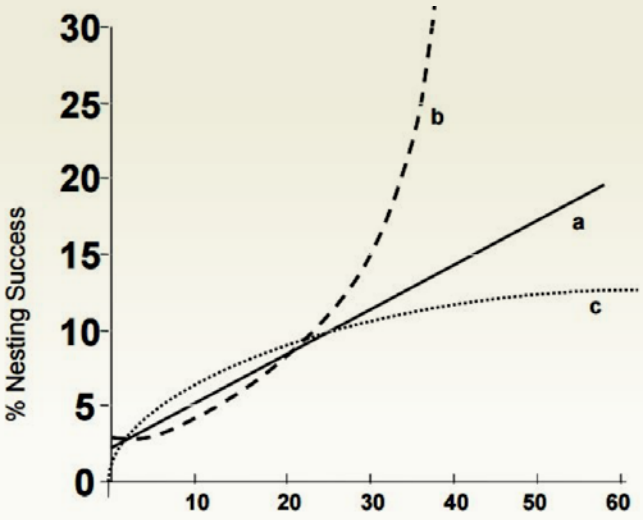


Figure 13. Graphical illustration of competing hypotheses about the relationship of percent grass in the landscape and duck nesting success.

- HO: Nesting success and percent grassland are Independent
- HA_a: Nesting success and percent grassland are positively and linearly related;
- HA_b: Nesting success and percent grassland are positively related but the relationship is exponential;
- HA_c: Nesting success and percent grassland are positively related but the relationship is non-linear and reaches an asymptote at about 30% grassland in the landscape.

In the absence of perfect information about how a system functions, we are forced to make assumptions like these; however, preserving the PPJV's legacy as a pre-eminent science based joint venture requires that we step back and examine the fundamental assumptions that underwrite our collective conservation strategies and make a concerted long term effort to learn about them. Some of the assumptions adopted in the Iowa Tactical Plan include:

- That increased waterfowl habitat will lead to benefits in populations of other species – a more rigorous assessment of this assumption is warranted, particularly for area and landscape sensitive species in intensively farmed landscapes. This includes migratory and resident birds, small mammals, and especially less mobile species like many amphibians and pollinators;
- That increased duck populations still lead to increased duck stamp sales;
- That increased waterfowl hunting access leads to increased duck stamp sales and that this may be more important than continental duck populations to duck stamp sales;
- Ascertain the relative importance to duck hunter satisfaction of hunting frequency versus hunting quality (and affirm the elements of quality hunting in Iowa);
- Determine configurations of wetlands and grasslands that most effectively reduce nitrogen and phosphorous and are compatible with current beliefs about waterfowl habitat;
- That waterfowl habitat restoration produces duck densities (of the same species) that are comparable to undrained wetlands or higher average annual densities because of more reliable precipitation and more fertile soils;
- Restoration in focal areas leads to higher duck densities than restorations outside of focal areas;
- That spatial scale of focal areas in Iowa is appropriate to achieve maximum average annual duck densities;
- That duck densities on wetlands outside of but adjacent to focal areas are higher than densities away from focal areas;
- That private sector conservation is greater in focal areas than outside focal areas;
- That rural communities near focal areas have higher development metrics (employment, household income, property values, lower mean age, etc.) than other rural communities in the Iowa PPR.
- That all of the above assumptions will remain the same under climate change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Other information needs include:

- Much better and more extensive information on migrating waterfowl, including density in the PPR in spring on wetlands and shallow lakes, turnover rates, and the features of wetlands and shallow lakes that encourage high migrant duck densities;
- The role of refuging habitat for ducks is probably more important in wetland depleted landscapes like Iowa than in states like South Dakota where the density of remaining wetlands is great enough that some refuging habitat inevitably exist;
- The characteristics of refuging areas that receive the greatest duck use;
- The "best" configuration for refuging habitat across landscapes and the PPR to maximize fall duck use and increase hunter harvest to objective levels;

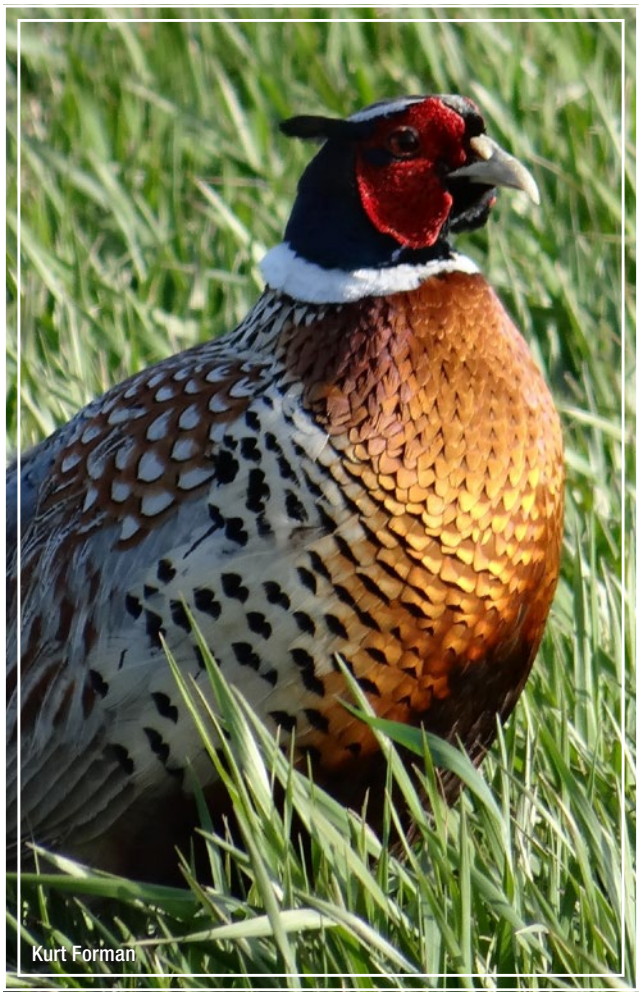
Evaluating these assumptions may require that we change some of our historic monitoring with monitoring better suited to address these strategic questions. For example, the FSMS may be a very effective means of detecting changes in migration and breeding phenology associated with climate change, but this is not what the survey was designed for, and it may not be the most efficient design. In short, our science, conservation strategies, monitoring and research, need to be continually scrutinized by the full PPJV Technical Committee to realize the greatest benefits of the PPJV partnership. Such a coalition for learning and developing conservation strategies that includes all partners, not just research collaborators, is one of the great added values of a joint venture.

EDUCATION AND OUTREACH

Greater emphasis must be placed on up-to-date social messaging about the value of habitat and healthy ecosystems to personal health and fiscal wellbeing and social justice issues using proven marketing techniques and professional marketing consultants rather than biologists to spread the message. The elements of a social marketing campaign must focus on issues of immediate concern to the public that evoke an emotional response rather than focusing on abstract facts. These elements would include but not be limited to:

- **Human health**
  - Clean water
  - Flood damage
  - Social justice issues
  - Rural economics
  - Farm economics
  - Impacts on pollinators
  - Impacts on other wildlife

- **Personal fiscal wellbeing**
  - The Farm Bill
  - Direct agricultural subsidies
  - Hidden agricultural subsidies
  - Impacts to emerging nations and emerging farming economies
  - Cost to taxpayers
  - Cost to family farms
  - Impacts on rural communities


Kurt Forman

Since government agencies are often either legally constrained or self-limited in what they may say to the public for fear of political repercussions or being perceived to be lobbying, partners that are not constrained by these factors will be essential in marketing these messages. Establishing an Iowa PPJV Action Group should be discussed by state partners. Functions of an action group could include:

- Coordinate NAWCA grant proposals and deliberate on match funds and related partner activities.
- Coordinate other grant proposals (RCPP, Pollinator initiatives, Gulf Hypoxia Initiative)
- Provide a forum for natural resource conservation professionals to socialize and build the partnership.
- Provide a forum for professional education and outreach activities (e.g., invited speakers), Compile partnership needs (information, funding, policy) to inform the greater JV.

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APPENDIX A:

FEDERAL (F) AND STATE (S) THREATENED (T) AND ENDANGERED (E) SPECIES, AND GRASSLAND, SAVANNAH, AND WETLAND MIGRATORY BIRD SPECIES OF GREATEST CONSERVATION NEED (SGCN) IN THE IOWA PPR.

Species	Status	Listing Entity
Higgins eye mussel	E	F
Sheepnose mussel	E	F
Topeka shiner	E	F
Dakota skipper	T	F=T/S=E
Poweshiek skipperling	E	F=E/S=T
Spectaclecase (mussel)	E	F
Prairie bush-clover	T	F
Mead's milkweed	T	F
Eastern prairie fringed orchid	T	F
Western prairie fringed orchid	T	F
Bald eagle	SpC[1]	S
Northern harrier	E	S
Red-shouldered hawk	E	S
King rail	E	S
Black tern	SpC	S
Forster's tern	SpC	S
Barn Owl	E	S
Short-eared owl	E	S
Henslow's sparrow	T	S
Whooping Crane (NB)[2,3]	E	F
Red knot (NB)	T	F
Sprague's pipit	Candidate	F
Common mudpuppy	T	S
White-tailed jackrabbit	SpC	S
Franklin's ground squirrel	SpC	S
Plains pocket gopher	SpC	S
Plains pocket mouse	SpC	S
Spotted skunk	E	S
Blanding's turtle	T	S
Western (Plains) hog-nosed snake	E	S
Smooth green snake	SpC	S
Gopher (bull) snake	SpC	S

Species	Status	Listing Entity
State listed butterflies		
Olympia marble	SpC	S
Purplish Copper	SpC	S
Acadian hairstreak	SpC	S
Edward's hairstreak	SpC	S
Striped hairstreak	SpC	S
Silvery blue	T	S
Regal fritillary	SpC	S
Common ringlet	E	S
Dreamy duskywing	SpC	S
Ottoe skipper	SpC	S
Argos skipper	SpC	S
Mulberry wing	T	S
Broad-winged skipper	SpC	S
Dion skipper	SpC	S
Two-spotted skipper	SpC	S
Dusted skipper	SpC	S
Pepper and salt skipper	SpC	S

Species	Status	Listing Entity
Migratory grassland, savannah and wetland bird Species of Greatest Conservation Need		
Breeding not listed above		
Trumpeter swan	SGCN	S
American wigeon	SGCN	S
Blue-winged teal	SGCN	S
Northern pintail	SGCN	S
Canvasback	SGCN	S
Redhead	SGCN	S
Ring-necked duck	SGCN	S
Lesser scaup	SGCN	S
Sandhill crane (sparse breeder) [3]		
Red-necked grebe	SGCN	S
Eared grebe	SGCN	S
American white pelican	SGCN	S
American bittern	SGCN	S
Black-crowned night heron	SGCN	S
White-faced ibis	SGCN	S
Common gallinule	SGCN	S
Upland sandpiper	SGCN	S
Wilson's snipe	SGCN	S
Wilson's phalarope	SGCN	S
Franklin's gull	SGCN	S
Yellow-billed cuckoo	SGCN	S
Common nighthawk	SGCN	S
Eastern whip-poor-will	SGCN	S
Belted kingfisher	SGCN	S
Northern flicker	SGCN	S
American kestrel	SGCN	S
Eastern kingbird	SGCN	S
Loggerhead shrike	SGCN	S
Bank swallow	SGCN	S
Sedge wren	SGCN	S
Brown thrasher	SGCN	S
Field sparrow	SGCN	S
Grasshopper sparrow	SGCN	S
Dickcissel	SGCN	S
Bobolink	SGCN	S
Eastern meadowlark	SGCN	S
Western meadowlark	SGCN	S
Baltimore oriole	SGCN	S

Species	Status	Listing Entity
Non-breeding not listed above		
Common loon	SGCN	S
Little blue heron	SGCN	S
Yellow rail[3]	SGCN	S
Black rail	SGCN	S
Black-bellied plover	SGCN	S
American golden plover	SGCN	S
Lesser yellowlegs	SGCN	S
Whimbrel	SGCN	S
Long-billed curlew[3]	SGCN	S
Hudsonian godwit	SGCN	S
Marbled godwit[3]	SGCN	S
Ruddy turnstone	SGCN	S
Sanderling	SGCN	S
Semipalmated sandpiper	SGCN	S
White-rumped sandpiper	SGCN	S
Pectoral sandpiper	SGCN	S
Stilt sandpiper	SGCN	S
Buff-breasted sandpiper	SGCN	S
Short-billed dowitcher	SGCN	S
Long-billed dowitcher	SGCN	S
Caspian tern	SGCN	S
Le Conte's sparrow	SGCN	S
Harris' sparrow	SGCN	S

[1]Species of Special Concern in Iowa

[2]Regularly observed during migration, but no recent breeding has been recorded in Iowa

[3]Probable or known regular historic breeding bird species. Only species of special note listed.

APPENDIX B:

IOWA PPJV PRIORITY SPECIES, PREDICTIVE MODEL TYPES AND SOURCES USED IN THE HABITAT PRIORITIZATION PROCESS.

Priority Bird Species	Model Source	Model Type
Grassland & Savannah		
Grasshopper Sparrow	U of MT	Abundance
Meadowlark	U of MT	Occurrence
Bobolink	U of MT	Abundance
Sedge Wren	U of MT	Abundance
Short-eared Owl (wintering)	HAPET	Occurrence
Northern Harrier	HAPET	Occurrence
Henslow's Sparrow	ISU	In Development
Ring-necked Pheasant	Iowa DNR	Abundance
Barn Owl	ISU	In Development
Black-billed Cuckoo	ISU	In Development
Water & Shorebirds		
Black Tern	SDSU	Occurrence
Upland Sandpiper	HAPET	Occurrence
Least Bittern	ISU	Occurrence
Virginia Rail	ISU	Occurrence
Marbled Godwit	HAPET	Occurrence
Waterfowl		
Mallard	USFWS	Abundance
Blue-winged Teal	USFWS	Abundance
Wood Duck	USFWS	Abundance
Trumpeter Swan		

APPENDIX C:

MONITORING PROGRAMS FOR PRIORITY BIRD SPECIES IN IOWA.

Bird Group	Monitoring Programs	Primary Agency
Waterfowl	Four Square Mile Survey	Iowa DNR
	Revised Survey of Breeding Waterfowl in the PPR	ISU, Iowa DNR
	Statewide Canada Goose Distribution and Breeding Abundance Survey	Iowa DNR
	Shallow Lake Restoration Surveys	Iowa DNR
	Preseason Duck Banding	Iowa DNR
	Goose Banding	Iowa DNR
	Mid-winter Waterfowl Survey	Iowa DNR
	Fall Migration Survey	Iowa DNR
	Spring Migration Survey – In development with MN	
	Trumpeter Swan Distribution and Production Survey	Iowa DNR
	Multi-species Inventory and Monitoring Program	Iowa DNR
Landbirds	North American Breeding Bird Survey	USGS
	Multi-species Inventory and Monitoring Program	Iowa DNR
	Pheasant Surveys – crowing counts and production	Iowa DNR
Shorebirds	Breeding Shorebird Surveys on Shallow Lakes and Drained Wetlands	ISU, Iowa DNR
	North American Breeding Bird Survey	USGS
	Multi-species Inventory and Monitoring Program	Iowa DNR
Waterbirds	Multi-species Inventory and Monitoring Program	Iowa DNR
	Recent and on-going research on Marsh Birds	ISU