

I. Introduction

1. Charting the Future

For nearly 60 years, Union Slough National Wildlife Refuge (Refuge) has provided important resting, nesting, and feeding habitat for thousands of birds during their annual migrations north and south. During years of drought, the Refuge's stable water conditions provide critical habitat for many regional species. A peak of forty-nine thousand ducks and over 240 different species of birds have been recorded on Union Slough Refuge since its inception. The Refuge, its wildlife, fish, and wildlands attract more than 8,000 visitors each year.



The bobolink is one of the 240 different bird species that utilize the Refuge.

The Refuge is located in Kossuth County, Iowa, approximately 55 miles north of Fort Dodge, Iowa; 160 miles southwest of Minneapolis, Minnesota; and 130 miles north of Des Moines, Iowa. The Refuge has long been an important component of

the Upper Mississippi River/Tallgrass Prairie Ecosystem (Figure 1).

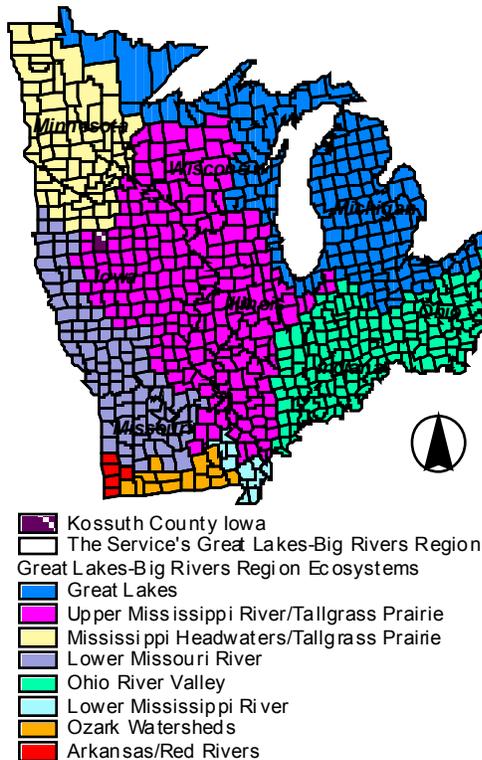


Figure 1 - Regional Orientation of the Refuge and Ecosystems within the Services Great Lakes-Big Rivers Region

The U.S. Fish and Wildlife Service and others are concerned for the Refuge's long-term environmental health and wildlife productivity. Recent studies have documented a declining status of numerous grassland and wetland dependent wildlife populations, while others have demonstrated how habitat loss and alteration are common causal factors in many of these declines. Since the early 1950's, grassland nesting duck production has been unacceptably low, and water quality in Refuge wetlands has deteriorated due to sedimentation and eutrophication due to runoff. More and more it is recognized that the long-term biological health of the Refuge is highly dependent on the ecological health of the Refuge watershed.

In response to these concerns, the decision was made to develop a Comprehensive Management Plan (Plan) for the Refuge. The Plan articulates Service management direction (goals, objectives, strategies) for a 15 year period that would (1) intensify and

concentrate federal, state, local, and private habitat restoration and preservation mechanisms in the Union Slough Refuge and portions of its watershed, (2) improve the quality of water entering the Refuge, and (3) provide the public with additional high quality wildlife-dependent environmental education and recreation opportunities at the Refuge.

The purpose of the Plan is to:

- L **provide a clear statement of the desired future conditions when Refuge purposes and goals are accomplished.**
- L **provide Refuge neighbors and visitors with a clear understanding of the reasons for management actions on and around the Refuge.**
- L **ensure that management of the Refuge reflects policies and goals of the National Wildlife Refuge System.**
- L **ensure that Refuge management is consistent with Federal, State, and County plans.**
- L **provide long-term continuity in Refuge management.**
- L **provide a basis for operation, maintenance and capitol improvement budget requests.**

Implementation of the Plan would rely on partnerships formed with landowners in the watershed, volunteers and interested citizens, farm and conservation organizations, and with appropriate government agencies. Cooperating landowners within the Refuge watershed would be offered incentives and/or compensated through cost-sharing agreements for applying conservation and environmental farming practices and for creating, maintaining, or enhancing habitat for wildlife.

Nineteen projects, ranging from improvements to the auto tour route to upgrading Refuge signs and brochures, have been identified. The total estimated cost to the Service is \$11.2 million dollars. Over the next 15 years, the Service would facilitate the restoration and preservation of 8,325 acres within the Refuge watershed (Figure 6). Of this acreage, the Service would purchase approximately 3,750 acres from willing sellers. The Service would purchase fee-title interest in lands only if lesser property interests are not available, appropriate, or effective (easements, leases, cooperative agreements, etc). Funding for Service land purchases would be the Migratory Bird Conservation Fund (proceeds from the sale of federal duck stamps) using the authority of the Migratory Bird Conservation Act.

The Plan supports the National Wetlands Priority Conservation Plan, the North American Waterfowl Management Plan - U.S. Prairie Pothole Joint Venture and the Iowa Prairie Pothole Joint Venture Implementation Plan, the Service's Regional Wetlands Concept Plan, the Service's Ecosystem Plan for the Upper Mississippi River/Tallgrass Prairie ecosystem, and strategic planning efforts of Kossuth County, which identifies preservation and protection of land and water resources and enhancement of the county's tourism potential as important public needs.

2. The U.S. Fish and Wildlife Service

The mission of the U.S. Fish and Wildlife Service is to provide Federal leadership to conserve, protect and enhance fish and wildlife and their habitat for the American people. The Service is the primary

Federal agency responsible for conserving, protecting, and enhancing America's fish and wildlife resources and their habitats. It shares this responsibility with other Federal, state, tribal, local, and private entities. However, the Service has specific trustee responsibility for migratory birds, endangered species, interjurisdictional fish, certain marine mammals, and lands and waters administered for the management and protection of these and other resources.

3. The National Wildlife Refuge System

The mission of the National Wildlife Refuge System is to preserve a national network of lands and waters for the conservation and management of fish, wildlife, and plant resources of the United States for the benefit of present and future generations. The broad goals of the National Wildlife Refuge System are to:

- L preserve, restore, and enhance in their natural ecosystems (when practical) all species of animals and plants that are endangered or threatened with becoming endangered;
- L perpetuate the migratory bird resource;
- L preserve a natural diversity and abundance of fauna and flora on refuge lands; and
- L provide an understanding and appreciation of fish and wildlife ecology and man's role in his environment and to provide refuge visitors with high quality, safe, wholesome and enjoyable recreational experiences oriented toward wildlife to the extent these activities are compatible with the purposes for which the refuge was established.

New Guidance for National Wildlife Refuges (Executive Order 12996)

On March 25, 1996, President Clinton released new guidance on the management and general use of the National Wildlife Refuge System. The Order affirmed four guiding principles which have been integrated into the Comprehensive Plan for Union Slough. They include:

- (a) **Habitat.** Fish and Wildlife will not prosper without high quality habitat, and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitat within refuges.
- (b) **Public Use.** The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation.
- (c) **Partnerships.** America's sportsmen and women were the first partners who insisted on protecting valuable wildlife habitat with wildlife refuges. Conservation partnerships with other Federal agencies, State agencies, Tribes, organization, industry, and the general public can make significant contributions to the growth and management of the Refuge System.
- (d) **Public Involvement.** The public should be given full and open opportunity to participate in decisions regarding the acquisition and management of our National Wildlife Refuges.

4. Union Slough National Wildlife Refuge

A. Refuge Purpose

Union Slough National Wildlife Refuge was established in 1937 by Franklin D. Roosevelt (Executive Order 7976, dated September 14, 1938) primarily to assist with the production and management of waterfowl in the Mississippi Flyway. The purpose of the Refuge is *"a refuge and breeding ground for migratory birds and other wildlife..."*. The mission of the Refuge is to preserve, restore, and manage lands and waters sufficient in size and character to meet the needs of migratory birds and other wildlife for the continued benefit of the American people.

B. Refuge Physiography, Hydrology, and Biology

Union Slough is a pre-glacial riverbed that forms a connection or "union" between the watersheds of the Blue Earth River and the East Fork of the Des Moines River. It is located on the eastern edge of

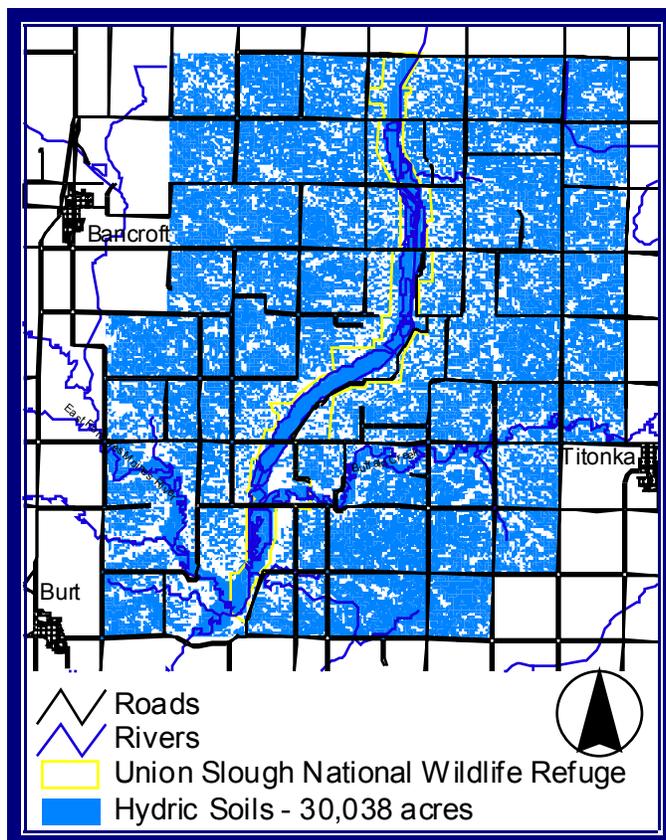


Figure 3 - Hydric soils in and around the Refuge (based on soil map analysis of a 40,000 acre study area).

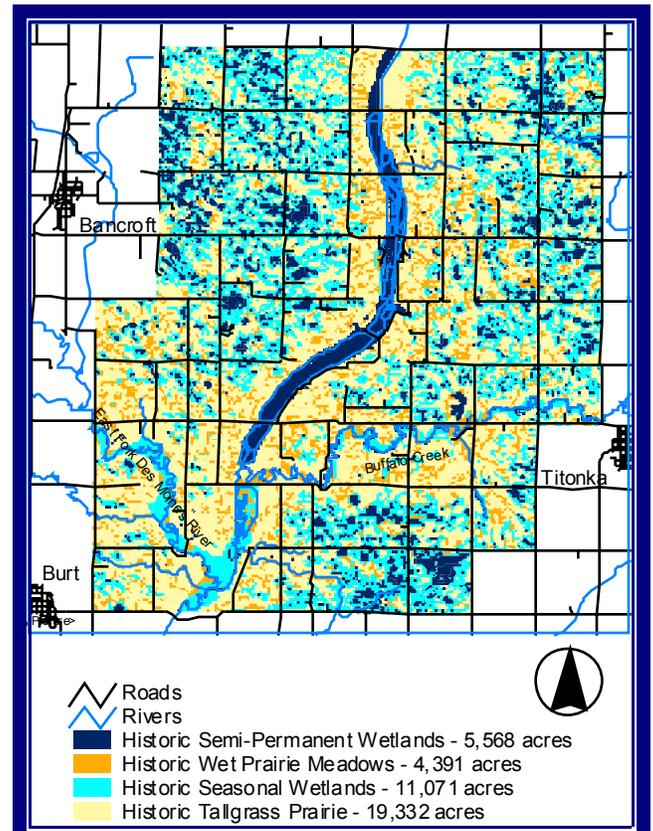


Figure 2 - Historic wetlands, meadows, and tallgrass prairie in and around the Refuge (based on soil map analysis and interpretation of a 40,000 acre area).

the Northern Great Plains within an area referred to as the "Des Moines Lobe" of the Northern Iowa Glaciated Region, which was the terminus of the Great Glacial Advances. As glacial ice receded from the area around 12,000 years ago, it created a rich mosaic of "prairie potholes" stretching from Des Moines to Spirit Lake to Mason City, and totaling nearly 7.6 million acres.

Soil map analysis of a 40,000 acre study area around the Refuge suggests that prior to European settlement, wetlands and tallgrass prairie covered

much of the area (Figure 2). Large depressions, characterized by hydric (wetland) soils are found throughout the area, most of which are now farmed in corn or soybeans (Figure 3). Where water is present at least seasonally, aquatic plants such as bulrush, cattail, bladderwort, and pondweeds flourish. Ridges, knobs, and rises that flank the wet areas historically supported tallgrass prairie plants such as big bluestem, little bluestem, indianguass, as well as an assortment of prairie flowers, while green ash, cottonwood, and willows dominated the stream banks.

The Refuge currently extends approximately 8 miles along Schwob Marsh, Union Slough, and Buffalo Creek, and under normal water conditions, contains 450 acres of open water, 850 acres of marsh, and 1,675 acres of uplands (Figure 4).

Wetlands and open water areas on the Refuge are contained within six manageable units and are recognized by their diversity (or lack thereof) of emergent, floating-leaved, and submersed aquatic plants (pondweeds, coontail, cattails, bull-rushes, smartweed, millet, etc.). Uplands on the Refuge consist mainly of idled hay fields and pastures seeded with mixtures of smooth brome, wheatgrasses and legumes and with mixtures of switchgrass, bluestem, gramma grasses, yellow indianguass, and needlegrasses.

Precipitation is the main source of water for the Refuge, thus the quality of water entering the Refuge is directly related to the ecological integrity of the Refuge watershed (Figure 5). Water control structures within the Refuge regulate drainage and because of nearly level topography, waters flow both north and south. Waters flowing north drain into the Blue Earth River and eventually into the Minnesota and Mississippi Rivers. Water draining south flows into Buffalo Creek, the Des Moines River, and the Mississippi River.

The Refuge watershed is an important biological system connected by a network of natural and manmade waterways (streams, ditches, and subsurface tile) in which materials and energy are transferred. Some provide an important ecological component to the Refuge by connecting biologically diverse food webs and providing important habitat features for wildlife.

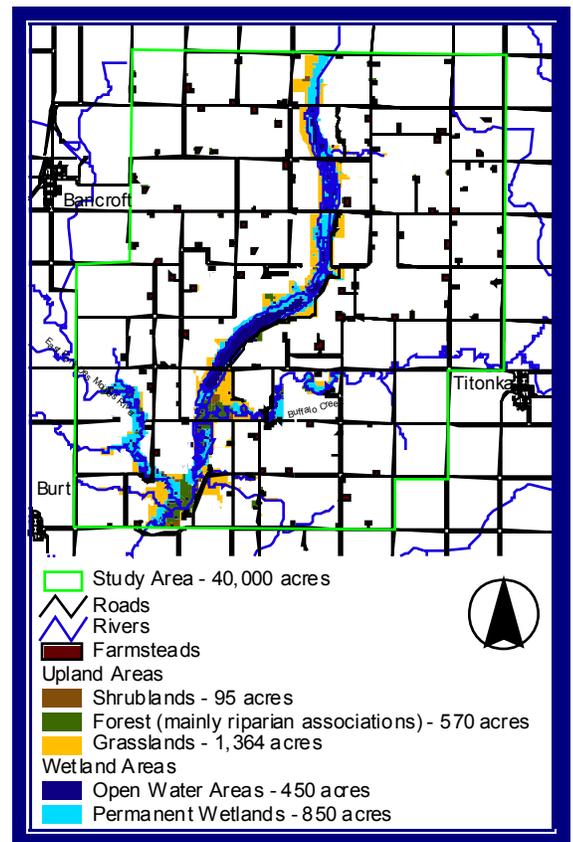


Figure 4 - Current land cover types in and around Union Slough NWR (40,000 acre study area). White areas indicate agriculture.

Mallards, blue-winged teal, wood ducks, white pelicans, great blue herons, dickcissels, warblers, brown thrashers, sparrows, meadowlarks, sora rails, black-crowned night herons, bobolinks, pheasants, grey partridge, red-tailed hawks, northern harriers, and American kestrels are just a few of the birds that utilize the Refuge during spring, summer, or fall. Annual counts of lesser and greater yellowlegs commonly reach 3-4,000 birds, while Canada, snow, and white-fronted geese peak at over 4,000 birds.

The Refuge also supports an assortment of mammals, such as white-tailed deer, woodchucks, red fox, squirrels, raccoons, muskrat, skunk, mink, opossum, shrews, voles, weasels, and badger.

Federally-listed threatened or endangered species that utilize the Refuge include the bald eagle and peregrine falcon. State-listed threatened or endangered species that use the Refuge include the northern harrier, king rail, forsters tern, and black tern, to name a few.

C. Refuge History

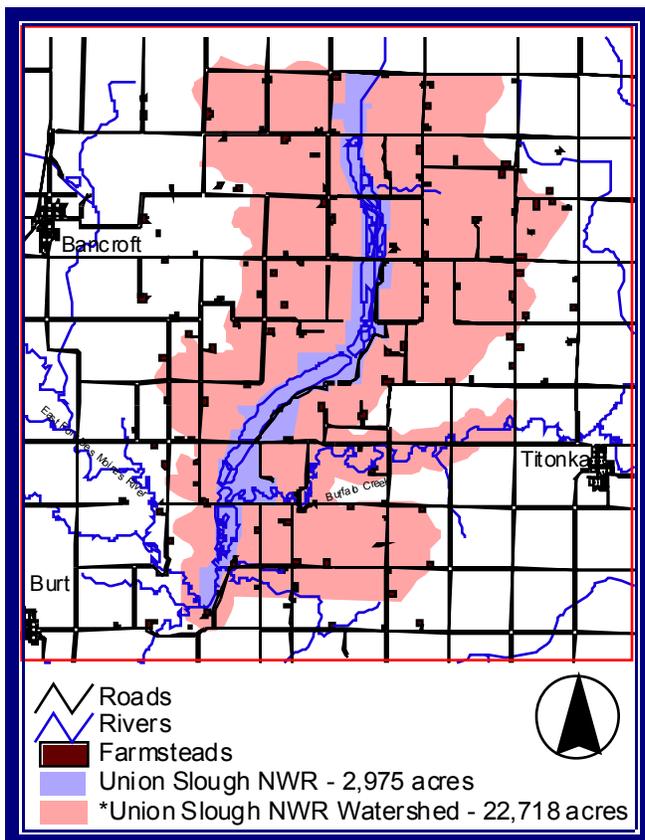


Figure 5 - Union Slough NWR and its primary watershed.
* Does not include entire Buffalo Creek drainage.

1913 - 1934	Union Slough drained and used for row crop agriculture and pasture.
1934	Ding Darling and local conservationists Phil DuMont and Logan Bennet surveyed Union Slough for its potential as a waterfowl refuge.
1938	President Franklin D. Roosevelt signed Executive Order 7976 establishing the Union Slough Migratory Waterfowl Refuge of Iowa. Price per acre ranged from \$10 to \$40.
1951	The town of Bancroft was issued a Special Use Permit to convert the gravel pit area to a recreational site.
1953	First building on the Refuge. A metal storage building 20x30' was purchased from the Reclamation Service in Huron, SD.
1958	First managed deer hunt on the Refuge during Iowa's two day shot gun season. Twenty-eight deer were taken on the Refuge.
1962	First successful nesting attempt by wood ducks in an artificial structure on the Refuge.
1968	Buffalo Creek Picnic Area was developed and opened to the public.
1969	Union Slough's gravel pits were closed because of possible unsafe swimming conditions due to bacterial contamination from cattle in an adjoining pasture.
1970-1980	Continued growth in wood duck structure program and improvements in design lead to a dramatic increase in the breeding wood duck population.
1971	The auto tour was opened for the first time for two weekends in April and September.
1972	The 75' foot bridge spanning Buffalo Creek was completed and a new mile loop Nature Trail was opened to the public at the Deer Meadow area.
1977	Office/vehicle building completed. Total cost: \$59,121.
1979	First tract (Pelzer Tract, 150 acres, Emmet Co.) acquired under the Small Wetland Acquisition program administered by Union Slough NWR.
1986	In exchange for three Service fish hatcheries in eastern Iowa, the Service acquired the Buffalo Creek and Schwob Marsh Units from the State (645 acres). Total Refuge acreage now stands at 2,845.
1988	Union Slough, the Iowa DNR, and Duck's Unlimited begin restoration of wetlands on private land throughout northern Iowa under the new Private Lands Program. One hundred and forty wetlands totaling over 900 acres were restored in its first full year.

E. Management of the Refuge

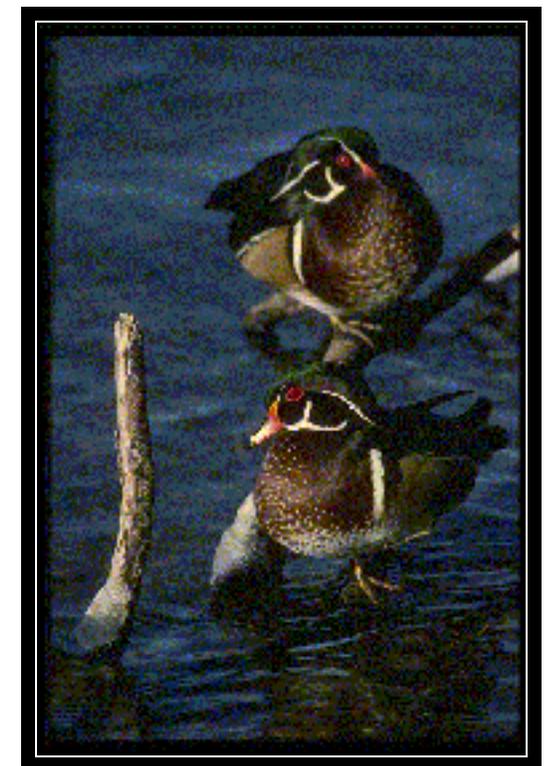
Management of Union Slough Refuge involves using a variety of management techniques to preserve and enhance marsh and upland habitats for wildlife. Wetland management plays an important role in the establishment and maintenance of wetland vegetation on the Refuge, and usually involves the



Mallard female with young

manipulation of water to achieve the desired successional stage or zone of wetland plant communities. Plant zones provide structural diversity to Refuge wetlands and several plant zones are more beneficial to wildlife than are homogenous stands. Each plant species within the wetland attracts its own species of bird, mammal, reptile, invertebrate, amphibian, and fish. Thus, in order to attract and maintain diverse populations of wildlife, Refuge wetlands are managed to promote diverse plant communities. The ideal composition of emergent vegetation (cattails, bull-rushes, phragmites, etc.) and open water areas containing submersed vegetation (pondweeds, coontail, etc.) is a hemi-marsh condition (50% emergent vegetation and 50% open water). Drought conditions, both natural and through periodic draw downs, also play an important role in the life cycle of Refuge wetlands. As wetland areas dry up and soils harden, nutrients are released and made available. This process results in rejuvenation, and when re-flooded, creates an area thriving with animal life and aquatic vegetation essential to wetland wildlife.

Riparian, or streamside areas within the Refuge, serve as the transition zone between the upland and wetland environments. These areas differ from the uplands due to the availability of water that promotes dominance of water-dependent plant species. From a watershed and wildlife management perspective, riparian areas serve several important functions. Riparian vegetation contributes to wetland morphology as available root biomass stabilizes erosive soils, while above ground portions of the plants promote sediment deposition outside the wetland thereby reducing sediment yield. In this same regard, riparian vegetation acts to control nonpoint-source pollution by filtering out nutrients and pesticides that are attached to the sediment particles. As a result of reduced sediment yields, spawning beds for fish can remain relatively free of fine



With the introduction of artificial nest cavities, the Refuge has become a major producer of wood ducks.

sediments, infilling of pools is reduced thereby maintaining water depths and structural diversity, and primary production is enhanced by reducing water turbidity.

Upland management on the Refuge includes establishing and maintaining productive grasslands for waterfowl and other migratory birds. Grasslands surrounding Refuge wetlands provide nesting habitat for waterfowl and other birds and provide a means to control runoff from surrounding lands. Prescribed burning is a tool used to maintain grasslands as burning increases the vigor of desirable vegetation while reducing competition from less desirable plants. Small acreages of brush and timber (mostly riparian associations) are being allowed to expand along Buffalo Creek through natural succession to enhance the habitat diversity for woodland-dependent species, especially neotropical migrant songbirds.



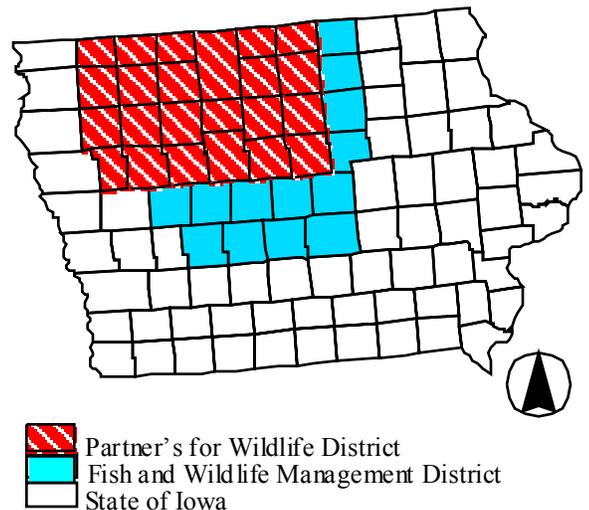
Ring-necked pheasants utilize the Refuge for winter cover, food, and nesting habitat.

F. Partners for Wildlife Program



Union Slough and its cooperating partner the Iowa DNR have focused considerable effort over the past few years on encouraging and assisting private landowners in restoring converted and degraded wetlands and associated upland habitats. In a 23 county area surrounding the Refuge, 521

wetland basins totaling 1,824 acres have been restored since 1987. The Refuge provides technical assistance and cost-sharing to complete the work if the landowner agrees to maintain the area for a period of 10 years or more. The program focuses on restoring and enhancing habitats that provide wildlife, fisheries, water quality, aesthetic, and recreation benefits. Participation in this program is strictly voluntary. In the past two years, landowners have also been offered the opportunity to restore warm season grasses for the benefit of wildlife. Two Refuge staff work exclusively on Partners for Wildlife projects.



G. Iowa Wetland Management District

The Refuge also administers the Iowa Wetland Management District (District) with its partner the Iowa DNR. The District encompasses 35 northcentral Iowa counties and currently consists of 10,011 acres of Waterfowl Production Areas (WPA's). The District uses a landscape-scale approach to manage habitat by incorporating a patch-work of wetlands and grasslands to create habitat conditions more favorable for self-sustaining wildlife populations in northcentral Iowa. The Service can purchase a wetland and

surrounding upland area outright, or enter into a perpetual easement with the landowner and only purchase certain ownership rights. Through a Memorandum of Agreement with the Iowa DNR, management of these WPA's is done by the Iowa DNR in cooperation with the Service. The District is not covered by this Plan but will be treated at a later date in a plan for the 11 Districts found within the Great Lakes-Big Rivers Region.