Appendix A: Environmental Assessment

Leopold

Wetland Management District

Environmental Assessment

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ENVIRONMENTAL ASSESSMENT FOR IMPLEMENTATION OF COMPREHENSIVE CONSERVATION PLAN FOR LEOPOLD WETLAND MANAGEMENT DISTRICT

Abstract: The U.S. Fish and Wildlife Service is proposing to implement a Comprehensive Conservation Plan (CCP) for the Leopold Wetland Management District (District) in southeastern Wisconsin. This Environmental Assessment (EA) considers the biological, environmental and socioeconomic effects that implementing the CCP (the preferred alternative is the proposed action) and two other alternatives would have on the issues and concerns identified during the planning process. The purpose of the proposed action is to establish the management direction for the District for the next 15 years. The management action will be achieved by implementing a detailed set of goals, objectives, and strategies described in a CCP.

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Chapter 1: Purpose and Need

1.1. Background

Established in 1993, the Leopold Wetland Management District manages 53 waterfowl production areas (WPAs) totaling more than 12,000 acres in 17 southeastern Wisconsin counties (Location map, Figure 1). The District also administers 45 conservation easements within an eastern Wisconsin area of 34 counties. Waterfowl production areas consist of wetland habitat surrounded by grassland and woodland communities. While WPAs are managed primarily for ducks and geese, they also provide habitat for a variety of other wildlife such as grassland birds, shorebirds, wading birds, mink, muskrat, wild turkey, and deer.

Redhead Duck. USFWS photo.

1.2. Purpose

The purpose of the proposed action is to specify a management direction for the Leopold Wetland Management District (WMD) over the coming 15 years. The purpose of the Environmental Assessment is to select a management direction for the District that best achieves the District's purposes, vision and goals; contributes to the mission of the National Wildlife Refuge System; is consistent with principles of sound fish and wildlife management; and addresses relevant mandates and major issues developed during scoping. The management direction will be described in detail through a set of goals, objectives, and strategies in a Comprehensive Conservation Plan (CCP).

1.3. Need for Action

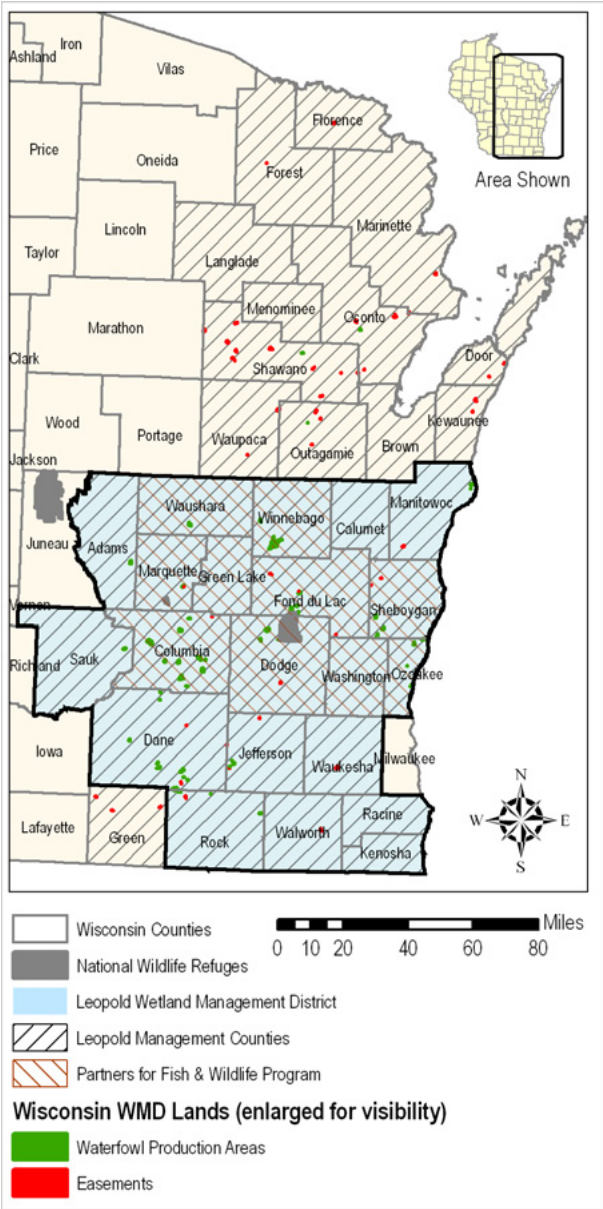
The action is needed because adequate, long-term management direction does not currently exist for the District. Management is now guided by various general policies and short-term plans. The action is also needed to address current management issues and to satisfy the legislative mandates of the National Wildlife Refuge System Improvement Act of 1997, which requires the preparation of a CCP for all national wildlife refuges, which includes wetland management districts, in the United States.

This EA presents four management alternatives for the future of Leopold Wetland Management District. The preferred alternative will be selected based on its ability to meet identified goals. These goals may also be considered as the primary need for action. Goals for the District were developed by the planning team and encompass all aspects of district management, including wildlife, habitat, and people. Each of the management alternatives described in this EA will be able to, at least minimally, achieve the following District goals.

Habitat: Preserve, restore, and enhance the ecological diversity of wetlands, grasslands, and native flora of District lands to support migrating waterfowl, grassland birds, and other wildlife.

Wildlife: Preserve, restore, and enhance the diversity and abundance of migratory birds and other native wildlife with emphasis on waterfowl, grassland and wetland dependent birds.

Figure 1: Location of Leopold WMD



People: A broad cross section of the public enjoys and appreciates District lands.

1.4. Decision Framework

The Regional Director for the Midwest Region (Region 3 of the U.S Fish and Wildlife Service) will need to make two decisions based on this EA: (1) select an alternative for the District, and (2) determine if the selected alternative is a major Federal action significantly affecting the quality of the human environment, thus requiring preparation of an Environmental Impact Statement (EIS). The planning team has recommended Alternative 4 ("Waterfowl emphasis with increased and balanced consideration for other 'Priority' species, their habitats, and public use/neighborhood relationships") to the Regional Director. The Draft CCP was developed for implementation based on these recommendations.

1.5. Authority, Legal Compliance, and Compatibility

The National Wildlife Refuge System includes federal lands managed primarily to provide habitat for a diversity of fish, wildlife and plant species. National wildlife refuges are established under many different authorities and funding sources for a variety of purposes. The District's Waterfowl Production Areas are a part of the Refuge System and the authority and purposes are derived from several federal statutes.

The Migratory Bird Conservation Act and amendments provides for the acquisition of lands determined to be suitable as an inviolate sanctuary for migratory birds. The Migratory Bird Hunting and Conservation Stamp Act (commonly called the Duck Stamp Act) and amendments authorize the acquisition of small wetland and pothole areas that are to be designated as 'Waterfowl Production Areas'. The Act further excepts Waterfowl Production Areas from the inviolate sanctuary provision of Migratory Bird Conservation Act.

The mandate for FmHA Easements and Fee title transfers "…for conservation purposes..." is codified in 7 U.S.C. 2002.

Appendix E of the Draft CCP contains a list of the key laws, orders and regulations that provide a framework for the proposed action.

1.6. Scoping of the Issues

The CCP planning process began in July 2006 with a kickoff meeting between District staff and regional planners from the Service's office in St. Paul, Minnesota. The participants in this "internal scoping" exercise reviewed the Leopold Wetland Management District's existing baseline resource data, planning documents and other information. In

addition, the group identified a preliminary list of issues, concerns and opportunities facing the District that would need to be addressed in the CCP. The group discussed federal mandates plus applicable state and local ordinances, regulations, and plans for their relevance to the planning effort. The group also agreed to a process for obtaining public input and for participation of the State of Wisconsin in the planning effort.

The official notice of the intent to develop a CCP for the District was published in the Federal Register in April 2006. Public input was encouraged and obtained using several methods, including open houses, written comments during a public scoping period, and personal contacts. A planning update was sent to 149 organizations and local government officials announcing the planning and open houses and inviting their input. A letter inviting participation in planning was sent to 34 tribes with interests in Wisconsin. A news release announcing open houses and inviting public comment was sent to media contacts in Wisconsin on August 28, 2006. Open house events were held in Portage and Waukau, Wisconsin on September 13 and 14, 2006. Total attendance for the two open house events was 11. Those interested in making written comments were asked to submit them by October 31. Comments could be submitted in person or by U.S. mail, e-mail, or via the District planning website on the internet. No written comments were submitted to the District during the scoping process.

A biological review of the District programs held January 23-24, 2007 helped clarify the habitat and wildlife issues. The biological review team included scientists from the U.S. Geological Survey, Washington and Regional Office representatives, Wisconsin state biologists and managers, and District staff. A visitor services review of the District held March 29-31, 2006 helped clarify visitor services issues and provided potential actions to consider in formulating alternatives. The visitor services review team included regional and refuge visitor services specialists, the CCP planner, and District staff.

The following list of issues and concerns was compiled from internal Refuge scoping, public open house sessions and program reviews:

Habitat Management: With more than 12,000 acres spread over several counties, managing and administering the WMDs is a big undertaking. Habitat management, control of invasive species, biological monitoring, and community outreach require staff and funding for programs, facilities, and equipment. Plans and planning need to articulate these needs and ensure they are represented in databases and other documents used in budget decision-making.

Habitat Loss and Fragmentation: Residential development is occurring around existing WPAs, which may be reducing their value for waterfowl production. Habitat loss and fragmentation are best dealt with at a landscape level, where there is an opportunity for improved coordination among responsible entities.

Land Acquisition: Residential development in rural Wisconsin is contributing to loss of habitat and a rapid rise in property values. In this rapidly changing and uncertain condition care must be used to judge where land should be purchased, if the public's limited resources are to be spent wisely.

Visitor Services: Higher quality experiences and greater satisfaction among visitors may be possible with improved visitor facilities. Better habitat conditions and less wildlife disturbance would result from a reduction in unauthorized uses.

Service Identity: An opportunity exists to increase public awareness and, ultimately, well-being of WPAs by increasing the public understanding of the purpose and mission of the WPAs.

Chapter 2: Description of the Alternatives

2.1. Formulation of Alternatives

The CCP planning team developed management alternatives for the District based on the issues, concerns and opportunities raised during the CCP scoping process. The issues that are discussed came from individuals, local citizens and officials, cooperating agencies, conservation organizations and District staff. A summary of the four alternatives is provided in Table 1 on page 104. The following management alternatives were developed to generally fit within the current District budget. In other words, the alternatives were formulated under the assumption that a large budget increase for operations is unlikely during the life of the plan. If an alternative calls for one program to increase in size or scope other District programs may need to be reduced. The alternatives do, however, consider the possibility of new private resources (volunteers, grant funds, etc.) and a modest District program and/ or staff funding increase over the next 15 years.

The concerns facing the planning team related to habitat, land acquisition, public use, and public awareness of waterfowl production areas. The team recognized the heritage of the small wetland acquisition program, and the program's importance to waterfowl production. The team also acknowledged that the wetland management districts of Wisconsin lie within a different physical and social landscape than the wetland management districts of the prairie pothole region of western Minnesota and North and South Dakota.

Throughout its existence, the small wetland acquisition program, although focused on waterfowl, has been recognized as benefiting species other than waterfowl. During the comprehensive conservation planning process the benefits have begun to be stated more explicitly and lands managed explicitly for other species. In the Prairie Pothole Region, for instance, some wetland management districts are writing objectives for the management of uplands for grassland birds. The realization that the Wisconsin waterfowl production areas have a different character has been recognized for some time. In the foreword to the "Wisconsin Wetland Management Guidelines" prepared by the Service for the Wisconsin Department of Natural Resources in 1975, an objective was established "to manage WPAs for optimum production and preservation of all forms of wildlife existing and native to the area in which the WPA is located."

Lesser Scaup. USFWS photo.

The planning team evaluated the current management of the District and thought about how management might change as a function of attention to other species, an increasingly developed and fragmented landscape, and public use. The team's evaluation of current management was that the District is, given its resources, managing for waterfowl production as well as possible through prioritization of activities. So, the team's challenge was to craft alternatives to management that considered the possible

reallocation of resources to include other outcomes and what might be gained with a modest increase in resources over the next 15 years.

The following sections describe the current management and three alternatives crafted by the planning team. Summaries of the four alternatives are provided in Table 1 on page 104. Chapter 4 of this Environmental Assessment describes the consequences that would likely result from the actions in each alternative.

2.1.1. Elements Common to All Alternatives

Under all alternatives federally listed threatened and endangered species would be protected and their populations monitored, if identified on District lands.

Under all alternatives the District would coordinate its objectives and activities with the Wisconsin DNR. The District would consider known populations of state listed species in management actions under every alternative.

Under all alternatives visitors would feel safe and the District's resources would be protected through sharing regional law enforcement resources and partnering with Wisconsin DNR Conservation Wardens and other enforcement authorities.

Under all alternatives, the Fish and Wildlife Service will be developing a proposal to construct new headquarters and maintenance facilities. The headquarters facility is inadequate to meet the needs of the Service. The facilities are not universally accessible and are not of an adequate size to support current staffing levels. The proposed maintenance facility would include a shop since there is no building for repairing and maintaining equipment. Factors that will be considered in choosing the location of the new facilities include highway access, environmental education potential on site, accessible trail construction feasibility, aesthetic features of the site, adjacent land uses and costs of preparing the site for construction. Other considerations include archeological and cultural resources on site, presence of utilities and impact on existing habitat on the WPA.

Under all alternatives the District Manager would, during early planning, provide the Regional Historic Preservation Officer (RHPO) a description and location of all undertakings (projects, activities, routine maintenance and operations that affect ground and structures, and requests for permitted uses); and of alternatives being considered. The RHPO would analyze these undertakings for their potential to affect historic properties and enter into consultation with the State Historic Preservation Officer and other parties as appropriate. The District Manager would notify the public and local government officials to identify their concerns about potential impacts by the undertaking; this notification will be at least equal to the public notification accomplished for NEPA and compatibility.

2.2. Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)

Under this alternative the activities of the District would continue as in the past with current staffing and resources. The primary emphasis in grassland and wetland management would be to provide waterfowl production and migration habitat. Grasslands would be established and managed through seeding, mowing, and burning. The target would be to restore 150 acres of grassland per year and have 40 percent of the grassland acres under optimal management. Optimal management would include a fire rotation of 4 to 5 years, little invasive brush and trees, maximized block size, and best grass and forbs species composition for the site. One-quarter mile of old fence rows would be removed each year to increase the habitat value for species that are sensitive to block size.

Wetland restoration and management would include plugging tiles and ditches, installation of water control structures, and vegetation control through fire, mechanical manipulation, or water level manipulation. The target would be to restore 50 percent of the drained wetland acres on District land within 15 years. Water levels would be managed on 500 acres. Shallow, seasonal basins would be maintained through scraping of sediment from small basins, as needed.

Woodlots and savannah would be managed through a combination of cutting, spraying, planting, and burning. The objective would be to inventory up to 20 percent of the forest habitat to locate

remnant oak savanna and restore approximately 25 percent of the identified potential savanna within 15 years. Little management would occur on the remaining woodlands.

Invasive species would be inventoried and treated with the recognition that only a small portion of the affected acres would be dealt with. The objective for invasive species control would not be stated in specific acres. The area and types of invasive species is too large to achieve total control. Invasive species control would be directed at those species and areas that would most likely impact the value of habitat for wildlife. Grasslands would be the top priority for treatment under this alternative. The target would be to inventory 20 percent of the District lands and apply biological/mechanical/chemical control on up to 10 percent of District lands.

Land acquisition would continue as funds were available with the intent of establishing larger complexes of wetlands and grasslands. Effort would be concentrated on rounding out existing WPAs. The intent would be to have a minimum size of 120 acres for new WPAs. The acquisitions would be based on opportunity and delineations made in the early days of the District. The target would be to acquire 300 acres per year.

An objective would be to raise the quality of the visitor services programs over time, reaching a higher level of rating within 5 years. Five WPAs would be more fully developed with improved parking lots, kiosks, and other compatible facilities. Improvements would include a website, better brochures, and maps.

The volunteer and partnership programs would continue at the 2008 level. Volunteer hours received would remain about 100 hours per year.

Working with the Wisconsin DNR and others, the Partners for Fish and Wildlife program would work to restore grassland, wetland, and oak savanna on non-Service land within the District. The target would be to restore 120 acres per year.

Community outreach would be limited to contacting neighbors the day of prescribed fires. Limited mailings would occur to inform immediate neighbors about management actions such as tree removal.

The District would meet Service monitoring guidelines for FSA easements by visiting each easement annually and following-up on any violations.

This alternative would be implemented and carried out by the current staff of a district manager, wildlife refuge specialist, wildlife biologist, two private lands wildlife biologists, maintenance worker, administrative technician, prescribed fire specialist, and seasonal lead fire technician. (8.5 FTEs total).

2.3. Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services

Under this alternative the types of habitat management activities of the District would continue, but with more acres affected. Monitoring of habitat and wildlife would increase compared to the current direction. Visitor services would improve about at the rate and extent of the current direction. The extent of habitat management and monitoring would occur as a result of a modest increase in staffing and resources.

The primary emphasis in grassland and wetland management would be to provide waterfowl production and migration habitat. As in Alternative 1, management activities would include seeding, mowing, haying, grazing, tree removal and burning. The target would be to restore 200 acres of grassland per year and have 70 percent of the grassland acres under optimal management. One mile of old fence rows would be removed each year to increase the habitat value for species that are sensitive to block size.

The target for wetland restoration would be to restore 75 percent of the drained wetland acres on District land within 15 years. Water levels would be managed on 1,000 acres. Shallow, seasonal basins would be maintained through burning, mowing or scraping of sediment from small basins. The basins would be monitored for vegetative, invertebrate, and wildlife response to active management of the seasonal basins.

As in the current direction, woodlands and oak savannah would be managed through a combination of cutting, spraying, planting, and burning. The objective would be to inventory up to 90 percent of the forest habitat to locate remnant oak savanna and restore approximately 75 percent of the identified potential savanna within 15 years. Vegetative response to restoration activities would be monitored. Timber stand improvement would occur on 20 percent of the remaining woodlands. Timber stand improvement would include thinning, site preparation for natural reproduction, and release-cutting or killing of undesirable older overtopping trees. The woodlands would be managed to benefit many species including Wood Ducks, warblers, white- tailed deer, and Wild Turkey.

Invasive species would be inventoried and treated with the recognition that only a small portion of the affected acres would be dealt with. The objective for invasive species control would not be stated in specific acres. The area and types of invasive species are too large to achieve total control. Invasive species control would be directed at those species and areas that would most likely impact the value of habitat for wildlife. Grasslands and wetlands, followed by woodlands, would be the priority for treatment under this alternative. The target would be to inventory 100 percent of the District lands and apply biological/mechanical/chemical control on 25 percent of District lands.

Land acquisition would continue as funds were available with the intent of establishing larger complexes of wetlands and grasslands. Two additional focus areas would be developed to complement the existing two. Round outs would be used to complete existing WPAs and, in cooperation with partners, maximize the size and quality of public wetland/grassland complexes. There would be increased coordination with the Wisconsin DNR with emphasis in the Glacial Habitat Restoration Area. The target of acquisition would be to acquire 500 acres per year.

Monitoring, as a basis for adaptive management, would be greater than in Alternative 1. In addition to monitoring wetlands, grasslands and oak savanna, the District would develop a monitoring program within 5 years to determine waterfowl recruitment. Using adaptive management, the District could revise and develop more effective techniques for wetland and grassland restoration and management. Monitoring would also be used to document the presence/absence of federally and state listed threatened and endangered species and to assess the value of local ecotype native seed plantings to migratory birds.

As in Alternative 1, an objective would be to raise the quality of the visitor services programs over time, reaching a higher level of rating within 5 years. Five WPAs would be more fully developed with improved parking lots, kiosks, and other compatible facilities. Improvements would include an enhanced website, better brochures, and maps.

The volunteer and partnership programs would increase under this alternative. The target for volunteer hours received would be 200 hours per year within 2 years of plan approval. At least four environmental education programs would be presented in partnership with local schools during the year.

The intent would be to increase and improve partnerships to more fully implement the Upper Mississippi and Great Lakes Joint Venture Plan and the North American Wetland Conservation Act (NAWCA) partners. Working with the Wisconsin DNR, specifically within the Glacial Habitat Restoration Area, and others as in Alternative 1, the Partners for Fish and Wildlife program would work to restore 120 acres per year of grassland, wetland, and oak savanna on non-Service land within the District. Partners for Fish and Wildlife work would be emphasized in the District focus areas.

Community outreach would be increased with the objective of identifying neighbors for 20 percent of the WPAs within 5 years and providing them with information about waterfowl management. At least two public presentations per year to civic groups, local governments and other organizations would also be used to develop community support for WPA management.

The District would meet Service monitoring guidelines for FSA easements by visiting each easement annually and following-up on any violations.

Full implementation of this alternative would require the addition of a wildlife biologist and a permanent, seasonal tractor operator (1.5 FTEs total) to the current staff. Additional funding would also allow the District to hire temporary seasonal positions to assist with projects.

2.4. Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services

Under this alternative the types and amounts of habitat management activities undertaken by the District would be similar to Alternative 1. Visitor services would expand and improve in quality compared with Alternative 1. Outreach activities would also be greater. Increases in visitor services and outreach would result from a modest increase in staffing and resources.

The primary emphasis in grassland and wetland management would be to provide waterfowl production and migration habitat. Grasslands would be established and managed through seeding, mowing, haying, grazing, tree removal and burning. The target would be to restore 150 acres of grassland per year and have 40 percent of the grassland acres under optimal management. Optimal management would include a fire rotation of 4 to 5 years, little invasive brush and trees, maximized block size, and best grass and forbs species composition for the site. One-quarter of a mile of old fence rows would be removed each year to increase the habitat value for species that are sensitive to block size.

Wetland restoration and management would include plugging tiles and ditches, maintenance of water control structures and dikes, and vegetation control through fire, mechanical manipulation, or water level manipulation. The target would be to restore 50 percent of the drained wetland acres on District land within 15 years. Water levels would be managed on 500 acres. Shallow, seasonal basins would be maintained through scraping of sediment from small basins, as needed.

Woodlands and oak savannah would be managed through a combination of cutting, spraying, planting, and burning. The objective would be to inventory up to 20 percent of the forest habitat to locate remnant oak savanna and restore approximately 25 percent of the identified potential savanna within 15 years. Little management would occur on the remaining woodlands.

Invasive species would be inventoried and treated with the recognition that only a small portion of the affected acres would be dealt with. The objective for invasive species control would not be stated in specific acres. The area and types of invasive species are too large to achieve total control. Invasive species control would be directed at those species and areas that would most likely impact the value of habitat for wildlife. Grasslands would be the top priority for treatment under this alternative. The target would be to inventory 50 percent of the District lands and apply biological/mechanical/chemical control on up to 10 percent of District lands. A larger monitoring program for invasive species would result from an expanded use of trained volunteers.

Land acquisition would continue as funds were available with the intent of establishing larger complexes of wetlands and grasslands. Effort would be concentrated on rounding out existing WPAs. The acquisitions would be based on opportunity and delineations made in the early days of the District. The target would be to acquire 300 acres per year.

An objective would be to raise the quality of the visitor services programs over time, reaching two higher levels of Service quality rating within 5 years. Seven WPAs would be more fully developed with improved parking lots, kiosks, and other compatible facilities. Improvements would include an enhanced website, better brochures, and maps. Wildlife-dependent recreationists rating of the quality of their visit would be evaluated within 15 years.

The volunteer and partnership programs would increase under this alternative. The target for volunteer hours received would be 200 hours per year within 2 years of plan approval. The intent would be to increase and improve partnerships with local schools and educational organizations to foster environmental education. At least 10 environmental education programs would be presented in partnership with local schools during the year.

Working with the Wisconsin DNR and others, as in Alternative 1, the Partners for Fish and Wildlife program would work to restore 120 acres per year of grassland, wetland, and oak savanna on non-Service land within the District.

Community outreach would be increased with the objective of identifying neighbors for 30 percent of the WPAs within 5 years and providing them with information about waterfowl management. At least five public presentations per year to civic groups, local governments and other organizations would also be used to develop community support for WPA management.

The District would meet Service monitoring guidelines for FSA easements by visiting each easement annually and following-up on any violations.

Full implementation of this alternative would require the addition of a park ranger, and a permanent, seasonal tractor operator (1.5 FTEs total) to the current staff. Additional funding would also allow the District to hire temporary seasonal staff to assist with priority projects.

2.5. Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships (Preferred Alternative)

This alternative incorporates components of Alternatives 2 and 3. Under this alternative the types of habitat management activities of the District would continue, but with more acres affected. Monitoring of habitat and wildlife would increase compared to the current direction. Visitor services would expand and improve in quality compared to the current direction. Outreach activities would also be greater. Program increases would result from a moderate increase in staffing and resources.

The primary emphasis in grassland and wetland management would be to provide waterfowl production and migration habitat. As in Alternative 1, management activities would include seeding, mowing, haying, grazing, tree removal and burning. The target would be to restore 200 acres of grassland per year and have 70 percent of the grassland acres under optimal management. One mile of old fence rows would be removed each year to increase the habitat value for species that are sensitive to block size. Grassland restoration would also include the removal of the remaining 28 acres of pine plantation on the District within 5 years. The target for tree/brush removal in grassland habitat would be at the rate of 15 acres per year.

The target for wetland restoration would be to restore 75 percent of the drained wetland acres on District land within 15 years. Water levels would be managed on 1,000 acres in four basins. Shallow, seasonal basins would be maintained through mowing, fire and scraping of sediment from small basins. The basins would be monitored for vegetative, invertebrate, and wildlife response to active management of the seasonal basins.

As in the current direction, woodlands and oak savannah would be managed through a combination of cutting, spraying, planting, and burning. The objective would be to inventory up to 90 percent of the forest habitat to locate remnant oak savanna and restore approximately 75 percent of the identified potential savanna within 15 years. Vegetative response to restoration activities would be monitored. Timber stand improvement would occur on 20 percent of the remaining woodlands. Timber stand improvement would include thinning, site preparation for natural reproduction, and release-cutting or killing of undesirable older overtopping trees. The woodlands would be managed to benefit many species including Wood Ducks, warblers, white- tailed deer, and Wild Turkey.

Invasive species would be inventoried and treated with the recognition that only a small portion of the affected acres would be dealt with. The objective for invasive species control would not be stated in specific acres. The area and types of invasive species are too large to achieve total control. Invasive species control would be directed at those species and areas that would most likely impact the value of habitat for wildlife. Grasslands and wetlands, followed by woodlands, would be the priority for treatment under this alternative. The target would be to inventory 100 percent of the District lands and apply biological/mechanical/chemical control on 25 percent of District lands. A larger monitoring program for invasive species would result from an expanded use of trained volunteers and working in partnerships with WPA neighbors, invasive species control would occur on private land adjacent to WPAs.

Land acquisition would continue as funds were available with the intent of establishing larger complexes of wetlands and grasslands. Round outs would be used to complete existing WPAs and, in cooperation with partners, maximize the size and quality of public wetland/grassland complexes. There would be increased coordination with the Wisconsin DNR with emphasis within the Glacial Habitat Restoration Area. The target of acquisition would be to acquire 600 acres per year.

Monitoring, as a basis for adaptive management, would be greater than in Alternative 1. In addition to monitoring wetlands and oak savanna, the District would develop a monitoring program within 5 years to determine waterfowl recruitment. Using adaptive management, the District would revise and develop more effective techniques for wetland and grassland restoration and management. Monitoring would also be used to document the presence/absence of federally and state listed threatened and endangered species and to assess the value of local ecotype native seed plantings to migratory birds.

An objective would be to raise the quality of the visitor services programs over time, reaching two higher levels of Service quality rating within 5 years. Seven WPAs would be more fully developed with improved parking lots, kiosks, and other compatible facilities such as trails and observation points. Improvements would include an enhanced website, better brochures, and maps. Wildlife-dependent recreationists rating of the quality of their visit would be evaluated within 15 years.

The volunteer and partnership programs would increase under this alternative. The target for volunteer hours received would be 300 hours per year within 2 years of plan approval. At least 5 environmental education programs would be presented in partnership with local schools during the year.

Working with the Wisconsin DNR and others, as in Alternative 1, the Partners for Fish and Wildlife program would work to restore 120 acres per year of grassland, wetland, and oak savanna on non-Service land within the District.

Community outreach would be increased with the objective of identifying neighbors for 40 percent of the WPAs within 5 years and providing them with information about waterfowl management. At least 5 public presentations per year to civic groups, local governments and other organizations would also be used to develop community support for WPA management.

The District would meet Service monitoring guidelines for FSA easements by visiting each easement annually and following-up on any violations.

Full implementation of this alternative would require the addition of a wildlife biologist, wildlife refuge specialist with emphasis in public use, a biological technician, and a permanent, seasonal tractor operator (3.5 FTEs total) to the current staff. Additional funding would also allow the District to hire temporary seasonal staff to assist with priority projects.

2.6. Alternatives Considered But Not Developed in Detail

As the planning team thought about possible management alternatives, ideas were freely exchanged and evaluated. Two alternatives were considered, discussed, and evaluated but were not developed in detail.

One alternative we discussed was the possibility of devoting resources to intensive management for waterfowl. The possibility of providing nest structures, planting crops, constructing moist soil units, and intensive predator control were discussed as options that have been used in the past in an attempt to optimize waterfowl production. This alternative was not pursued because the resource demands for this kind of management have less probability of long-term, sustainable success than an approach that increases the size and quality of habitat. It is thought that long-term success will more likely be achieved when management supports the historical functioning of the land than attempts to force the land and its processes in a different direction.

Another alternative that was considered centered on the idea of what would be possible with a lot more resources. In this alternative the team thought about all that management could do for waterfowl, other wildlife, and visitors with unlimited resources. This “pie-in-the-sky” alternative was interesting to talk about, but ultimately judged unrealistic. The team could not imagine a scenario in which considerable staff and budget increases would occur in the next 15 years.

2.7. Comparison of Management Alternatives

Table 1 presents more detail about the four proposed management alternatives summarized above, including the objectives under each alternative.

Table 1: Summary of Management Alternatives

Objectives	Goals and Objectives			
	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
Goal 1: Habitat Preserve, restore, and enhance the ecological diversity of wetlands, grasslands, and native flora of District lands to support migrating waterfowl, grassland birds, and other wildlife.				
1.1 Grasslands	Restore 150 acres per year; within 15 years 40% of grassland acres under optimal management; remove .25 mile of fence row per year.	Restore 200 acres per year; within 15 years 70% of grassland acres under optimal management; remove 1 mile of fence row per year.	Restore 150 acres per year; within 15 years 40% of grassland acres under optimal management; remove .25 mile of fence row per year.	Restore 200 acres per year; within 15 years 70% of grassland acres under optimal management; remove 1 mile of fence row per year.
	Strategies: ■ Planting prairie species. ■ Convert farm fields to prairie. ■ Mowing and haying. ■ Grazing. ■ Prescribed fire. ■ Tree removal. ■ Pine plantation removal.	*Strategies:* Same as Alternative 1.	*Strategies:* Same as Alternative 1.	*Strategies:* Same as Alternative 1 plus: ■ Work with neighbors to establish native grassland buffers around WPAs and remove trees from common fence rows.
1.2 Wetlands	Within 15 years 50% of wetland acres restored; water level managed on 500 acres. Minimal management of seasonal basins.	Within 15 years 75% of wetland acres restored; water level managed on 1000 acres. Active management to maintain seasonal basins in an early successional state.	Within 15 years 50% of wetland acres restored; water level managed on 500 acres. Minimal management to maintain seasonal basins.	Within 15 years 75% of wetland acres restored; water level managed on 1000 acres. Active management to maintain seasonal basins in an early successional state.
	Strategies: ■ Maintain levees and water control structures; ■ Water level manipulation through natural flow and pumping; ■ Burn or mow small basins; ■ Prescribed fire; ■ Scrape sediment from small basins.	*Strategies:* ■ Maintain levees and water control structures; ■ Water level manipulation through natural flow and pumping; ■ Burn or mow small basins; Prescribed fire; ■ Scrape sediment from small basins; ■ Monitor vegetative, invertebrate, and wildlife response to active management of seasonal basins.	*Strategies:* Same as Alternative 1.	*Strategies:* Same as Alternative 2 plus: ■ Work with neighbors to restore co-owned wetland basins.

Table 1: Summary of Management Alternatives (Continued)

Objectives	Goals and Objectives			
	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
1.3 Oak Savanna	Inventory less than 20% of forest habitat to locate remnant oak savanna; restore approximately 25% of identified potential savanna (to include complete tree removal and regular prescribed fire) within 15 years.	Within 15 years inventory 90% of forest habitat to locate remnant oak savanna and restore approximately 75% of identified potential savanna (to include complete tree removal and regular prescribed fire) and plant local ecotype grass and forb species on 30 acres per year to establish understory.	Inventory less than 20% of forest habitat to locate remnant oak savanna; restore approximately 25% of identified potential savanna (to include complete tree removal and regular prescribed fire) within 15 years.	Within 15 years inventory 90% of forest habitat to locate remnant oak savanna and restore approximately 75% of identified potential savanna (to include complete tree removal and regular prescribed fire) and plant local ecotype grass and forb species on 30 acres per year to establish understory.
	Strategies: ■ Prescribed fire; ■ Mechanical removal of trees; ■ Planting prairie species	*Strategies:* ■ Prescribed fire; ■ Mechanical removal of trees; ■ Planting prairie species; ■ Monitor vegetative response to management; ■ Add additional grassland native prairie species to seed nursery; ■ Add oak savanna grass and forb species to nursery program.	*Strategies:* Same as Alternative 1.	*Strategies:* Same as Alternative 2.
1.4 Woodlands		Implement timber stand Improvement on 20% of forest habitat.		Implement timber stand Improvement on 20% of forest habitat.
		Strategies: ■ Thinning; ■ Site preparation for natural reproduction; ■ Release--cutting or killing undesirable older overtopping trees.		*Strategies:* Same as Alternative 2.

Table 1: Summary of Management Alternatives (Continued)

Objectives	Goals and Objectives			
	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
1.5 Invasive Species	Inventory 20% of District lands for invasive species; apply biological/mechanical/chemical control on up to 10 percent of District lands; priority for control on grasslands.	Inventory 100% of District lands for invasive species; apply biological/mechanical/chemical control on up to 25 percent of District lands; priority for control on grasslands and wetlands, followed by woodlands.	Inventory 50% of District lands for invasive species; apply biological/mechanical/chemical control on up to 10 percent of District lands; priority for control on grasslands.	Inventory 100% of District lands for invasive species; apply biological/mechanical/chemical control on up to 25 percent of District lands; priority for control on grasslands and wetlands, followed by woodlands.
	Strategies: ■ Inventory and map distribution of invasive species.	*Strategies:* ■ Inventory and map distribution of invasive species; ■ Develop integrated pest management plan; ■ Within District collection and distribution of biocontrol agents.	*Strategies:* ■ Inventory and map distribution of invasive species; ■ Develop monitoring program with volunteers.	*Strategies:* ■ Same as Alternative 2 plus: ■ Develop monitoring program with volunteers; ■ Work with neighbors to control invasive species on private lands adjacent to WPAs.
1.6 Acquisition	Acquire 300 acres per year, concentrating on roundouts of existing WPAs.	Acquire 500 acres per year.	Acquire 300 acres per year, concentrating on roundouts of existing WPAs.	Acquire 600 acres per year.
	Strategies: ■ Respond to inquiries; ■ Identify and contact landowners of key, small inholdings.	*Strategies:* ■ Respond to inquiries; Identify and contact landowners of key, small inholdings; ■ Work with partners to develop additional focus areas; ■ Include roundouts to maximize public wetland-complexes in program.; ■ Increase coordination with Wisconsin DNR for implementation of the Glacial Habitat Restoration Area.	*Strategies:* Same as Alternative 1.	*Strategies:* Same as Alternative 2 plus: ■ Secure non-traditional funding sources for land acquisition.

Table 1: Summary of Management Alternatives (Continued)

Objectives	Goals and Objectives			
	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
Goal 2: Wildlife: Preserve, restore, and enhance the diversity and abundance of migratory birds and other native wildlife with emphasis on waterfowl, grassland and wetland dependent birds.				
2.1 Waterfowl		Develop recruitment monitoring program within 5 years of CCP approval.		Develop recruitment monitoring program within 5 years of CCP approval.
		Strategies: ■ Partner with Wisconsin DNR and Ducks Unlimited.		*Strategies:* Same as Alternative 2.
2.2 T&E Species	Assure that federally listed species and federally proposed species and their habitats are protected.	Same as Alt. 1	Same as Alt. 1	Same as Alt. 1
	Strategies: ■ Protect known occurrences of listed and proposed species.	*Strategies:* ■ Protect known occurrences of listed and proposed species; ■ Survey for presence/absence of listed and proposed species.	*Strategies:* Same as Alternative 1.	*Strategies:* Same as Alternative 2.
2.3 Regional Species of Concern (RSC)		Develop baseline surveys to identify RSC use of District lands. Surveys will identify the presence/absence of species and abundance of select high priority species.		Develop baseline surveys to identify RSC use of District lands. Surveys will identify the presence/absence of species and abundance of select high priority species.
		Strategies: ■ Develop monitoring plan.		*Strategies:* Same as Alternative 2.
2.4 State T&E Species and Species of Concern	Consider known populations of state listed species in management actions.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
		Strategies: ■ Document the presence of state listed species.		*Strategies:* Same as Alternative 2.

Table 1: Summary of Management Alternatives (Continued)

Objectives	Goals and Objectives			
	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
2.5 Monitoring		Assess value of local ecotype native seed plantings to migratory birds.		Assess value of local ecotype native seed plantings to migratory birds.
		Strategies: ■ Develop partnership with a university.		*Strategies:* ■ Develop partnership with a university.
Goal 3: People: A broad cross section of the public enjoys and appreciates District lands.				
Visitor Services(General)	Improve visitor services facilities and programs to raise quality of visitors' experiences.	Improve visitor services facilities and programs to raise quality of visitors' experiences.	Improve visitor services facilities and programs to raise quality of visitors' experiences.	Improve visitor services facilities and programs to raise quality of visitors' experiences.
	Strategies: ■ Develop 5 properties with parking lot, kiosks, and other compatible facilities; ■ Develop visitor services plan; ■ Improve website; Improve District brochures; ■ Update WPA maps and aerial photos.	*Strategies:* ■ Develop 5 properties with parking lot, kiosks, and other compatible facilities; ■ Develop visitor services plan. ■ Improve website; Improve District brochures; ■ Update WPA maps and aerial photos.	*Strategies:* ■ Develop 7 properties with parking lot, kiosks, and other compatible facilities; ■ Develop visitor services plan; ■ Improve website; Improve District brochures; ■ Update WPA maps and aerial photos.	*Strategies:* ■ Develop 7 properties with parking lot, kiosks, and other compatible facilities; ■ Develop visitor services plan; ■ Improve website; Improve District brochures; ■ Update WPA maps and aerial photos.
3.1 Hunting	Service quality ranking of program "good."	Maintain Service quality ranking of "good."	Maintain Service quality ranking of "good"; evaluate quality of visits within 15 years.	Maintain Service quality ranking of "good"; evaluate quality of visits within 15 years.
	Strategies: ■ Develop hunting plan.	*Strategies:* ■ Develop hunting plan.	*Strategies:* ■ Develop hunting plan; ■ Develop accessible hunting opportunities.	*Strategies:* ■ Develop hunting plan; ■ Develop accessible hunting opportunities.
3.2 Fishing	Wetlands on Leopold WMD waterfowl production areas do not support fishing, therefore fishing does not occur.			

Table 1: Summary of Management Alternatives (Continued)

Objectives	Goals and Objectives			
	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
3.3 Observation and Photography	Service quality ranking of program "good".	Maintain Service quality ranking of "good."	Maintain Service quality ranking of "good"; evaluate quality of visits within 15 years.	Maintain Service quality ranking of "good"; evaluate quality of visits within 15 years.
	Strategies: ■ See strategies under "Visitor Services (General)"	*Strategies:* ■ See strategies under "Visitor Services (General)"	*Strategies:* ■ See strategies under "Visitor Services (General)"	*Strategies:* ■ See strategies under "Visitor Services (General)"
3.4 Environmental Education and Interpretation	Service quality ranking of program fair within 5 years.	Service quality ranking of program fair within 5 years.	Service quality ranking of program good within 5 years; evaluate quality of visit.	Service quality ranking of program good within 5 years; evaluate quality of visit.
	Strategies: ■ See strategies under "Visitor Services (General)"; ■ Present three programs per year.	*Strategies:* ■ See strategies under "Visitor Services (General)"; ■ Present four programs per year.	*Strategies:* ■ See strategies under "Visitor Services (General)"; ■ Present 10 curriculum based environmental education programs per year.	*Strategies:* ■ See strategies under "Visitor Services (General)"; ■ Present five programs per year.
3.5 Volunteers	100 volunteer hours received per year.	200 volunteer hours received per year within two years of plan approval.	200 volunteer hours received per year within two years of plan approval.	300 volunteer hours received per year within two years of plan approval.
	Strategies: Follow Service guidelines for management of the volunteer program.	*Strategies:* Follow Service guidelines for management of the volunteer program.	*Strategies:* Follow Service guidelines for management of the volunteer program.	*Strategies:* Follow Service guidelines for management of the volunteer program; Develop Friends/ Conservation Organization support group within 5 years.

Table 1: Summary of Management Alternatives (Continued)

Objectives	Goals and Objectives			
	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
3.6 Partnerships	Maintain partnerships at the 2008 level.	Increase and improve partnerships over the level of the 2008 program.	Increase and improve partnerships over the level of the 2008 program.	Increase and improve partnerships over the level of the 2008 program.
	Strategies: ■ Continue to work with Wisconsin DNR, local government, and conservation organizations.	*Strategies:* ■ Active implementation of the Upper Mississippi Joint Venture Plan and Ducks Unlimited Northwest Pothole Focus Area; ■ Increase partnering with conservation organizations; ■ Continue to work with Wisconsin DNR and local government. ■ Evaluate creating "Friends of Leopold WMD."	*Strategies:* ■ Work with local schools and educational organizations to foster environmental education.	*Strategies:* Same as Alternative 2.
3.7 Community Outreach	Limited contacts with neighbors; respond to calls or specific projects.	Within 5 years identify neighbors for 20% of WPAs and provide them information about waterfowl management, make two public presentations per year to civic groups, local governments and other organizations to develop community support for WPA management.	Within 5 years identify neighbors to 30 % of the District's WPAs and provide them with information about waterfowl management; make 5 public presentations per year to civic groups, local governments, and other organizations to develop community support for WPA management.	Within 5 years identify neighbors to 40 % of the District's WPAs and provide them with information about waterfowl management and make 5 public presentations per year to civic groups, local governments, and other organizations to develop community support and action for waterfowl management across the entire District, both on and off Service lands.
	Strategies: ■ Contact neighbors the day of prescribed fires.	*Strategies:* ■ Engage neighbors in active habitat management; ■ Contact neighbors the day of prescribed fires.	*Strategies:* ■ Develop neighbors email list; ■ Develop an outreach plan; ■ Contact neighbors the day of prescribed fires.	*Strategies:* ■ Develop neighbors email list; ■ Develop an outreach plan; ■ Engage neighbors in active habitat management; ■ Contact neighbors the day of prescribed fires.

Table 1: Summary of Management Alternatives (Continued)

Objectives	Goals and Objectives			
	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
Goal 4: Land and Visitor Protection Protect the integrity of biological resources within the District and the cultural resources and health and safety of visitors and Service staff on WPAs.				
4.1 Conservation Easements	Meet service monitoring guidelines for FSA easements.	Meet service monitoring guidelines for FSA easements.	Meet service monitoring guidelines for FSA easements.	Meet service monitoring guidelines for FSA easements.
	Strategies: ■ Inspect each easement annually and follow-up on violations.	*Strategies:* ■ Inspect each easement annually and follow-up on violations.	*Strategies:* ■ Inspect each easement annually and follow-up on violations.	*Strategies:* ■ Inspect each easement annually and follow-up on violations.
4.2 Partners for Fish and Wildlife	Restore 120 acres of wetland, grassland, and oak savanna habitat per year.	Restore 120 acres of wetland, grassland, and oak savanna habitat per year with emphasis on focus areas..	Restore 120 acres of wetland, grassland, and oak savanna habitat per year.	Restore 120 acres of wetland, grassland, and oak savanna habitat per year with emphasis on focus areas.
	Strategies: ■ Work with Wisconsin DNR and other partners.	*Strategies:* ■ Work with Wisconsin DNR and other partners.	*Strategies:* ■ Work with Wisconsin DNR and other partners.	*Strategies:* ■ Work with Wisconsin DNR and other partners.
4.3 Enforcement	Visitors feel safe and the resource is protected.	Visitors feel safe and the resource is protected.	Visitors feel safe and the resource is protected.	Visitors feel safe and the resource is protected.
	Strategies: ■ Share regional law enforcement resources; ■ Partner with Wisconsin DNR Conservation Wardens.	*Strategies:* ■ Share regional law enforcement resources; ■ Partner with Wisconsin DNR Conservation Wardens.	*Strategies:* ■ Share regional law enforcement resources; ■ Partner with Wisconsin DNR Conservation Wardens.	*Strategies:* ■ Share regional law enforcement resources; Partner with Wisconsin DNR Conservation Wardens.
4.4Cultural Resources	Protect the cultural, historic, and pre-historic resources of federally-owned lands with the District.	Protect the cultural, historic, and pre-historic resources of federally-owned lands with the District.	Protect the cultural, historic, and pre-historic resources of federally-owned lands with the District.	Protect the cultural, historic, and pre-historic resources of federally-owned lands with the District.
	Strategies: Follow Service policy guidelines.	*Strategies:* Follow Service policy guidelines.	*Strategies:* Follow Service policy guidelines.	*Strategies:* Follow Service policy guidelines.

Table 1: Summary of Management Alternatives (Continued)

Objectives	Goals and Objectives			
	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
Implementation Requirements				
Staffing	■ District manager ■ Wildlife refuge specialist ■ Wildlife biologist ■ 2 private lands wildlife biologist ■ maintenance worker ■ administrative technician ■ fire management specialist ■ seasonal lead fire technician ■ (Total 8.2 FTEs)	■ Additional wildlife biologist ■ permanent seasonal tractor operator ■ (Add'l 1.5 FTEs)	■ Additional park ranger, ■ permanent seasonal tractor operator ■ (Add'l 1.5 FTEs)	■ Additional wildlife biologist, ■ Wildlife Refuge Specialist with emphasis in public use ■ Permanent seasonal tractor operator, ■ Biological Technician ■ (Add'l 3.5 FTEs)
Facilities	New shop and headquarters	New shop and headquarters	New shop and headquarters	New shop and headquarters

Chapter 3: Affected Environment

This chapter contains an overview of the affected environment of the Leopold Wetland Management District. More detail is contained in Chapter 3 of the CCP.

3.1. Introduction

The Leopold WMD covers 34 counties in eastern Wisconsin. This includes 21 counties approved for Waterfowl Production Area (WPA) acquisition, a 10-county Partners for Fish and Wildlife (PFFW) private lands district, and a 34-county Wildlife Management District, involving management and enforcement of U.S. Department of Agriculture's Farm Service Agency Conservation Easements (CEs). Currently there are 53 fee-title WPAs and 45 CEs.

3.2. Geographic/Ecosystem Setting

In pre-settlement times the southern half and western third of Wisconsin were covered with forests. Dominant species were primarily oak on the drier sites; sugar maple, basswood, slippery elm, red oak and ironwood on the mesic sites; and silver maple and American elm on the lowland sites. Scattered throughout the southern forest type were areas of true tall grass prairie. These prairies covered just over 2 million acres and were most dominant in the southwest corner of the state becoming smaller and more scattered as one moved northeast. The northern half of Wisconsin was dominated by forests. Northern forests supported jack, red, and white pine with red maple and red oak on the dry sites. The more mesic sites of the northern forests were contained sugar maple, hemlock, and/or beech. The northern lowlands consisted of tamarack-black spruce bog forests, white cedar-balsam fir conifer swamps, and black ash-yellow birch-hemlock hardwood swamps.

Pickerel frog. USFWS photo.

Of the approximately 9.5 million acres of prairie and oak savanna in pre-settlement Wisconsin, one-half of one percent (less than 10,000 acres) of the prairies and less than one-tenth of one percent (less than 1,000 acres) of the savanna remains. Farming, urban sprawl, fire suppression, and other developments continue to threaten the few acres of prairie and savanna that remain.

In 2002 about 60 percent of the land area in the District was in farms. (Table 2) For the state of Wisconsin about 45 percent of the land is in farms. Within the District 174,584 acres of land were enrolled in Conservation Reserve or Wetlands Reserve Programs in 2002. This represents 3.7 percent of the farm land or 2.3 percent of the total land area of the District. Percent land cover for each county is shown in Table 2.

The District contributes to the goals and objectives of various regional, national, and international conservation plans and initiatives, including the North American Waterfowl Management Plan and Partners in Flight.

Table 2: Land Cover in the Leopold Wetland Management District

County	Urban	Agricultural	Grassland	Forest	Water	Wetland	Barren	Shrubland
Adams	0.3%	19.3%	16.3%	44.6%	6.2%	11.0%	0.9%	1.4%
Calumet	1.3%	63.9%	1.4%	3.2%	19.3%	9.4%	1.4%	0.0%
Columbia	1.2%	50.9%	12.4%	17.7%	2.8%	13.9%	1.0%	0.1%
Dane	5.5%	54.6%	13.2%	15.8%	3.1%	6.3%	1.6%	0.0%
Dodge	1.5%	62.3%	9.8%	3.9%	3.9%	16.9%	1.7%	0.0%
Fond du Lac	2.0%	62.2%	10.5%	4.6%	5.5%	13.5%	1.7%	0.1%
Green Lake	1.2%	45.5%	11.8%	11.9%	7.2%	21.5%	0.7%	0.1%
Jefferson	1.8%	57.7%	11.6%	7.5%	4.5%	15.4%	1.3%	0.0%
Kenosha	6.8%	52.5%	11.8%	11.2%	3.1%	9.3%	3.8%	1.5%
Manitowoc	2.2%	73.1%	3.3%	6.5%	0.3%	13.3%	1.2%	0.0%
Marquette	0.5%	27.6%	17.1%	30.0%	2.6%	21.9%	0.2%	0.2%
Ozaukee	6.9%	49.2%	19.3%	9.1%	1.6%	10.6%	1.1%	2.2%
Racine	7.6%	53.9%	11.5%	12.1%	2.9%	6.9%	3.8%	1.3%
Rock	4.0%	72.0%	10.4%	8.5%	1.0%	3.9%	0.3%	0.0%
Sauk	1.5%	40.7%	13.9%	35.9%	1.2%	5.8%	1.0%	0.0%
Sheboygan	3.6%	57.6%	10.4%	11.4%	0.9%	12.0%	1.5%	1.5%
Walworth	2.6%	59.0%	10.1%	12.4%	3.8%	7.6%	4.0%	0.5%
Washington	3.4%	49.1%	16.6%	11.6%	1.4%	15.3%	1.9%	0.7%
Waukesha	11.9%	29.4%	24.3%	13.3%	4.6%	13.9%	1.6%	1.0%
Waushara	0.3%	34.6%	20.2%	27.4%	2.0%	13.9%	1.5%	0.0%
Winnebago	5.4%	50.9%	3.8%	3.4%	24.1%	11.0%	1.3%	0.0%
Wisconsin	1.6%	30.8%	10.7%	37.5%	3.4%	14.1%	1.1%	0.9%

Other public conservation lands occur within the District. U.S. Fish and Wildlife Service lands within the District include Horicon (more than 21,000 acres) and Fox River (about 1,000 acres) National Wildlife Refuges. Necedah National Wildlife Refuge (more than 43,000 acres) is located a few miles west of Adams County, which is in the northwest part of the District. Wisconsin Department of Natural Resources manages over 307,000 acres of conservation and recreation lands within the District. The DNR lands include 58 State Wildlife Areas with a total acreage close to 144,000 acres. The largest Wildlife Area is over 12,000 acres. The DNR manages over 18,000 acres of natural areas, 22,000 acres of parks and trails, and nearly 29,000 acres of other wildlife habitat within the District. Most of the lands managed for wildlife and some other state lands are open to wildlife-dependent recreation.

3.3. Socioeconomic Setting

Just as the environmental characteristics vary across the District, so, too, do the socioeconomic characteristics. (Table 3) Milwaukee influences the southeastern portion of the District. The counties of Racine, Washington, and Waukesha in the southeast have the highest median household income and the highest median housing value in the District. The population of the District is expected to grow about one percent per year over the next twenty years. The counties projected to grow at the highest average annual rate are Calumet, Dane, Kenosha, Sauk, Walworth, and Washington. The District's population is projected to increase about 374,000 from 2005 to 2025.

Table 3: Socioeconomic Data, Counties Within the Leopold Wetland Management District[1]

County	Total Population	Percent Urban	Median Age	Percent Female	College[2] Educated	Percent Hispanic	Percent American Indian	Percent Asian	Percent Black	Median HH Income	Median Housing Value[3]
Adams County	19,920	0.0	44.5	49.3	10	1.4	0.6	0.3	0.3	$33,408	$83,600
Calumet County	40,631	60.3	35.2	50	21	1.1	0.3	1.5	0.3	$52,569	$109,300
Columbia County	52,468	36.8	38.0	49.6	17	1.6	n/a	0.3	0.9	$45,064	$115,000
Dane County	426,526	84.5	33.2	50.5	41	3.4	n/a	3.5	4.0	$49,223	$146,900
Dodge County	85,897	47.8	37.0	47.7	13	2.5	n/a	0.3	2.5	$45,190	$105,800
Fond du Lac County	97,296	62.1	36.9	51	17	2.0	0.4	0.9	0.9	$45,578	$101,000
Green Lake County	19,105	25.1	40.9	51	14	2.1	02	0.3	02	$39,462	$90,100
Jefferson County	74,021	57.8	36.6	50.4	17	4.1	n/a	0.4	0.3	$46,901	$123,800
Kenosha County	149,577	88.6	34.8	50.4	19	7.2	n/a	0.9	5.1	$46,970	$120,900
Manitowoc County	82,887	60.9	38.3	50.5	15	1.6	0.4	2.0	n/a	$43,286	$90,900
Marquette County	14,555	0.0	40.9	n/a	10	n/a	n/a	n/a	n/a	$35,746	$87,000
Ozaukee County	82,317	74.6	38.9	50.7	39	1.3	n/a	1.1	0.9	$62,745	$177,300
Racine County	188,831	87.0	36.1	50.5	20	7.9	n/a	0.7	10.5	$48,059	$111,000
Rock County	152,307	78.2	35.9	50.8	17	3.9	n/a	0.8	4.6	$45,517	$98,200
Sauk County	55,225	50.1	37.3	50.6	18	1.7	n/a	0.3	0.3	$41,941	$107,500
Sheboygan County	112,646	70.8	36.8	49.8	18	3.4	n/a	3.3	1.1	$46,237	$106,800
Walworth County	93,759	64.0	35.1	50.3	22	6.5	n/a	0.7	0.8	$46,274	$128,400
Washington County	117,493	65.2	36.6	50.1	22	1.3	n/a	0.6	0.4	$57,033	$155,000
Waukesha County	360,767	87.8	38.1	50.8	34	2.6	n/a	1.5	0.7	$62,839	$170,400
Waushara County	23,154	0.3	42.1	50	12	3.7	0.%	0.3	0.3	$37,000	$85,100
Winnebago County	156,763	84.2	35.4	50	23	2.0	0.5	1.8	1.1	$44,445	$97,700
State of Wisconsin		68.3%	36.0	50.6%	22	3.6	0.8	1.6	5.6	$43,791	$112,200

1. *Source: Census 2000 as reported in Wisconsin SCORP*
2. *Percent college educated calculated for persons age 25 and older.*
3. *Housing value is calculated for owner occupied housing units.*

3.4. Climate

The District's climate is continental with cold winters and warm summers. Given the extent of the District, the long-term averages vary across the District. Lake Michigan moderates the temperatures in the eastern portion of the District. The average annual precipitation is higher in the southern part of the District than in the central and northern part. The normal temperatures and annual precipitation averages for the period 1971-2000 for a region that includes Columbia, Dane, Dodge, Green, Jefferson, and Rock Counties present an adequate indication of the climate of the District. The region has an average annual temperature of 45.9 degrees Fahrenheit. July is the warmest month with an average temperature of 71.3 degrees Fahrenheit. The coldest month is January with an average temperature of 16.8 degrees Fahrenheit. Annual precipitation is 34.11 inches. The average monthly precipitation exceeds 3 inches for April, May, and September. The average monthly precipitation exceeds 4 inches for June, July, and August.

3.5. Geology and Soils

A majority of the WMD is quite similar to the glaciated prairie region of western Minnesota. This similarity is recognized with the inclusion of these glaciated prairie areas in Category 2, Prairie and Pothole Parklands, in the Service's revised Waterfowl Habitat Acquisition Plan. The counties that lie within the Leopold WMD boundaries owe much of their ecology to the glacial history of Wisconsin. Glaciers most recently flowed into Wisconsin about 25,000 years ago and reached their greatest extent, covering approximately two thirds of the state, some 14,000 to 16,000 years ago.

3.6. Water and Hydrology

Hydrologic features vary across the ecological landscapes of the District, although the past draining of wetlands is consistent throughout the District. According to the Wisconsin DNR, watershed and groundwater pollution vary considerably across the District. From a practical perspective, the relevance of hydrology to the establishment and management of a WPA is best analyzed and discussed at a local scale.

Wetlands within the District occur in a diverse distribution of sizes, types, locations, and associations. The WPAs have approximately 5,265 acres of wetlands ranging in size from small seasonal basins less than half an acre in size to large permanent marshes over 200 acres in size.

3.7. Plant Communities

3.7.1. Plant Communities Associated with Wetlands

Wetlands throughout the District provide both resting cover and food resources for migratory birds. Substantial emergent and submergent aquatic vegetation occurs in freshwater wetlands. Sago pondweed, coontail, various pondweeds and duckweed occur in the deeper, more permanently flooded zones, while cattail, hardstem and softstem bulrush, burreed, arrowhead, sedges, and smartweed grow in shallow areas that may go dry during some periods.

3.7.2. Plant Communities Associated with Uplands

3.7.2.1. Grasslands

Past habitat management emphasized the provision of dense nesting cover (DNC) for waterfowl. Several areas on the District were planted to monotypic stands of switchgrass. These fields initially provided good cover for nesting birds; however, over time they deteriorated and were prone to invasion by Canada thistle and other problem species (e.g., smooth brome). In addition, many of the Waterfowl Production Areas contained fields that had been enrolled in the Conservation Reserve Program and were planted to brome by the previous owners. These monotypic stands of brome provide some habitat for wildlife but not as much as diverse native species plantings. The District has begun the process of restoring these grasslands to native grasses and forbs.

3.7.2.2. Shrub-Scrub

Some scrub shrub communities are found on District lands. Most are found in upland grass fields that have not been managed intensively with fire, mowing or grazing. These fields are usually going through succession and if left unmanaged would

eventually turn into forest. Common plant species include willow, dogwood, box elder, prickly ash, sumac and numerous young tree saplings.

3.7.2.3. Forests

The District is located along a transition zone where several forest, wetland and prairie vegetation community types intersect. Several types of forests are found on the District including oak savanna, southern oak forest, southern mesic forest and northern mesic forest. Oak savannas are dominated by burr oaks, white oaks and an understory of prairie grasses and forbs. Southern oak forests are found in small sections of the District and are dominated by white, black and red oaks. Southern mesic forests contain sugar maple, elm and basswood while northern mesic forests contain maple, hemlock and yellow birch. Most of the forested habitat on WPAs are oak savannas, oak forests, old farm woodlots or pine plantations with red pine or white pine.

3.7.3. Shrubs and Trees in Fencerows

Some WPAs contain old fencerows that are remnants from previous land owners. The fencerows contain shrubs and trees that are beneficial for some wildlife and are, generally, a detriment to grassland bird species. Many of the trees found in fencerows are invasive species such as Siberian elm, honeysuckle, black locust, box elder and buckthorn. Since these trees and shrubs invade grassland areas, the trees along the fencerows are typically removed.

3.8. Fish and Wildlife Communities

The variety of vegetative communities on the District provides habitat for both wetland and upland associated wildlife, such as ducks, herons, songbirds, deer, and turkey. The District also hosts furbearers, marsh birds, raptors, and a variety of woodland mammals, in addition to amphibians and reptiles. Most wetlands within the District are too shallow to support fish although several species of minnows have been observed.

3.8.1. Birds

A complete inventory of bird species that use WPAs within the District has not been completed. Based on the state list and surveys completed during the 1970s, we would expect over 250 species to be found on the WPAs.

Mallards, Wood Ducks, Blue-winged Teal, and Canada Geese are common nesting waterfowl species on WPAs. In addition, during migration the following waterfowl species are also common: Canvasback, Greater and Lesser Scaup, Gadwall, Northern Shoveler, Redhead, Bufflehead, Green-winged Teal, American Wigeon, and Ring-necked Duck.

The grassland and wetland complexes in the District provide nesting habitat for many species of birds including Bobolinks, Meadowlarks, Bluebirds, Henslow's Sparrows, Killdeer, Sandhill Cranes, Northern Harrier, and Short-eared Owls. In addition, many species of waterbirds including Great Blue Herons, Great Egrets, Green Herons, Least Bitterns, rails, and coots use District wetlands. Numerous other species use District lands during spring and fall migration.

3.8.2. Mammals

Common mammal species for the District include white-tailed deer, raccoon, beaver, muskrat, mink, red squirrel, gray squirrel, eastern cottontail and numerous small mammals such as eastern chipmunks, deer mouse, meadow jumping mouse, meadow vole, short-tail shrew, white-footed mouse, and thirteen-lined ground squirrel. Red fox are the most common carnivores of the area followed by coyote and gray fox. An inventory of mammal species has not been completed for the District.

3.8.3. Amphibians and Reptiles

No surveys have been conducted on District lands to document species presence or distribution, although some species such as Blanding's turtle, snapping turtle, painted turtle, and spring peepers are commonly seen or heard.

3.8.4. Invertebrates

No formalized invertebrate sampling, other than for Karner blue butterfly (see T&E Species below), has been conducted on the WPAs. Freshwater invertebrates are important waterfowl food, but no studies have been done to determine the species present.

3.8.5. Fish

No formalized fish sampling has been conducted on the WPAs. Generally fish are not promoted as they are perceived to compete with waterfowl for important invertebrate resources. Additionally, most District wetlands freeze out over winter and as such do not hold large populations of fish.

3.9. Threatened and Endangered Species

The Karner blue butterfly is listed as federally endangered in Adams, Green Lake, Marquette, Oconto, Outagamie, Shawano, and Waushara Counties within the District. To date, one WPA in the District has confirmed populations of Karner blue butterflies. New Chester WPA in Adams County has lupine present however; no surveys have been conducted to document the presence/absence of Karner blue butterflies on this property.

The Eastern prairie fringed orchid is listed in Dane, Jefferson, Kenosha, Ozaukee, Rock, Walworth, Waukesha, Sheboygan, and Winnebago Counties. A population of Eastern Prairie Fringed Orchids has been found on one WPA within the District.

The Whooping Crane has the designation as a "Non-essential Experimental Population" in Wisconsin. Since the re-introduction whooping cranes have been spotted using WPAs in Columbia and Winnebago counties.

Several state listed T&E species have been identified on Districts lands among them Blanding's turtle, Osprey, and Henslow's Sparrow.

3.10. Threats to Resources

3.10.1. Invasive Species

Three categories of undesirable species (invasive, exotic, noxious) are found within the District. Invasive species are alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Exotic species are species that are not native to a particular ecosystem. Service policy directs the Refuge to try to maintain habitats free of exotic species. Noxious weeds are designated by the U.S. Department of Agriculture or the Wisconsin Department of Agriculture as species which, when established, are destructive, competitive or difficult to control.

Invasive, exotic and noxious weed species are relatively abundant within the District. The principal invasive and exotic plant species within the District are reed canary grass, spotted knapweed, leafy spurge, garlic mustard, box elder, buckthorn, black locust, phragmites, hybrid cattail, brome and purple loosestrife. Currently, most District control efforts focus on Canada thistle, spotted knapweed, leafy spurge, buckthorn and black locust. Exotic and invasive plant species pose one of the greatest threats to the maintenance and restoration of the diverse habitats found on WPAs. They threaten biological diversity by causing population declines of native species and by altering key ecosystem processes like hydrology, nitrogen fixation, and fire regimes.

3.10.2. Drainage and Pesticides

Waterfowl Production Areas are often islands in a sea of intensive agriculture. Natural drainage patterns have been altered throughout the landscape, increasing the frequency, intensity, and duration of water flowing into many units. Siltation, nutrient loading, and contamination from point and non-point sources of pollution are a serious problem on many WPAs. Waterfowl Production Areas are also threatened by farming trespass, dumping, wildfires, and pesticide applications on adjacent agricultural land.

3.10.3. Rural Development

Rural development also threatens District lands in counties with growing populations, such as Dane, Milwaukee, and Winnebago counties. Lands adjoining WPAs are often seen as highly desirable rural building lots that are purchased as small hobby

farms or rural home sites. This can result in the WPA being "ringed" by homes, with a series of negative impacts on the WPA. Such development can limit future management such as prescribed fire; increase trespass on District lands by neighbors using ATVs, horses, or vehicles; increase threats to wildlife from stray pets (cats and dogs); increase use of District land by neighbors for illegal uses such as dumping, gardening, equipment storage, etc.; and can place hunters and neighbors at odds over concerns about safety during the hunting seasons.

3.11. Cultural Resources and Historic Preservation

Because the District includes such an extensive area, it likely contains archeological sites from all of the cultural periods found in Wisconsin: PaleoIndian, Archaic, Woodland, Mississippian, Oneota, and Western (French, British, and United States) cultures. In addition, Indian tribes may identify sacred sites and traditional cultural properties on WPAs, and the Districts may acquire buildings and other structures of historical importance. However, as of 2006, the Service has no record of extant sacred sites, traditional cultural properties, and historic buildings and structures on any WPA.

Just 118 acres of District lands in Wisconsin have been subjected to an archeological survey. From those surveys and other sources, 89 cultural resources sites are reported on the Districts in Wisconsin. The potential, therefore, is high for finding many more cultural resources sites. At this time no sites on the Districts have been nominated or placed on the National Register of Historic Places, although all sites are considered eligible until determined not eligible through the Section 106 process.

The CCP lists 38 Indian tribes that have been recognized by the Federal government or self-identified by the tribe as having a potential concern for traditional cultural resources, sacred sites, and cultural hunting and gathering areas in Wisconsin. Although Indian tribes are generally understood to have concerns about traditional cultural properties, other groups such as church congregations, civic groups, and county historical societies could have similar concerns.

3.12. Visitor Services

Waterfowl Production Areas differ from national wildlife refuges in that they are open to hunting, fishing, and trapping by specific regulation, and open to the other wildlife-dependent activities by notification in general brochures available at the District office. New and existing WPAs are thus "open until closed" versus national wildlife refuges, which are "closed until opened." Within the Leopold WMD, Blue-wing WPA in Ozaukee County and Wilcox WPA in Waushara are closed to hunting for safety concerns and as a condition of the willing seller, respectively. New acquisitions are evaluated for these ramifications and probably will not be purchased.

Thirty-eight parking lots are provided on 24 WPAs in the District. The parking lots range in condition from semi-improved (gravel) to a mowed grass area for visitors to exit the road way. A General District Brochure with driving directions are provided to visitors for locating the WPAs and the District maintains a website for downloading maps and aerial photos. The majority of hunters on WPAs hunt waterfowl, white-tailed deer, and small game. Pheasants, cotton-tail rabbits, and Wild Turkeys are the common small game species that hunters pursue. The District receives one or two requests a year for special use permits for accessible hunting opportunities.

Fishing consistent with state regulations is allowed on all WPAs; however this activity is virtually non-existent due to the lack of fish.

Wildlife observation, photography, interpretation, and environmental education are encouraged on WPAs and are increasing in popularity with the public. District staff provide several interpretive programs each year to groups and conservation organizations. Generally there are limited facilities on WPAs for wildlife observation or photography. District staff respond to occasional requests for environmental education programs for school groups. The District does not provide structured curriculum based environmental education.

3.13. Other Refuge Uses

In addition to the wildlife-dependent recreation, the District regularly receives requests for various non-wildlife-dependent uses such as dog trials,

horseback riding, plant collecting, berry picking, and special events. Also, various economic uses such as haying, grazing, and timber harvest are used as habitat management tools and involve the issuance of special use permits. The manager must often decide about other "uses" including requests for rights-of-way for new or expanded roads, utilities, pipelines, and communications equipment. Generally the District receives a few requests each year for these "uses", although the quantity has been increasing, which may be one result of the increased developmental pressure.

Chapter 4: Environmental Consequences

4.1. Effects Common to All Alternatives

Specific environmental and social impacts of implementing each alternative are examined in this chapter. Several potential effects will be very similar under each alternative, and they are summarized in this section. See Table 4 on page 127 for a summary of environmental and social impacts.

4.1.1. Air Quality

None of the management alternatives would have appreciable, long-term impacts on ambient air quality in the District. Habitat management involving prescribed fire would occur under each alternative, but prescribed fire would be used only under ideal weather conditions. Approved smoke management practices developed by state and federal land management agencies would be implemented in all burning events. However, under each alternative there would be some potential for temporary air quality impacts from smoke to neighbors of WPAs.

Tailpipe emissions from operation of District equipment and from visitation to WPAs by the motoring public are negligible in comparison with overall regional emissions.

4.1.2. Environmental Justice

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was signed by President Clinton on February 11, 1994. Its purpose was to focus the attention of federal agencies on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low income communities access to public information and participation in matters relating to human health or the environment.

Song Sparrow. USFWS photo.

None of the management alternatives would disproportionately place any adverse environmental, economic, social, or health impacts on minority and low income populations. Public use activities that would be offered under each of the alternative would be available to any visitor regardless of race, ethnicity or income level.

4.1.3. Climate Change Impacts

The U.S. Department of the Interior issued an order in January 2001 requiring federal agencies, under its direction, that have land management responsibilities to consider potential climate change

impacts as part of long range planning endeavors. The increase of carbon dioxide within the earth's atmosphere has been linked to the gradual rise in surface temperature commonly referred to as global warming. In relation to comprehensive conservation planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy's "Carbon Sequestration Research and Development" (U.S. DOE, 1999) defines carbon sequestration as "...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere." Vegetated land is a tremendous factor in carbon sequestration. Terrestrial biomes of all sorts – grasslands, forests, wetlands, tundra, and desert – are effective both in preventing carbon emission and acting as a biological "scrubber" of atmospheric carbon dioxide. The Department of Energy report's conclusions noted that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere.

One District activity, prescribed burning, releases carbon dioxide directly into the atmosphere from the biomass consumed during combustion. However, there is actually no net loss of carbon, since new vegetation quickly germinates and sprouts to replace the burned-up biomass and sequesters or assimilates an approximately equal amount of carbon as was lost to the air. Overall, there should be little or no net change in the amount of carbon sequestered on WPAs from any of the proposed management alternatives. Preserving natural habitat for wildlife is the heart of any long-range plan for waterfowl production areas. Land that may be acquired and its management altered from annual cropping to wildlife habitat will sequester more carbon as a waterfowl production area than as an agricultural field. The actions proposed in this CCP would preserve or restore land and habitat, and would thus retain existing carbon sequestration on the WPAs. This in turn contributes positively to efforts to mitigate human-induced global climate change.

4.1.4. Cultural Resources

The Service is responsible for managing archeological and historic sites found on waterfowl production areas. Management activities on the WPAs have the potential to impact cultural resources. The consequences for cultural resources would be the same under each management alternative. Although the presence of cultural resources, including historic properties, cannot stop a Federal undertaking, the undertakings are subject to Section 106 of the National Historic Preservation Act and sometimes other laws. Thus, the District Manager, during early planning, provides the Regional Historic Preservation Officer a description and location of all projects, activities, routine maintenance and operations that affect ground and structures; requests for permitted uses; and alternatives being considered. The RHPO analyzes these undertakings for potential to affect historic properties and enters into consultation with the State Historic Preservation Officer and other parties as appropriate. And, the District Manager asks the public and local government officials to identify concerns about impacts caused by the undertaking in a notification that is at least equal to, and preferably with, the public notification carried out for NEPA and compatibility.

4.1.5. Other Common Effects

None of the alternatives would have more than negligible or at most minor effects on soils, topography, noise levels, transportation and traffic, waste management, human health and safety, or visual resources.

4.2. Effects of Alternatives

4.2.1. Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)

Under Alternative 1 the District would continue to restore wetlands to provide for waterfowl during nesting and fall migration. It is expected that habitat benefits to these birds would continue under Alternative 1.

And, the District's grasslands, 4,874.5 acres (includes all current native grasslands, existing brome fields and croplands in the process of conversion), would continue to be restored and maintained as grasslands made up of species native to the area. This restoration of a habitat that has been in regional decline is a positive effect in and of itself, and it would also benefit nesting waterfowl and grassland birds. The projected increase in grassland parcel sizes from the removal of trees along old fencerows would also be beneficial, because it would reduce the adverse effects of habitat fragmentation.

The control of invasive plant species using a variety of chemical, mechanical and biological methods would have the beneficial result of slowing the spread of these species, which tend to supplant native flora and reduce habitat value for wildlife. Under Alternative 1, there would be limited control and monitoring of invasive species.

The restoration of oak savannahs would help maintain stand health and the resulting increased amount of light penetrating to lower levels in the forest would trigger greater growth in the sub-stories below the canopy; this in turn would benefit terrestrial wildlife that feed on shoots, leaves, flowers, fruits, nuts, grass and forbs, all of which are in short supply in the understory and ground levels of closed canopy forests. Oak savannas are a very endangered ecosystem and the restoration of this habitat would help preserve a diversity of plant species.

Broader landscape involvement by Partners for Fish and Wildlife would continue to restore an average of 515 acres of habitat each year on non-Service land. These restoration efforts would benefit wildlife, but they would not capture the potential complementary effects of restoring lands and waters in complexes with WPAs or other public land complexes.

This alternative would not advance the Region's interest in promoting Regional Conservation Priority Species. If any of these species were to become established and thrive within the District, it would not be from any proactive measures on the District's part.

This alternative would not advance the Service's understanding of waterfowl recruitment within the Wetland District. Lack of recruitment and waterfowl pair abundance data limits the District's ability to target areas for habitat restoration and acquisition based on biological data.

Under this alternative acquisition would continue at the current rate of approximately 300 acres per year providing for limited benefits associated with completing the habitat complexes around existing WPAs. The focus areas within the District, as determined by modeling, would also continue as important areas for acquisition and management.

Under this alternative the wildlife-dependent opportunities available on the District would continue at the present low quality level. Volunteer and partnership participation would continue, as would the current level of contact with neighbors of WPAs. The result would be that recreation experiences, visitor satisfaction, and public awareness of the purpose and mission of WPAs would continue at levels that would not enhance Service goals and identity.

This alternative would not advance the Service's understanding of waterfowl recruitment within the Wetland District. Lack of recruitment and waterfowl pair abundance data limits the District's ability to target areas for habitat restoration and acquisition based on biological data.

Because of the scarcity of resources to perform outreach in neighboring communities, needed management actions are likely to be misunderstood by some people. This could lead to a lack of support for important habitat management tools such as the removal of trees, fencerows and pine plantations, and the use of prescribed fire and grazing.

4.2.2. Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/ Moderate Consideration for Visitor Services

Under Alternative 2 the District would restore more wetlands over the next 15 years than would be restored at the current rate to provide for waterfowl during nesting and fall migration. Habitat benefits to these birds would be greater than under Alternative 1. Increased restoration and management of seasonal basins would provide important spring migratory and pair habitat for waterfowl as well as increased benefits to amphibians such as frogs and salamanders. The District would also actively manage 1,000 acres of wetlands through the use of existing water management facilities.

The District's grasslands would be restored and maintained as grasslands made up of species native to the area at a rate greater than under Alternative 1. The restoration of this habitat, which has been in regional decline, is a positive effect in and of itself, and it would benefit nesting waterfowl and grassland birds. The projected increase in grassland parcel sizes from the removal of trees along old fencerows would also be beneficial, because it would reduce the adverse effects of habitat fragmentation. By increasing the number of grass and forb species

in the nursery program, the District's grasslands would be more diverse plantings, providing for increased benefits for wildlife.

The control of invasive plant species would have the beneficial result of slowing the spread of these species, which tend to supplant native flora and reduce habitat value for wildlife. Increased inventory and monitoring of invasive species under Alternative 2 would allow the District to more efficiently target species for control resulting in greater wildlife benefits.

The proposed thinning of woodlands would help maintain stand health and the resulting increased amount of light penetrating to lower levels in the forest would trigger greater growth in the sub-stories below the canopy; this in turn would benefit terrestrial wildlife that feed on shoots, leaves, flowers, fruits, nuts, grass and forbs, all of which are in short supply in the understory and ground levels of closed canopy forests. Resident wildlife species and some migratory species would benefit from increased management of forest stands.

Oak savanna restoration would be accelerated under this alternative. The District would be inventoried to locate remnant oak savannas and develop a plan to restore them. Increased plant diversity in the nursery program would also allow the District to plant oak savanna dependent understory species in restoration areas and to increase the diversity of prairie restoration sites.

Broader landscape involvement by Partners for Fish and Wildlife would continue to restore an average of 515 acres of habitat each year on non-Service land. These restoration efforts would benefit wildlife, but they would not capture the potential complementary effects of restoring lands and waters in complexes with WPAs or other permanently protected lands.

This alternative would increase the District's understanding of waterfowl recruitment and allow for a more biologically based approach for targeting restoration and acquisition efforts to benefit waterfowl and other grassland and wetland dependent migratory birds. The biological data would also provide benefits to other public agencies managing habitat for waterfowl within the counties the District manages WPAs.

Under this alternative, acquisition would proceed at a greater rate than Alternative 1, taking advantage of the complementary effect of acquiring habitat near existing public lands complexes. Focus areas within the District, as determined by modeling, would also continue to be an important tool in identifying areas for acquisition and management.

This alternative would not advance the Region's interest in promoting Regional Conservation Priority Species. Monitoring of these species would increase the District's ability to consider these regionally important species in management planning.

Under this alternative the wildlife-dependent recreation opportunities available on the District would continue at the current level. There would be a slight increase in the quality of these experiences since facilities would be maintained in a better condition. Volunteer and partnership participation would continue, as would the current level of contact with neighbors of WPAs. The result would be that recreation experiences, visitor satisfaction, and public awareness of the purpose and mission of WPAs would continue at levels that are of concern.

This alternative would result in some outreach to neighboring communities regarding management actions, but not at a level that would result in widespread support.

4.2.3. Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services

Under Alternative 3, the District would restore and manage the same amount of wetlands over the next 15 years as in Alternative 1. Habitat benefits to waterfowl and other wetland dependent species would the same as under Alternative 1.

The District's grasslands would be restored and maintained as grasslands made up of species native to the area at a rate greater than under Alternative 1. The restoration of this habitat, which has been in regional decline, is a positive effect in and of itself, and it would benefit nesting waterfowl and grassland birds. The projected increase in grassland parcel sizes from the removal of trees along old fencerows would also be beneficial, because it would

reduce the adverse effects of habitat fragmentation. Fencerow removal would continue at a slightly higher rate than Alternative 1 through the use of the volunteer program.

The control of invasive plant species would have the beneficial result of slowing the spread of these species, which tend to supplant native flora and reduce habitat value for wildlife. Through partnerships and volunteers, inventory of invasive species would be at a rate higher than Alternative 1.

The proposed thinning of woodlands and restoration of oak savannahs would help maintain stand health and the resulting increased amount of light penetrating to lower levels in the forest would trigger greater growth in the sub-stories below the canopy; this in turn would benefit terrestrial wildlife that feed on shoots, leaves, flowers, fruits, nuts, grass and forbs, all of which are in short supply in the understory and ground levels of closed canopy forests. These activities would continue at the same rate as Alternative 1.

Broader landscape involvement by Partners for Fish and Wildlife would continue to restore an average of 515 acres of habitat each year on non-Service land. These restoration efforts would benefit wildlife, but they would not capture the potential complementary effects of restoring lands and waters in complexes with WPAs.

This alternative would not advance the Service's understanding of waterfowl recruitment within the Wetland District. Lack of recruitment and waterfowl pair abundance data limits the District's ability to target areas for habitat restoration and acquisition based on biological data.

Under this alternative, acquisition would continue at the current rate of approximately 300 acres per year providing for limited benefits associated with completing the habitat complexes around existing WPAs. The two focus areas within the District would also continue as important areas for acquisition and management.

This alternative would not advance the Region's interest in promoting Regional Conservation Priority Species. If any of these species were to become established and thrive within the District, it would not be from any proactive measures on the District's part.

Under this alternative the wildlife-dependent recreation opportunities available on the District would continue with more opportunities than under Alternative 1. The quality rating of these experiences would increase. Volunteer and partnership participation in District activities would increase over Alternative 1. The result would be that recreation experiences, visitor satisfaction, and public awareness of the purpose and mission of WPAs would improve over current levels.

This alternative would result in increased outreach to neighboring communities regarding management actions. There would be increased public understanding of management actions including removal of pine plantations, trees and fencerows and the use of prescribed fire and grazing.

4.2.4. Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships (Preferred Alternative)

Under Alternative 4 the District would restore more wetlands over the next 15 years than would be restored at the current rate to provide for waterfowl during nesting and fall migration. Habitat benefits to these birds would be greater than under Alternative 1. Increased restoration and management of seasonal basins would provide important spring migratory and pair habitat for waterfowl as well as increased benefits to amphibians such as frogs and salamanders. The District would also actively manage 1,000 acres of wetlands through the use of existing water management facilities.

The District's grasslands would be restored and maintained as grasslands made up of species native to the area at a rate greater than under Alternative 1. The restoration of this habitat, which has been in regional decline, is a positive effect in and of itself, and it would benefit nesting waterfowl and grassland birds. The projected increase in grassland parcel sizes from the accelerated removal of trees along old fencerows would also be beneficial, because it would reduce the adverse effects of habitat fragmentation. By increasing the number of grass and forb species in the nursery program, the District's grasslands would be more diverse plantings, providing for increased benefits for wildlife. There would

also be increased grassland benefits from working with neighbors to restore buffers on private lands adjacent to WPAs.

The control of invasive plant species would have the beneficial result of slowing the spread of these species, which tend to displace native flora and reduce habitat value for wildlife. Increased inventory and monitoring of invasive species under Alternative 4 would allow the District to more efficiently target species for control resulting in greater wildlife benefits. Increased partnerships and coordination with neighbors to control invasives on private lands adjacent to WPAs would provide a buffering effect for WPAs.

The proposed thinning of woodlands would help maintain stand health and the resulting increased amount of light penetrating to lower levels in the forest would trigger greater growth in the sub-stories below the canopy; this in turn would benefit terrestrial wildlife that feed on shoots, leaves, flowers, fruits, nuts, grass and forbs, all of which are in short supply in the understory and ground levels of closed canopy forests. Resident wildlife species and some migratory species would benefit from increased management of forest stands. Forest acreage would decrease under this alternative as oak savannas are restored and woodlots in historic prairie areas are returned to grassland. Pine plantations would also be removed at an accelerated rate under this alternative.

Oak savanna restoration would be accelerated under this alternative. The District would be inventoried to locate remnant oak savannas and develop a plan to restore them. Increased plant diversity in the nursery program would also allow the District to plant oak savanna dependent understory species in restoration areas.

Broader landscape involvement by Partners for Fish and Wildlife would continue to restore an average of 515 acres of habitat each year on non-Service land. These restoration efforts would benefit many species of wildlife and also take advantage of the complementary effects of restoring habitat near existing complexes of WPAs or other permanently protected lands.

This alternative would increase the District's understanding of waterfowl recruitment and allow for a more biologically based approach for targeting restoration and acquisition efforts to benefit waterfowl and other grassland and wetland dependent migratory birds. The biological data would also provide benefits to other public agencies managing habitat for waterfowl within the 34-county District.

Under this alternative, acquisition would proceed at a greater rate than Alternative 1, taking advantage of the complementary effect of acquiring habitat near existing public lands complexes. Focus areas within the District, as determined by modeling, would also continue to be an important tool in identifying areas for acquisition and management.

This alternative would advance the Region's interest in promoting Regional Conservation Priority Species. Monitoring of these species would increase the District's ability to consider these regionally important species in management planning.

Under this alternative, the wildlife-dependent recreation opportunities available on the District would continue with more opportunities than under Alternative 1. The quality rating of these experiences would increase. Volunteer and partnership participation in District activities would increase over Alternative 1. The result would be that recreation experiences, visitor satisfaction, and public awareness of the purpose and mission of WPAs would improve over current levels. Emphasis would be placed on developing a WPA neighbors program to develop support for long-term management of the WPAs and the use of prescribed fire as a management tool. Waterfowl management and grassland birds would be an important focus of educational efforts. Side benefits such as habitat restoration in partnership with neighbors is an anticipated outcome.

This alternative would result in increased outreach to neighboring communities and WPA neighbors regarding management actions. There would be increased public understanding and support of management actions including removal of pine plantations, trees and fencerows and the use of prescribed fire and grazing.

4.3. Cumulative Impacts Analysis

"Cumulative environmental impacts" refer to effects that result from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions,

Table 4: Summary of Impacts

Impact Topics	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
Impacts Associated with Habitat Management				
Waterfowl Productivity	Slight increase	Increase	Slight increase	Increase
Grassland-dependent migratory birds	Slight increase	Increase especially species dependent on large grassland block size	Slight increase	Increase especially species dependent on large grassland block size
Forest-dependent migratory birds	Slight decrease	Slight decrease	Slight decrease	Slight decrease
Other Migratory Birds	Slight increase	Increase	Slight increase	Increase
Threatened and Endangered Species	Remain stable	Remain stable	Remain stable	Remain stable
Habitat Restoration and Management	Remain stable	Increased restoration and management of grassland and wetland habitat	Remain stable	Increased restoration and management of grassland and wetland habitat
Biological Inventories and Monitoring	Remain stable	Increase	Remain stable	Increase
Resident Wildlife	Slight increase	Increase – especially grassland dependent species	Slight increase	Increase-especially grassland dependent species
Invasive Species	Minimal control and inventory	Increased control and inventory	Minimal control, some inventory	Increased control and inventory
Impacts associated with Habitat Loss and Fragmentation				
Grassland	Slight increase in overall grassland acreage and block size	Increase in overall grassland acreage and block size	Slight increase in overall grassland acreage and block size	Increase in overall grassland acreage and block size
Oak Savanna	Remain stable	Increase in restoration and management	Slight increase in restoration and management	Increase in restoration and management
Wetland	Slight increase in restored acres and no increase in managed acres	Increase in restored and managed acres	Slight increase in restored acres and no increase in managed acres	Increase in restored and managed acres
Forest	No active management	Increased management through timber stand improvement	No active management	Increased management through timber stand improvement
Tree Removal	Slight increase	Increase in rate	Slight increase	Increase in rate

Table 4: Summary of Impacts

Impact Topics	Alternative 1: Waterfowl Emphasis – Current Management Direction (No Action)	Alternative 2: Waterfowl Emphasis with Increased Consideration for Other "Priority" Species and Low/Moderate Consideration for Visitor Services	Alternative 3: Waterfowl Emphasis with Low Increase in Management for Other Wildlife and Increased Consideration for Visitor Services	Alternative 4: Waterfowl Emphasis with Increased and Balanced Consideration for Other "Priority" Species, Their Habitats, Visitor Services and Neighborhood Relationships. (Preferred Alternative)
Impacts associated with Land Acquisition				
Acres acquired per year	300 acres additional habitat	500 acres additional habitat	300 acres additional habitat	600 acres additional habitat
Wildlife-dependent Recreation	Slight increase	Moderate increase in opportunities	Slight increase in opportunities	Moderate increase in opportunities
Tax-base	Offset by revenue sharing	Offset by revenue sharing	Offset by revenue sharing	Offset by revenue sharing
Easement acquisition	No acquisition	Acquire wetland and grassland easements	No acquisition	Acquire wetland and grassland easements
Impacts associated with Visitor Services				
Hunting	Slight increase in opportunities	Moderate increase in opportunities	Slight increase in opportunities	Moderate increase in opportunities
Fishing	Remain stable	Remain stable	Remain stable	Remain stable
Observation and Interpretation	Remain stable	Remain stable	Increase in opportunities	Slight increase in opportunities
Education and Interpretation	Remain stable	Remain stable	Increase	Slight increase
Wildlife Disturbance	Remain stable	Remain stable	Slight increase	Slight increase
Quality of Wildlife Dependent Recreation	Slight increase	Slight increase	Increase	Increase
Impacts associated with Service Identity				
Neighbors who know about District's mission	Remain stable	Remain stable	Slight increase	Increase
Reaction to prescribed fire	Remain stable	Remain stable	Increased understanding of the importance of fire in management	Increased understanding of the importance of fire in management, especially with WPA neighbors
General public knowledge of Service mission	No change	Slight increase	Increase	Increase

regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In this section, the cumulative impact of the alternatives is discussed in terms of grasslands and wetlands.

4.3.1. Grasslands

As documented in "Wisconsin's Biodiversity as a Management Issue" by the Wisconsin Department of Natural Resources (1995), grassland communities covered 9 percent of Wisconsin before Euro-American settlement. Grasslands, which historically were maintained by fire, have since been converted to crop production, overgrazed, or invaded by shrubs and trees. Tall grass prairie and oak savannah are identified as "the most decimated and threatened plant communities in the Midwest." The Wisconsin report projects continued loss of grasslands due to intensive agriculture and urban development. In addition to identifying actions on state lands, the report identifies the potential for maintaining and regaining grassland biodiversity through cooperation and partnerships with other agencies and nongovernmental organizations. The District's activities are part of the partnerships identified by the State. The District's grasslands will complement the State's Glacial Habitat Restoration Area goal of restoring and conserving 38,600 acres of permanent grassland nesting cover in Columbia, Dodge, Fond du Lac and Winnebago Counties and other efforts at maintaining grasslands. All alternatives, by maintaining and restoring grasslands, would contribute incrementally in a beneficial way toward reversing the historic loss of this habitat.

4.3.2. Wetlands

As documented in "Wisconsin's Biodiversity as a Management Issue" by the Wisconsin Department of Natural Resources (1995), wetland communities were abundant before Euro-American settlement occupying about 10 million of the state's 35 million acres. Since settlement, wetlands have greatly decreased in number through agricultural drainage and urban development. Several governmental programs have been instituted to counter the loss of wetlands beginning in the 1970s. Wisconsin has lost 47 percent of its original acres of wetlands with losses exceeding 75 percent in some southern counties according to the Wisconsin report. The trend of wetland loss has been countered by wetland use regulations and acquisition and easement programs by state, federal, and private organizations. Wetland restoration has also taken place on private lands with federal assistance. The Leopold WMD presently includes 1.2 percent of the wetland acres on public lands managed for wildlife in Wisconsin (Wisconsin Waterfowl Strategic Plan: 2008-2016). All alternatives, by maintaining and restoring wetlands, would contribute incrementally in a beneficial way toward reversing the historic loss of wetlands, which will benefit waterfowl, other wetland species, and water quality.

Chapter 5: List of Preparers

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Chapter 6: Consultation and Coordination with Stakeholders

The Service and the District have consulted and coordinated with stakeholders throughout the planning process. Representatives of the Wisconsin Department of Natural Resources have been active participants during scoping, review of the biological program, and alternatives development. See Chapter 2 of the CCP for a discussion of the planning process and opportunities for public and stakeholder input.