

U.S. Fish & Wildlife Service

Necedah

National Wildlife Refuge

Comprehensive Conservation Plan and Environmental Assessment





The mission of the U.S. Fish & Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Mission of the National Wildlife Refuge System

Comprehensive Conservation Plans provide long-term guidance for management decisions; set forth goals, objectives and strategies needed to accomplish refuge purposes; and, identify the Fish and Wildlife Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.

Cover Photograph: U.S. Fish & Wildlife Service

Necedah

National Wildlife Refuge

Comprehensive Conservation Plan Approval

Submitted by:

Larry Wargowsky 9-24-04
Larry Wargowsky Date
Refuge Manager

Concur:

Barry Christenson 10-12-04
Barry Christenson Date
Refuge Supervisor, Area 3

Nita M. Fuller 10-25-2004
Nita M. Fuller Date
Regional Chief, National Wildlife Refuge System

Approve:

Charles M. Wooley 10/26/04
Charles M. Wooley Date
Acting Regional Director

Robyn Thorson
Robyn Thorson
Regional Director

Necedah

National Wildlife Refuge

Comprehensive Conservation Plan

Table of Contents

Chapter 1: Introduction and Background	1
1.1 Introduction	1
1.2 Refuge Purpose	3
1.3 Refuge Vision	3
1.4 Refuge Mission Statement	3
1.5 Purpose and Need for the Plan	3
1.6 U.S. Fish & Wildlife Service	4
1.6.1 Mission Statement of the U.S. Fish and Wildlife Service	4
1.6.2 Goals of the U.S. Fish and Wildlife Service	4
1.6.3 National Wildlife Refuge System	5
1.6.3.1 Mission of the National Wildlife Refuge System	6
1.6.3.2 Goals of the National Wildlife Refuge System	6
1.6.3.3 Guiding Principles of the National Wildlife Refuge System	6
1.7 Other Planning Efforts	6
1.8 Existing Partnerships	7
1.9 Legal and Policy Guidance	7
Chapter 2: The Planning Process	8
2.1 Explanation of Plan Development	8
2.2 Public Involvement	10
2.3 Issues	10
2.4 Opportunities and Issues	11
2.4.1 Service Trust Resources	11
2.4.2 Refuge Visitor Services	12
2.4.3 Habitat Management	13
2.4.4 The Yellow River Focus Area	14
Chapter 3: Refuge Environment	17
3.1 Refuge History	17
3.2 Ecosystem Goals	19
3.3 Refuge Resources	19
3.3.1 Fish and Wildlife Resources	19
3.3.1.1 Regional Fish and Wildlife Conservation Priorities	19
3.3.1.2 Birds	19
3.3.1.3 Mammals	19

3.3.1.4	Reptiles and Amphibians	20
3.3.1.5	Invertebrates	20
3.3.1.6	Fish	20
3.3.1.7	Rare Plants	20
3.3.1.8	Listed Species	20
3.3.2	Archaeological and Cultural Values	23
3.3.3	Hydrology	24
3.3.3.1	Refuge Watershed	24
3.3.3.2	Refuge Water Sources and Sinks	24
3.4	Physiography	26
3.4.1	Refuge Ecosystem	26
3.4.2	Bailey's Ecological Unit Classification System	26
3.4.3	Historic Condition	26
3.4.4	Current Condition	27
3.5	Geology	31
3.5.1	Refuge Soils	32
3.6	Social and Economic Resources	32
3.6.1	Economic Impact Assessment	32
3.7	Refuge Operations	35
3.7.1	Fish And Wildlife Management	35
3.7.1.1	Birds	35
3.7.2	Mammals	37
3.7.3	Reptiles and Amphibians	37
3.7.4	Invertebrates	37
3.7.5	Fish	38
3.8	Habitat Restoration	38
3.8.1	Wetland Restoration	38
3.8.2	Upland Restoration	38
3.9	Habitat Management	39
3.9.1	Water Level Management	39
3.9.2	Moist Soil Management	39
3.9.3	Grazing, Haying, and Mowing	39
3.9.4	Farming	40
3.9.5	Forest Management	40
3.9.6	Fire Management	41
3.9.7	Pest Management	42
3.10	Resource Conservation	43
3.10.1	Law Enforcement	43
3.10.2	Permits and Economic Use Management	43
3.10.3	Contaminant Investigations and Cleanup	44
3.10.4	Water Rights Management	44
3.10.5	Cultural Resource Management	45
3.10.6	Special Designations	45
3.10.7	Land Acquisition	45
3.11	Monitoring and Studies	46
3.11.1	Surveys and Censuses	46
3.11.2	Studies and Investigations	46
3.12	Coordination Activities	47
3.12.1	Interagency Coordination	47
3.12.2	Tribal Coordination	48

3.12.3 Private Lands Activities	49
3.12.4 Cooperative Events/Friends Organizations	50
3.13 Visitor Services	50
3.13.1 Recreation	51
3.13.1.1 Hunting	51
3.13.1.2 Fishing	53
3.13.1.3 Wildlife Observation and Wildlife Photography	54
3.13.2 Education, Interpretation, and Outreach	54
3.14 Planning and Administration	57
3.14.1 Step-down Management Plans	57
3.14.2 General Administration	57
3.15 Work Force	58
Chapter 4: Management Direction	59
4.1 Core Values and Guiding Principles	59
4.2 Compatibility	60
4.3 Strategic Framework	60
4.4 Refuge Goals, Objective, Strategies and Projects	61
4.4.1 Fish and Wildlife Management	61
4.4.1.1 Waterfowl and Other Migratory Birds	61
4.4.2 Listed Species	62
4.4.3 Habitat Restoration and Management	64
4.4.3.1 Other Habitat Management Actions	70
4.4.4 Resource Conservation	71
4.4.4.1 Law Enforcement	71
4.4.4.2 Land Conservation	71
4.4.5 Monitoring and Studies	73
4.4.6 Coordination Activities	74
4.4.7 Visitor Services	75
4.4.7.1 Facilities and Services	79
4.4.8 Planning And Administration	79
4.4.9 Work Force	80
Chapter 5: Implementation	82
5.1 Tools	82
5.1.1 Staffing Patterns	82
5.2 Step-Down Management Plans	83
5.3 Partnerships	83
5.4 Volunteer Program	84
5.5 Land Acquisition	84
5.6 Budget and Schedule	85
5.6.1 Station Budget	85
5.6.2 Project Descriptions	85
5.6.2.1 Habitat Restoration and Management Projects	85
5.6.2.2 Resource Conservation Projects	87
5.6.2.3 Monitoring and Studies Projects	88
5.6.2.4 Visitor Services	88
5.6.2.5 Planning And Administration Projects	90
5.6.2.6 Work Force Projects	91
5.6.3 Project Schedule and Annual Funding Needs	91

Appendix A: Environmental Assessment	95
Appendix B: Glossary	195
Appendix C: Species List	203
Appendix D: Compatibility Determinations	213
Appendix E: Compliance Requirements	217
Appendix F: Refuge Operating Needs System (RONS) and Maintenance Management System (MMS)	223
Appendix G: Mailing List	229
Appendix H: List of Preparers	237
Appendix I: Resource Conservation Priority Species	241
Appendix J: References	253
Appendix K: Summary and Response to Public Comments	259
Appendix L: Necedah NWR Yellow River Focus Area Land Protection Plan	283

Necedah

National Wildlife Refuge

Comprehensive Conservation Plan

List of Tables

Table 1: Rare Plants Found on the Refuge and Within the Yellow River Focus Area	21
Table 2: Summary of Water Sources and Sinks for Necedah NWR, May 1988-April 1999	26
Table 3: Land Cover Types, Necedah NWR	31
Table 4: Refuge Step-Down Management Plans	57
Table 5: Current Staffing Patterns, Necedah NWR	58
Table 6: Management Strategies and Vegetation Composition	65
Table 7: Special Refuge Management Areas	72
Table 8: Future Staffing Needs, Necedah NWR	82

Necedah

National Wildlife Refuge

Comprehensive Conservation Plan

List of Figures

Figure 1: Location of Necedah National Wildlife Refuge	2
Figure 2: National Wildlife Refuges and Waterfowl Flyways	5
Figure 3: Planning Process Model for the Necedah NWR Comprehensive Conservation Plan	9
Figure 4: Yellow River Focus Area	15
Figure 5: Necedah Wildlife Management Area Location	18
Figure 6: Castle Rock Watershed, Necedah National Wildlife Refuge	25
Figure 7: Ecoregion of Necedah NWR	27
Figure 8: Bailey's Ecoregions, Region 3 of the U.S. Fish & Wildlife Service	28
Figure 9: Historic Vegetation, Necedah NWR	29
Figure 10: Current Land Cover, Necedah NWR	30
Figure 11: Soils Found On Necedah NWR	33
Figure 12: Physiographic Areas for Necedah NWR	36
Figure 13: Private Lands District, Necedah NWR	49
Figure 14: Wildlife Management Area, Necedah NWR	50
Figure 15: Facilities, Necedah NWR	52
Figure 16: Desired Future Vegetation, Necedah NWR	66
Figure 17: Desired Future Management, Necedah NWR	67
Figure 18: Future Desired Conditions, Visitor Services, Necedah NWR	76

Chapter 1: Introduction and Background

1.1 Introduction



U.S. Fish & Wildlife Service

Situated on the bed of former Glacial Lake Wisconsin and the Great Central Wisconsin Swamp, the land in and around Necedah National Wildlife Refuge (NWR) was once a vast peat bog with low, wooded islands and savannas. Higher sand ridges were filled with mature stands of pine and other species.

In 1939, the Refuge was established as a refuge and breeding ground for migratory birds and for use as an inviolate sanctuary for migratory birds. It is located in central Wisconsin, about 180 miles east of Minneapolis, Minnesota, 150 miles northwest of Milwaukee, Wisconsin, and about 4 miles west of Necedah, Wisconsin.

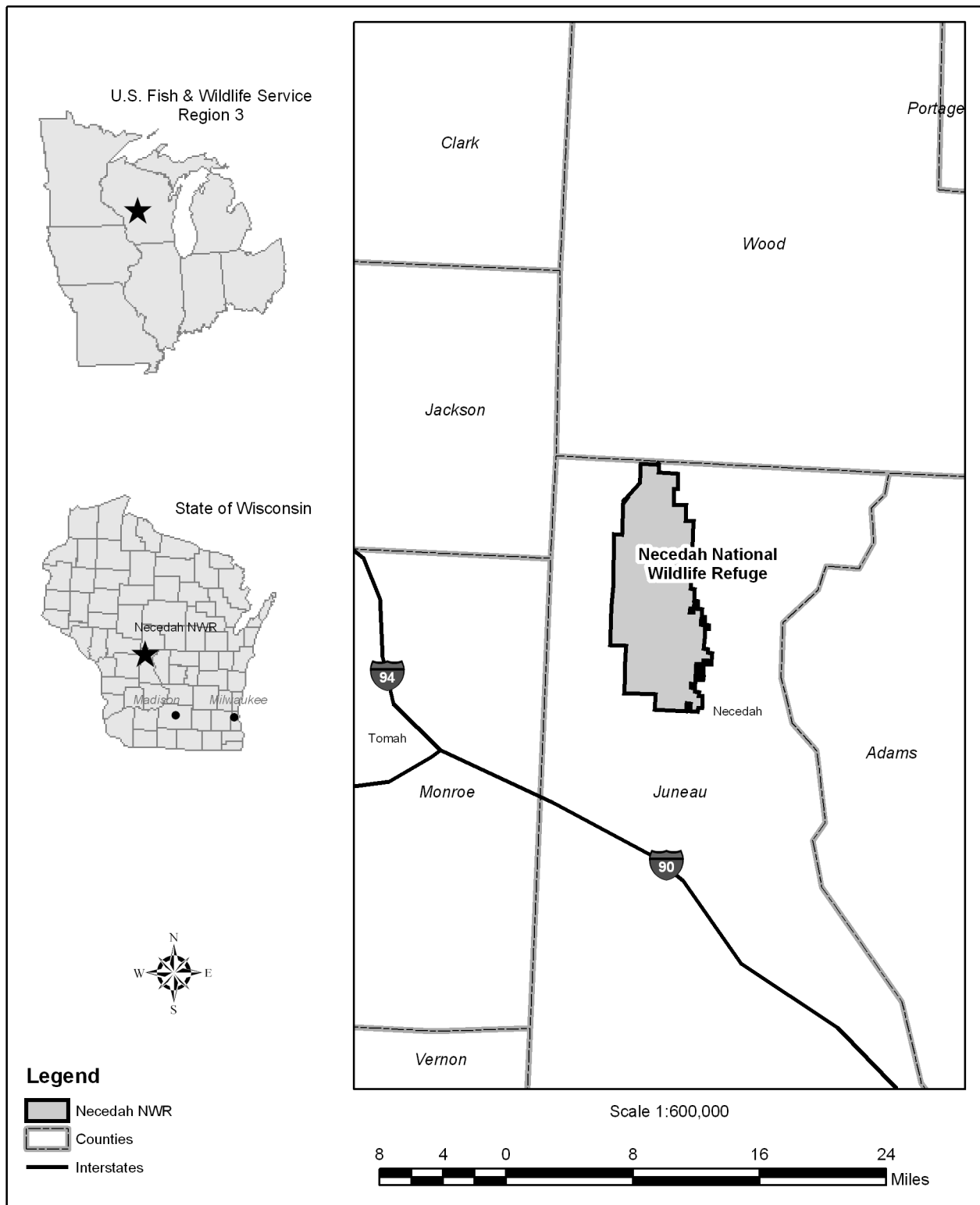
Today, the 43,696-acre Necedah NWR is a mix of pine, oak and aspen forests, wetlands and open water areas, grasslands, and rare savannas. This mixture of habitats supports a rich diversity of fish, wildlife and plant populations. More than 230 species of birds have been identified on the Refuge. More than 100,000 migratory waterfowl and shorebirds use the Refuge annually, and it is the largest stopover in the state for migrating Sandhill Cranes. With the surrounding Necedah Wildlife Management Area, it has the Wisconsin's second largest colony of Black Terns (a state-listed endangered species).

A number of endangered species make their home on Refuge land. Necedah NWR has the southernmost timber wolf habitat in the state, and it is also home to the Blanding's turtle, the Eastern massasauga rattlesnake and the phlox moth. The largest population of Karner blue butterflies in the world uses the Refuge, and it was recently selected as the reintroduction site for a new population of federally-listed endangered Whooping Crane.

The Refuge attracts people as well as wildlife. An estimated 150,000 people visit the Refuge every year to hunt, fish, hike, observe and photograph wildlife, and pick berries.

Managing a refuge demands long-range planning that reflects vision, science and people. The Necedah NWR Comprehensive Conservation Plan, or CCP, describes how we will provide for migratory species within our boundaries, support endangered species on the Refuge, work with partners to improve habitats beyond our boundaries, expand opportunities for wildlife viewing and fishing, and develop environmental education and outreach programs to increase appreciation of fish and wildlife.

Figure 1: Location of Necedah National Wildlife Refuge



1.2 Refuge Purpose

The purpose for which the Refuge was established provides the basic framework for developing management direction for the Refuge. It is within the Refuge purpose that management functions are developed and what uses and facilities can be provided.

Pursuant to the Refuge's enabling legislation, the Refuge purpose is "a refuge and breeding ground for migratory birds and other wildlife..." (Executive Order 8065, dated 1939) and "...for use as an inviolate sanctuary, or for any other purpose, for migratory birds" (Migratory Bird Conservation Act of 1929).

1.3 Refuge Vision

Necedah NWR exemplifies a diverse and productive ecological system of woodlands, savannas, and wetlands managed to perpetuate waterfowl and other migratory birds, listed species, and native biological diversity within Wisconsin's Central Sand Plain Natural Division. Refuge staff are a multi-disciplined team of biologists, technicians, and support staff who are dedicated to providing quality wildlife-dependent public use opportunities to a diverse and supportive public. The Refuge is a model in its commitment to create long-term mutually-beneficial relationships with its stakeholders, and has produced consistent growth in the public's understanding and appreciation of the Refuge, the National Wildlife Refuge System, and Service trust resources.

1.4 Refuge Mission Statement

Our mission is to provide scientific and community leadership and support in the restoration, preservation, and management of waterfowl and other migratory birds, listed species, and native biological diversity within south central Wisconsin, while providing, to the extent possible, quality wildlife-dependent recreational and educational experiences that foster an understanding and appreciation of these resources, and expands the role humankind plays in their stewardship.

1.5 Purpose and Need for the Plan

This Comprehensive Conservation Plan (CCP) identifies the role Necedah NWR will play in supporting the mission of the National Wildlife Refuge System and provides primary management guidance for the Refuge. The plan articulates management goals for the next 15 years and defines objectives and strategies that will achieve those goals. Legislative and other policies, including the National Wildlife Refuge System Improvement Act of 1997, have guided the development of this plan. These mandates include:

- Wildlife has first priority in the management of refuges.
- Wildlife-dependent recreation activities of hunting, fishing, wildlife observation, wildlife photography, environmental education and interpretation are the priority public uses of the Refuge System. These uses will be accommodated when they do not interfere with a refuge's purposes or the mission of the Refuge System.
- Other uses of the Refuge will only be allowed when they are determined to be appropriate and compatible with the Refuge purposes and mission of the Refuge System.

Following the recommendations in the CCP will enhance management of Necedah NWR by:

- Providing a clear statement of direction for future management of the Refuge.
- Giving Refuge neighbors, visitors, and the general public an understanding of the Service's management actions on and around the Refuge.
- Ensuring that the Refuge's management actions and programs are consistent with the mandates of the National Wildlife Refuge System.
- Ensuring that Refuge management is consistent with federal, state and county plans.
- Establishing long-term Refuge management continuity.
- Providing a basis for the development of budget requests for Refuge operations, maintenance, and capital improvement needs.

1.6 U.S. Fish & Wildlife Service

The U.S. Fish and Wildlife Service (Service) is the principal Federal agency responsible for conserving, protecting and enhancing fish, wildlife, and plants and their habitats for the continuing benefit of the American people.



The Service manages the 93-million acre National Wildlife Refuge System of more than 545 national wildlife refuges and thousands of small wetlands and other special management areas. It also operates 66 national fish hatcheries, 64 fishery resource offices and 78 ecological services field stations. Among its key functions, the Service enforces Federal wildlife laws, protects endangered species, manages migratory birds, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, and helps foreign governments with their international conservation efforts. It also oversees the Federal Aid program that distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

The Service employs approximately 7,500 people at facilities across the country, with a headquarters in Washington D.C., seven geographic regions, and nearly 700 field units. Necedah NWR is located in the Great Lakes/Big Rivers Region of the Service, which includes the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin (Figure 1). The Great Lakes-Big Rivers Region manages over 1.2 million acres of land and water on 46 national wildlife refuges and nine wetland management districts, including more than 240,000 acres in waterfowl production areas. The Region also manages six national fish hatcheries, nine fisheries stations, 10 ecological services field offices, and 18 law enforcement field offices.

1.6.1 Mission Statement of the U.S. Fish and Wildlife Service

The mission of the Service is working with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

1.6.2 Goals of the U.S. Fish and Wildlife Service

- Sustainability of Fish and Wildlife Populations: Migratory birds, endangered fish and wildlife species, interjurisdictional fish, and marine mammals are conserved, protected, enhanced, or restored. The Service is participating in conservation of other species when its expertise, facilities, or lands can enhance state, tribal, or local efforts.
- Habitat Conservation – Network of Lands and Waters: An ecologically diverse network of lands and waters, of various ownerships, is conserved to provide habitats for marine

mammals and migratory, interjurisdictional, endangered, and other species associated with ecosystems conserved in cooperation with others.

- **Connecting Americans to Wildlife:** The American public understands and participates in the conservation and use of fish and wildlife resources.
- **Workforce Excellence:** The Service's workforce, scientific capability, and business practices - in cooperation with the Department of Interior's scientific expertise - fully support achievement of the Service mission.

1.6.3 National Wildlife Refuge System

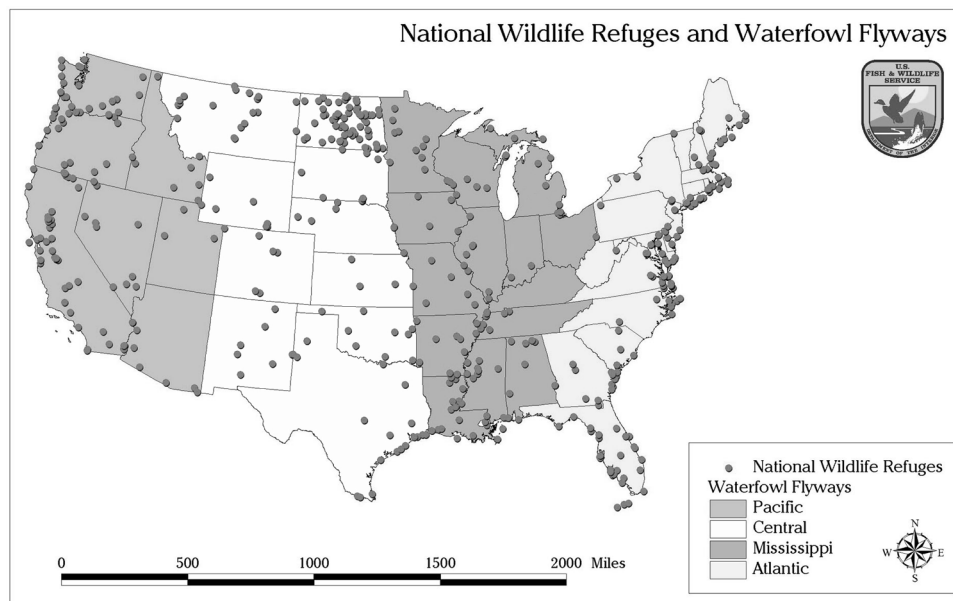
The National Wildlife Refuge System is the world's largest and most diverse collection of lands and waters set aside specifically for wildlife. The Refuge System began in 1903 when President Theodore Roosevelt designated 3-acre Pelican Island, a pelican and heron rookery in Florida, as a national bird sanctuary.



Today, over 545 national wildlife refuges have been established from the Arctic Ocean to the South Pacific, from Maine to the Caribbean. Varying in size from half-acre parcels to thousands of square miles, they encompass more than 92 million acres of the Nation's best wildlife habitats. The vast majority of these lands are in Alaska, with the rest spread across the rest of the United States and several U.S. territories.

Like Pelican Island, many early wildlife refuges were created for herons, egrets, and other water birds. Other refuges were set aside for large mammals like elk and bison. However, most national wildlife refuges were created to conserve migratory waterfowl. This is a result of the United States' responsibilities under international treaties for migratory bird conservation and legislation such as the Migratory Bird Conservation Act of 1929. Refuges dot the map along the four major "flyways" that waterfowl follow from their northern nesting grounds to southern wintering areas (Figure 2).

Figure 2: National Wildlife Refuges and Waterfowl Flyways



National wildlife refuges play a vital role in conserving endangered and threatened species and their habitat. Among these are Aransas National Wildlife Refuge in Texas, the winter home of the whooping crane; the Florida Panther National Wildlife Refuge, which protects one of the Nation's most endangered mammals; the Hawaiian Islands National Wildlife Refuge, home of the Laysan duck and monk seal; and Necedah NWR, which provides critical habitat for the federally listed endangered Karner blue butterfly.

1.6.3.1 Mission of the National Wildlife Refuge System

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

1.6.3.2 Goals of the National Wildlife Refuge System

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

1.6.3.3 Guiding Principles of the National Wildlife Refuge System

Habitat: Fish and wildlife will not prosper without high quality habitat, and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitat within refuges.

Public Use: The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Partnerships: America's sportsmen and women were the first partners who insisted on protecting valuable wildlife habitat with wildlife refuges. Conservation partnerships with other Federal agencies, state agencies, tribes, organizations, industries, and the general public can make significant contributions to the growth and management of the Refuge System.

Public Involvement: The public should be given full and open opportunity to participate in decisions regarding the acquisition and management of our national wildlife refuges.

1.7 Other Planning Efforts

The following Federal, state, and local plans, planning efforts, and initiatives were reviewed and considered when developing the CCP for the Refuge:

- U.S. Fish and Wildlife Service Timber Wolf Recovery Plan
- U.S. Fish and Wildlife Service Bald Eagle Recovery Plan
- U.S. Fish and Wildlife Service Karner Blue Butterfly Recovery Plan

- Juneau and Wood County Land and Water Resource Management Plans
- Juneau and Wood County 10-Year Forest Management Plans
- Wisconsin DNR/Refuge Cooperative Agreement (Meadow Valley Management)
- Wisconsin DNR/Refuge Cooperative Agreement (Fire Protection Agreement)
- Savanna Partnership Memorandum of Understanding
- Golden Sands Resource Conservation and Development Area
- Central Wisconsin River Basin Partnership
- Hardwood Bombing Range Guidelines (pertaining to Refuge overflights)
- North American Waterfowl Management Plan
- Partners In Flight Bird Conservation Plans
- U.S. Shorebird Conservation Plan

1.8 Existing Partnerships

Necedah NWR is part of the Necedah Wildlife Management Area, a 111,564-acre area of Federal property. Land that is outside of the Refuge is managed by the Wisconsin Department of Natural Resources (DNR) as part of surrounding State Wildlife Areas through a cooperative agreement. The Service considers the Wisconsin DNR a major partner in conservation efforts in the area.

In addition, the Refuge has cooperative working relationships with several universities, other Federal agencies, the State of Wisconsin, educational institutions, and non-government organizations.



John and Karen Hollingsworth

1.9 Legal and Policy Guidance

The authority for developing CCPs for national wildlife refuges is the National Wildlife Refuge System Improvement Act of 1997. However, management and administration of refuges is governed by numerous national and regional directives derived from Secretarial Orders, Service Director's Orders, Service Regional Director's Orders, and Service Policy Guidance contained in the Interior Departmental Manual and the Service's Manual (see part 602 of the Service Manual at www.fws.gov).

In addition to the executive order establishing the Refuge, the National Wildlife Refuge System Improvement Act of 1997, several federal laws, executive orders, and regulations govern the administration of Necedah NWR. Appendix E contains a partial list of the legal mandates that guided the preparation of this plan and those that pertain to Refuge management activities.

Chapter 2: The Planning Process

2.1 Explanation of Plan Development

This CCP was prepared in compliance with the National Wildlife Refuge System Improvement Act of 1997, the National Environmental Policy Act of 1969, and Service policy guidance set forth in the Departmental Manual (see part 602 of the Fish and Wildlife Service Manual at the Internet website, www.fws.gov).

While there are many steps involved in developing a CCP, the process the planning team followed for developing the Necedah NWR CCP focused around five functional parts (Figure 3):

- Reaffirming the Refuge's purpose and developing vision,
- Conducting an operational assessment and environmental analysis,
- Establishing management direction (goals and objectives),
- Developing a range of programs, activities, and projects to achieve desired outcomes (implementation strategies), and
- Developing protocols to monitor and evaluate progress.

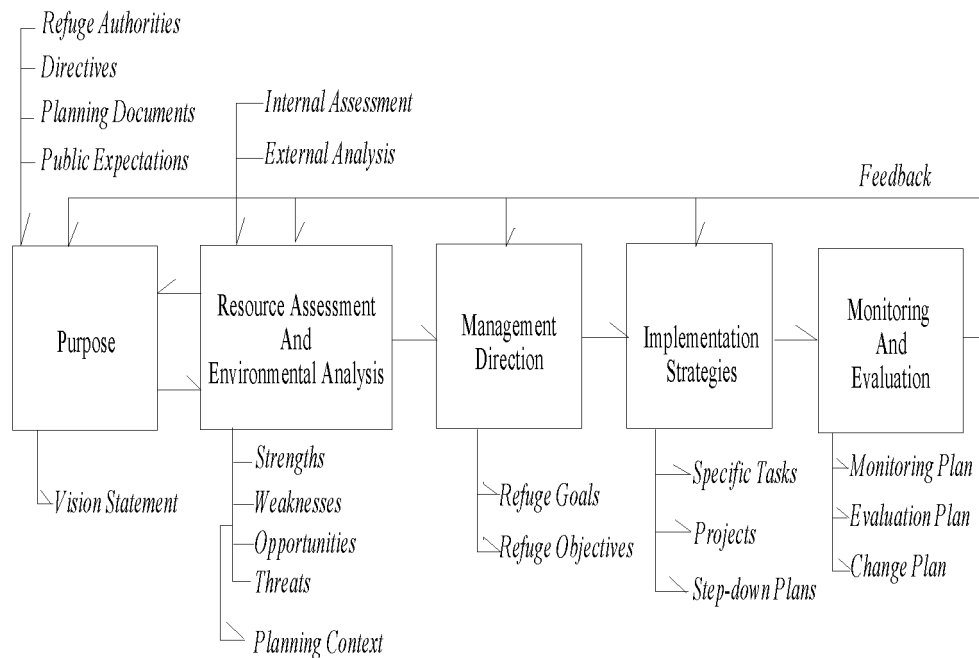


U.S. Fish & Wildlife Service

As a first step, the planning team developed a vision statement to provide focus for the actions and character of the Refuge, as well as to clarify its purpose and direction. In developing the vision statement, the planning team reviewed the Refuge's authorizing legislation, national and regional directives, internal and external planning documents, and information relative to the public's expectations for the Refuge. Figure 3 was adapted from Justis et al. 1985.

An operational assessment and environmental analysis was performed to identify the Refuge's current strengths, weaknesses, opportunities, and threats. Strengths and weaknesses refer to internal factors, operational components controlled by management such as habitat, certain fish and wildlife populations, resource conservation, cooperative programs, administration, work force, public use, and maintenance. Opportunities and threats refer to external factors, such as favorable actions or situations in the Refuge environment that can benefit the Refuge, or unfavorable actions or situations in the Refuge environment that may impede operation and/or development of the Refuge. External

Figure 3: Planning Process Model for the Necedah NWR Comprehensive Conservation Plan



factors include the Refuge's biological environment, physical environment, political/legal environment, economic environment, and socio/cultural environment. The results of the operational assessment and environmental analysis formed a planning context and provided the basis from which management direction was derived.

Management direction was established through a strategic framework, which we define as a pattern of purposes, policies, programs, actions, decisions, or resource allocations that describe what the Refuge is, what it does, and why it does it. Refuge goals were developed that articulate broad direction, end results, or positions to be achieved. Refuge objectives serve as intermediate-term targets necessary for the accomplishment of goals.

Strategies and projects were developed to describe the means, methods, and approaches used to achieve Refuge objectives (also answers the who, what, why, when, and where questions). However, in many cases step-down management plans will be developed to provide the specific details necessary for implementation of objectives, strategies, and projects. In this regard, step-down management plans refer to annual work plans, fire management plans, public use plans, inventory and monitoring plans, and occupational safety and health plans (see Chapter 5 for a list of step-down plans and schedules for revisions). Thus, the CCP provides an overview of future Refuge programs and projects and leaves the details of scheduling and budgets to be developed as funding levels and staffing patterns become clearer. Refuge staff will set priorities and make decisions based on Refuge operating needs and directives from Regional and Washington Office staff.

Finally, the fifth process function dealt with developing monitoring and evaluation protocols. Four basic steps capture this process function: (1) identification and establishment of predetermined standards of strategy performance, (2) a measurement of the actual performance results, (3) a

comparison of the results achieved against those previously established, and (4) determining whether the CCP is producing the desired results, or if corrective action is necessary. The CCP was developed using the best information available at the time of preparation. As new and better information emerges, including new input from partners and stakeholders, the CCP will be revised. Additional step-down plans will be developed to address plan monitoring, plan evaluation, and plan change procedures. Adaptive management will be fundamental to keeping the plan active and effective.

2.2 Public Involvement

Scoping is the process of identifying opportunities and issues related to a proposed action. The Service publicly announced it was preparing a CCP for the Refuge in June 1997. Since that time, information about the planning project has been provided to the public through news releases, presentations, interviews, informational letters, and one-on-one briefings. Federal, state, local, and private entities were involved in the scoping process. More than 6,000 people were sent information on the Refuge CCP (e.g., letters, newsletters, draft CCPs), including landowners in the four townships surrounding the Refuge (information was obtained from Juneau County and Wood County tax records) and landowners in the Yellow River Focus Area. Others involved were Wisconsin's Congressional Delegation, the U.S. Department of Agriculture, elected officials representing Juneau and Wood counties, the Wisconsin DNR, local governments, representatives of national, state, and local conservation organizations, neighboring landowners, and other interested people.



U.S. Fish & Wildlife Service

Public input was considered at all phases of the CCP planning process. The Service coordinated its scoping effort closely, and corresponded frequently with many of the aforementioned entities. Since June of 1997, 10 public meetings were held to gather public input. In addition, three draft CCPs/EAs were released for public review. The first draft was released in August 1998. The second draft was released in July 2000, and a third draft was released in October 2001. Draft documents were published on the Service's website for this planning project, and paper copies were provided in all of the libraries in the counties surrounding the Refuge. In October 2001, a summary of the draft CCP was mailed to individuals who requested to be on the Necedah NWR mailing list. Comments received during the scoping and public involvement process covered a wide range of interests.

The Service used a highly participatory planning process to develop the Necedah NWR CCP. Throughout the CCP process, the Service initiated outreach to diverse stakeholders and afforded numerous opportunities for public input. Information about the CCP was provided to stakeholders and the general public through news releases, presentations, interviews, informational letters, newsletters, public meetings, briefings, and the Internet. Questionnaires, focus groups, public meetings, and one-on-one discussions were used to gather input from Refuge visitors, neighbors, and other stakeholders. A geographic information system (GIS) was developed to aid in the analysis and transfer of information. Additional information on the public involvement process is located in the Environmental Assessment (Appendix A).

2.3 Issues

In response to the Service's proposed action to prepare and implement a CCP for the Refuge and from questions raised in conversations and correspondence with individuals and organizations within

and outside the Service, the Service identified several significant issues to analyze in the planning process, specifically:

- *Service trust resources*: What effect will Refuge management actions have on listed species, waterfowl and other migratory birds, and biological diversity (internal issue)?
- *Refuge visitor services*: What effect will Refuge management actions have on the quality of visitor services provided at the Refuge, namely hunting, fishing, wildlife observation, photography, environmental education, and interpretation (internal/external issue)?
- *Habitat management*: What effect will Refuge habitat management actions have on the quantity and quality of habitats within the Refuge and the Refuge watershed, namely the wetlands, forests, and open landscapes (internal issue)?
- *The Yellow River Focus Area*: How will Refuge management actions affect the habitat in the Yellow River Focus Area, and how will those management actions impact private property rights and the areas tax base (external issue)?

2.4 Opportunities and Issues

2.4.1 Service Trust Resources

Numerous Service trust resources utilize the Refuge and the Yellow River Focus Area for meeting one or more of their life cycle needs, including four Federally listed threatened or endangered species. Under the Endangered Species Act of 1973, as amended, the Service has primary responsibility to conserve not only jeopardized life, but also the natural resources on which life depends. Federally listed species include the Karner blue butterfly (federally listed as endangered), Eastern timber wolf (federally listed as endangered), Whooping Crane (federally listed as endangered), and Bald Eagle (federally listed as threatened). The Eastern massasauga rattlesnake, which is currently a candidate for federal listing, is found in low numbers in the Yellow River Area. Several state-listed threatened or endangered species also use the Refuge, including the Blanding's turtle and Trumpeter Swan. The Refuge also supports several rare, threatened, or endangered species of plants, including the spring beauty, oval-leaved milkweed, and wooly milkweed, and provides habitat for several important plants (e.g., wild lupine) that support rare organisms (e.g., Karner blue butterflies). Protecting endangered and threatened species and restoring them to secure status in the wild is a primary responsibility of the Service and the Refuge.

Many bird species are declining across part or all of their breeding range in the Midwest (Peterjohn et al. 1994). Breeding Bird Surveys for the Great Lakes-Big Rivers Region indicate that numerous grassland nesting, non game species in the Midwest have shown extensive declines since the mid-1960s (National Biological Survey 1995). Grassland-dependent birds have shown steeper, more consistent, and geographically more widespread declines (25-65 percent) than any other group of North American birds (Samson and Knopf 1994). Several of these declining species utilize the Refuge and the Yellow River Area. These include the Bobolink, Henslow's Sparrow, Grasshopper Sparrow, Vesper Sparrow, Savannah Sparrow, Lark Sparrow, Field Sparrow, Dickcissel, Eastern Meadowlark, and American Bittern. The Grasshopper Sparrow and Dickcissel have declined over 80 percent in Wisconsin since the mid-1960s. Many others, especially those associated with rare oak savannas (e.g., Red-headed Woodpecker, Northern Flicker), have experienced similar, though less dramatic declines.

In total, more than 230 different species of birds have been observed on the Refuge since its inception. The Refuge has long been considered an important migratory stopover area for waterfowl such as Mallards, Blue-winged Teal, Ring-necks, and Wood Ducks. Other migrant bird species that utilize the Refuge during spring, summer, or fall include: Canada, Snow, and White-fronted Geese; Sandhill Cranes; Woodcock; Snipe; Great Blue Herons; Swans; egrets; Dickcissels; warblers; Brown

Thrashers; several different species of sparrows; meadowlarks; Sora Rails; Black-crowned Night Herons; Bobolinks; bitterns; and Red-tailed Hawks; just to name a few. During migrations, three species of geese, 10 species of dabbling ducks, nine species of diving ducks, and Trumpeter and Tundra Swans can be found on the Refuge.

The Refuge has incomplete inventories for many of its natural, archeological, and cultural resources, including wildlife and habitat. Monitoring systems needed to conserve and properly manage Refuge resources are inadequately funded. Monitoring and evaluation systems need to be developed to measure progress toward habitat goals.

2.4.2 Refuge Visitor Services

The National Wildlife Refuge System Improvement Act of 1997 has ushered in a new era of public involvement on national wildlife refuges. Providing for public uses is now an essential part of Refuge missions across the country. Necedah NWR has always been a popular destination for hunting and fishing enthusiasts. However, in recent years other uses, such as wildlife observation and wildlife photography, hiking, environmental education and interpretation have surpassed traditional activities in terms of public interest.

The Refuge currently has two major needs relative to providing quality services to its visitors. First, the main office (which also serves as the visitor center) is ineffective as an initial visitor contact point due to its isolation, distance from a main road, and small size. The current facility has no formal education features, with the exception of a small conference room, and it is lacking in interpretive programming displays. In recent years, Refuge programs and activities have attracted over 150 participants at some events. The current facility accommodates a maximum of 30 people. Programs are held in the office space, reducing productivity of staff who are not directly involved with the event. It also compromises the overall effectiveness of the educational experience, due to the distraction of office business and the lack of student comfort.

Public use of the Refuge now exceeds over 150,000 visits annually. Three state highways border the Refuge: 21, 80 and 173. The Wisconsin Department of Transportation numbers from 1995 (the latest information available) shows that over 1,500 vehicles a day use Highway 173; more than 3,200 vehicles a day travel on Highway 21; and over 1,100 use Highway 80 each day. Occupants of these vehicles are all potential visitors to the Refuge. Due to small, inconvenient facilities and poor signage, many of these potential visitors are currently being overlooked.

Further, the Refuge is now the site for an experimental Whooping Crane population, an attraction that will undoubtedly increase visitor use long-term at the Refuge. During the first year of the 10-15 year reintroduction program, the Refuge hosted an event that drew more than 600 visitors. The project frequently drew the attention of the media. This increased use of the Refuge could further disseminate key messages about the Refuge, its resources, and the National Wildlife Refuge System.

Another need relates to the quality of the existing visitor facilities at the Refuge. There is a need to renovate existing facilities for safety and accessibility, to improve visitor information systems (signs and brochures), and to bring public facilities up to Service standards. To improve customer service, the Refuge needs to collect additional information on Refuge visitor volume, characteristics, opinions, and what their expectations are for the Refuge. Key components to customer service is having suitable facilities (addressed above) and having an eager work force that can provide quality service. Current refuge staffing patterns do not emphasize the importance of good customer service. A strong volunteer base exists and could easily be used in the contact areas. A volunteer coordinator is vital. Seasonal public use staff could also help meet increased needs during peak times.

Another visitor services concern learned through scoping is that the Refuge is not known and understood within the local area. This was made apparent during the multi-year planning process for

the Refuge CCP. Many people living near the Refuge do not distinguish the Service from the Wisconsin DNR, or understand that the Refuge is part of a national system of Refuges dedicated to perpetuating the nation's fish and wildlife resources for the enjoyment of present and future generations. The Refuge needs to promote its recreation and educational opportunities, as well as raise awareness of the importance of the Refuge among the various economic and environmental interests that influence public policy and Refuge management direction.

2.4.3 Habitat Management

The need for additional wildlife habitat conservation, restoration and management at the Refuge has been made clear by the declining status of numerous grassland, savanna, and wetland dependent species of birds (see "Service Trust Resources" above) and numerous studies that have demonstrated that habitat loss or degradation is a common causal factor in many of those declines.

Of the estimated 221 million acres of wetland habitat present in the lower 48 states at the time of colonial America, only 103 million acres remain (47 percent). Draining, dredging, filling, leveling, and flooding have reduced wetlands by 50 percent or more in 22 states, and 10 states have lost 70 percent or more (Dahl 1990). Prior to European settlement, Wisconsin had approximately 10 million acres of wetlands. Currently less than 47 percent remain (Dahl, 1990).



U.S. Fish & Wildlife Service

In recent years, many plant and animal species associated with Midwestern grasslands have experienced serious declines, primarily due to habitat loss and alteration of natural structure and function (e.g., predation, exotic species, fire suppression, habitat fragmentation, drainage/flooding). The original tallgrass prairie, which extended from western Indiana to the eastern part of Kansas, Nebraska, and North and South Dakota and south to Oklahoma and Texas, has been virtually eliminated throughout its historic range. Recent surveys suggest that 82.6 to 99.9 percent declines in the acreage of tallgrass prairie have occurred in 12 states and one Canadian province since European settlement. The State of Wisconsin has lost over 99 percent of its original prairies. For years following the initial conversion of native Midwestern prairies, many prairie-

dependent wildlife remained relatively stable through their ability to colonize agricultural grasslands. However, 20th century agricultural grassland loss has followed a similar path of decline as native prairie loss in the 19th century. In many parts of the Midwest, agricultural grasslands are at their lowest level in more than 100 years.

Similarly, oak savanna, which covered approximately 27-32 million acres of the Midwest prior to European settlement (Nuzzo 1985), has become one of the nation's most endangered ecosystems (Noss et al. 1995). Nationwide, over 99 percent of the original savanna has been lost, and Midwestern oak savannas are among the rarest ecosystems in the Nation. Historically Wisconsin had roughly 4 million acres of savannas. Today, less than 60,000 acres remain, and much of what remains is highly degraded. Nuzzo (1985) found that by 1985 only 113 sites (2,607 acres) of quality oak savanna remained across the Midwest. Development has destroyed, fragmented, and disrupted the natural processes needed to maintain quality oak savanna ecosystems.

The wide-scale loss of oak savanna and pine barren ecosystems across 12 states and the province of Ontario, Canada, has had severe negative impacts on Karner blue butterflies (Karner Blue Butterfly

Habitat Conservation Plan and Environmental Impact Statement, 1999). As a result, the Karner blue butterfly was proposed for federal listing on January 21, 1992, and listed as endangered on December 14, 1992. Today scattered populations are only found in portions of New Hampshire, New York, Michigan, Wisconsin, Indiana, and Minnesota. The Refuge is home to the world's largest remaining population of Karner blue butterflies, providing habitat for 12 population complexes. No critical habitat has been designated for this species. The long-term effect of these landscape-scale losses of important ecosystems has yet to be determined.

The long-term declines in early successional forests across the north-eastern and north-central United States has contributed to the decline of many bird species. Selective harvesting, fire suppression, urban sprawl, and cessation of agricultural abandonment contributed to the present imbalance in distribution of young forests (Oliver and Larson, 1999).

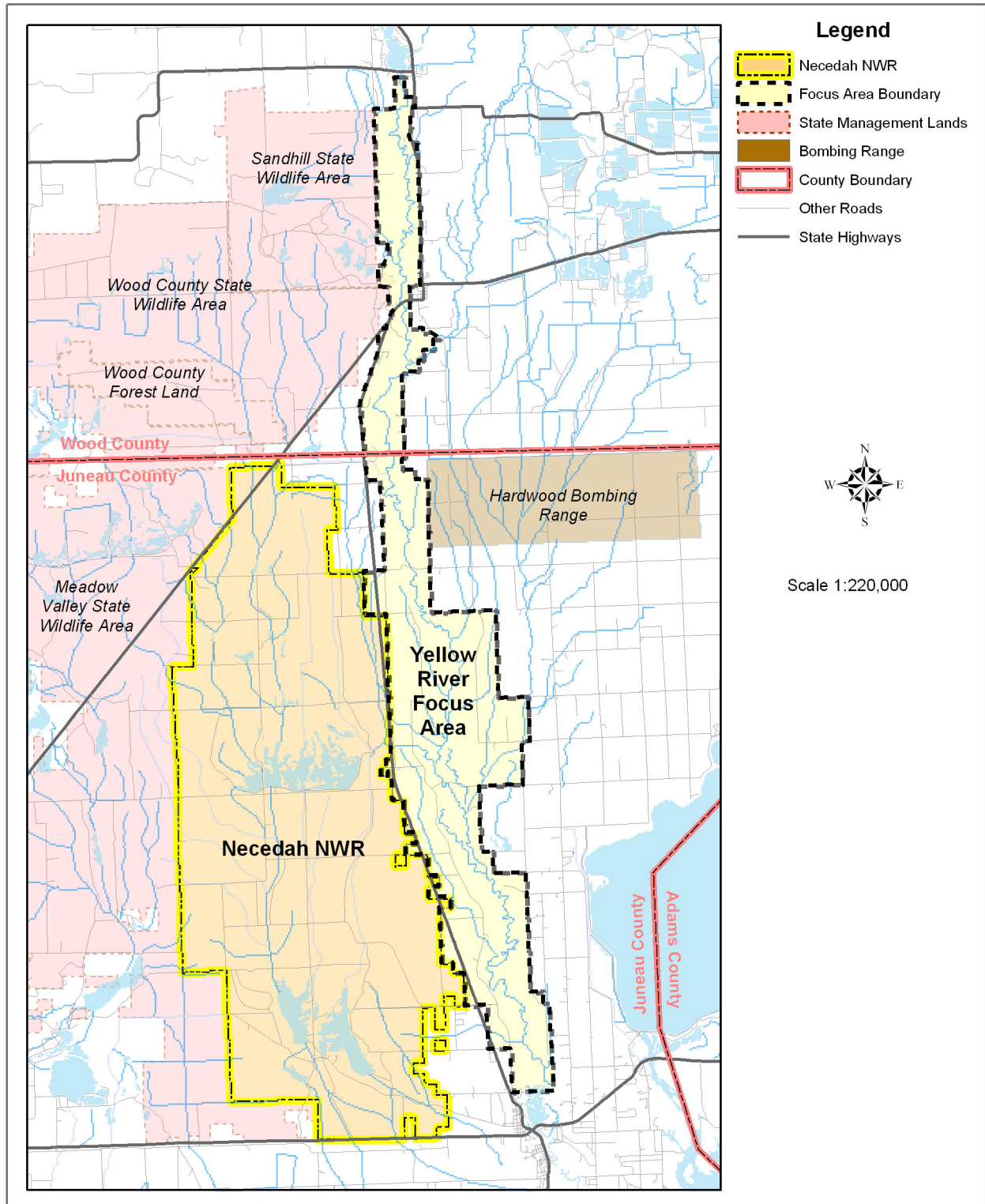
The Refuge is facing increasing threats to its ecological and health due to air, water, and noise pollution, exotic species, and incompatible recreational uses. Of late, a new round of change threatens many remaining ecosystems in the Refuge area. A trend called "rurbanization" where rural areas containing quality wildlife habitat are being converted to a more densely developed state. In recent years, the population of the area surrounding the Refuge has expanded, while the size of the undeveloped land base continues to shrink, leaving many natural areas as scattered fragments of increased importance for scientific study, education, and conservation of natural ecological processes. According to the U.S. Census, the Town of Necedah and the Town of Finley grew by 34 percent and 27 percent respectively between 1990 and 2000. As a result, many of the large natural areas around the Refuge (and in the Yellow River Area) are at risk of being fragmented through housing development, driveways, etc., which diminishes the value of these areas for area-sensitive wildlife like the Bobolink, Prairie Chicken, and many large mammals. Habitat size, shape, and amount and type of edge are important factors in the reproductive success of many grassland birds. It is this type of development that particularly threatens the remaining oak savanna habitat in this region. Without management, most areas will continue to degrade due to their size, isolation, absence of natural processes such as fire and hydrologic cycle maintenance, and inadequate buffers conserving them from surrounding agricultural and urban land uses. It also places greater demands on the Refuge and its partners in terms of safeguarding Refuge ecosystem structure and function for the benefit of Service trust resources.

2.4.4 The Yellow River Focus Area

The Yellow River Area (Figure 4), which lies east of the Refuge within an area referred to as Wisconsin's Central Sand Plain Natural Division, provides a unique opportunity to conserve rare and declining bottomland forest and adjacent upland habitat for the benefit of listed species, waterfowl and other migratory birds, and native biological diversity. According to Wisconsin's Statewide Natural Area Inventory, extensive field reconnaissance by the Refuge, and other sources, the Yellow River Area represents one of the few remaining quality bottomland hardwood forest ecosystems in the Midwest. Silver maple, swamp white oak, green ash, and river birch dominate the floodplain, while the lower sandy ridges, slightly higher than the flood plain, support white oak, bur oak, shagbark hickory, basswood, and white pine. The highest of these areas were once oak and pine savannas, one of North America's most endangered habitats, with only .02 percent of its pre-settlement acreage remaining. The shrub spectrum within the area varies in density from sparse to impenetrable, and includes buttonbush, dogwoods, prickly ash, winterberry, and wild grapes. The herbaceous layer of the forested areas support wood nettle, coneflowers, ferns, and many sedges. Aggressive non-native species are currently not an issue.

Many rare, uncommon, and declining species of animals have been documented in the Yellow River Area in recent years. Many of them are sensitive to size, isolation, context, and quality of habitat. These include the Eastern massasauga, Blanding's turtle, Red-shouldered Hawk, Cerulean Warbler, Acadian Flycatcher, Yellow-crowned Night-heron, Prothonotary Warbler, and Louisiana Waterthrush.

Figure 4: Yellow River Focus Area



Several neo-tropical migrants that are suspected of or exhibiting extensive population declines that use the area include the Verry, Wood Thrush, Sedge Wren, Blue-winged Warbler, and Golden-winged Warbler. Waterfowl species include Mallard, Wood Duck, and Hooded Merganser. Bald Eagles utilize the area year-round and at least one active nest has been documented. Great Blue Heron rookeries are found in the Yellow River Area as well as extensive Wood Duck nesting. Federally listed endangered Karner blue butterflies are also found on Friendship and Plainfield soils throughout the area. These soil types offer potential for expansion of oak savanna and the restoration of essential Karner blue butterfly habitat.

While rich in biological diversity, the Yellow River Area is experiencing degradation, primarily due to rural development and lack of habitat management, and could benefit from habitat conservation and management practices designed to sustain its ecological value. Habitat conservation and management practices could take the form of financial incentives to landowners, prescribed fire, mowing, wetland and upland restorations, and forest management. Recreational development pressures are high in the area. An expansion of agricultural activities could directly impact Yellow River habitats and create many indirect impacts due to habitat fragmentation, withdrawal and discharge of surface and ground waters, and construction of needed infrastructure.

Many Federal, state, and local conservation organizations support stewardship and conservation of the natural resources in the Yellow River Area. Several property owners have indicated an interest in selling their land and/or a conservation easement on their land to the Service. Many landowners within the 21,952-acre Yellow River Focus Area have contacted the Refuge in recent years in search of technical assistance in managing their land for wildlife. Between 2000 and 2002, 121 landowners owning 17,308 acres in the Yellow River Focus Area received technical assistance from the Service. However, an organized group of Yellow River property owners as well as several local units of government strongly oppose any public acquisition of land in the area (fee title and conservation easements) that could potentially restrict future cranberry bed expansion, residential development, and impact the area's tax base.

Chapter 3: Refuge Environment

3.1 Refuge History

The history of the Refuge dates back to the early 1930s when the U.S. Government acquired 114,964 acres of land in Juneau, Wood, Monroe, and Jackson counties, Wisconsin, using the authority of the National Industrial Recovery Act of 1933 and the Emergency Relief Appropriation Act of 1935. The purpose for these acquisitions was to assist farmers living within the area and to develop the area for wildlife.



U.S. Fish & Wildlife Service

On March 14, 1939, President Franklin D. Roosevelt signed an executive order authorizing 43,696 acres of this Federal land be set aside as the Necedah Migratory Waterfowl Refuge for the purpose of “a refuge and breeding ground for migratory birds and other wildlife...” (Executive Order 8065) and “...for use as an inviolate sanctuary, or for any other purpose, for migratory birds” (Migratory Bird Conservation Act of 1929).

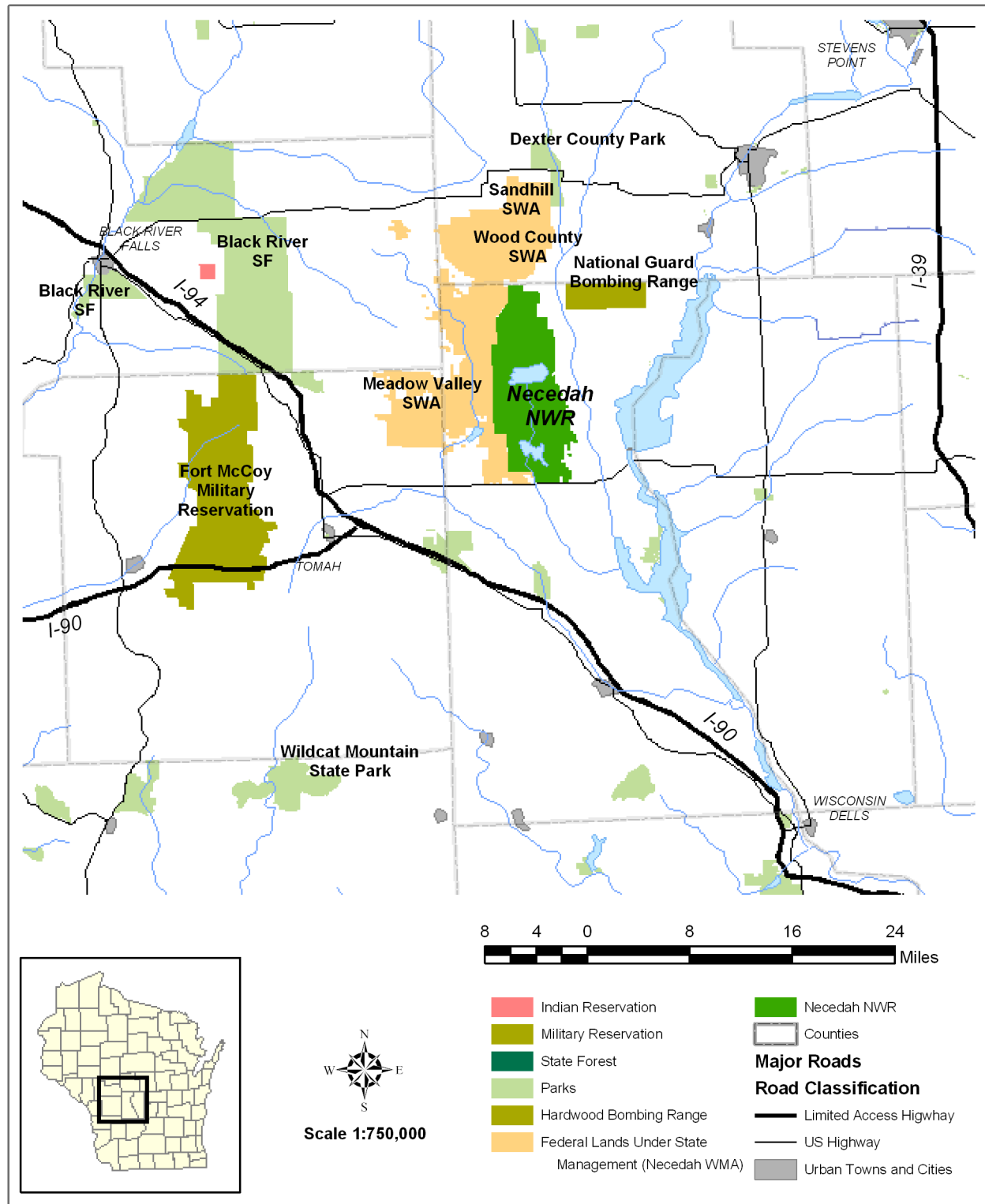
One year later, the Necedah Migratory Waterfowl Refuge became formally known as the Necedah National Wildlife Refuge.

Around this same time, the management of 55,000 acres of this Federal land was transferred to the State of Wisconsin with the signing of a Cooperative and License Agreement.

However, in 1941, Executive Order 8763 declared these federally owned/state-managed lands be “reserved as a refuge and breeding ground for native birds and other wildlife and for research relating to wildlife and associated forest resources, under such conditions of use and administration as will best carry out the purposes of the land conservation and land utilization program for which such lands have been, or are being acquired...”. Executive Order 8763 also designated the Service as custodial agent for the property.

Today this land is known as Necedah Wildlife Management Area, which includes parts of the Central Wisconsin Conservation Area (parts of Meadow Valley State Wildlife Area, parts of Wood County Wildlife Area, and parts of Sandhill State Wildlife Area) and scattered parcels in Jackson County (Figure 5). They are part of the National Wildlife Refuge System, but managed cooperatively with the Wisconsin DNR through a Cooperative Agreement. It should be noted that this CCP is for the Refuge portion of this land only.

Figure 5: Necedah Wildlife Management Area Location



3.2 Ecosystem Goals

As stated previously, the Refuge is located in the Upper Mississippi River/Tallgrass Prairie Ecosystem. Six eco-types are currently the Service's focus for this ecosystem. They include: prairie wetland and associated habitats, tallgrass prairie and associated habitats, oak savanna and forest lands, the Driftless area, streams and riparian woodland corridors, and the Mississippi River corridor. Service goals for this Ecosystem are to:

- Protect, restore, and enhance native and trust species and their habitats.
- Restore and maintain natural ecosystem processes, including hydrology and sediment transport to maintain species and habitat diversity.
- Promote environmental awareness of the ecosystem and its needs with emphasis on sustainable land use management, improve water quality of the Ecosystem.
- Promote balance and compatible socioeconomic uses of the Ecosystem's resources.
- Improve water quality in the ecosystem

3.3 Refuge Resources

3.3.1 Fish and Wildlife Resources

3.3.1.1 Regional Fish and Wildlife Conservation Priorities

In 1999, the Great Lakes-Big Rivers Region of the Service initiated a process to identify its top species priorities in terms of those in need of the greatest conservation attention in the Region. Appendix I is a list of regional priority species that occur on the Refuge and/or the Yellow River Focus Area. In addition, the Refuge and the adjacent Yellow River Area contain habitat that supports or historically supported several species of birds on the Service's List of Migratory Nongame Birds of Management Concern. Appendix I contains those species as well. The planning team used this information when developing goals and objectives for the Refuge.

3.3.1.2 Birds

For centuries, birds have descended upon the Refuge area during their annual migrations between Central and South America and their northern U.S., Canadian, and Arctic breeding grounds. In total, over 230 different species of birds have been observed on the Refuge since its inception. The Refuge has long been considered an important migratory stopover area for Mallards, Blue-winged Teal, Ring-neck Duck, and Wood Duck. Other migrant species that utilize the Refuge during spring, summer, or fall include: Canada, Snow, and White-fronted Geese; Sandhill Crane; American Woodcock; Common Snipe; Great Blue Heron; swans; egrets; various warblers; Brown Thrasher; several different species of sparrows; meadowlarks; Sora; Black-crowned Night Heron; Bobolink; Least Bittern, American Bittern; Red-breasted Nuthatch, White-breasted Nuthatch, and Red-tailed Hawks; just to name a few. During migrations, three species of geese, 10 species of dabbling ducks, nine species of diving ducks, and Trumpeter and Tundra swans are commonly found on the Refuge. Waterfowl are most abundant in the fall, with fall counts of ducks averaging around 20,000. Resident bird species include Wild Turkeys, Ruffed Grouse, Sharp-tailed Grouse, Woodpeckers, and Nuthatches.

3.3.1.3 Mammals

The Refuge supports an assortment of mammals that contribute to the ecological, economic, and aesthetic value of central Wisconsin. Within the past 3 years, timber wolves have established two packs on Refuge land. Timber wolves are a top predator that play an important ecological role, as well as provide educational opportunities for Refuge visitors. Black bear and bobcat are also present in low numbers. White-tailed deer are very abundant and can be seen on the Refuge almost anywhere, and

at anytime. Cottontail rabbits, snowshoe hare, gray, red, fox and flying squirrels, woodchucks, raccoon, skunks, red and gray fox, coyotes, muskrat, mink, otter, opossum, weasels, and badger are mid-sized mammals that serve as both predators and prey in Refuge plant and animal communities. Small mammalian residents include meadow voles, white-footed and deer mice, shrews, and moles. These small animals are a primary food source for many larger animals.

3.3.1.4 Reptiles and Amphibians

Reptiles and amphibians are important Refuge residents. Snake species include hog-nosed snakes, Eastern garter snakes, smooth green snakes, Northern water snakes, fox snakes, and Eastern massasauga rattlesnakes. Five-lined skinks are a species of lizard that call the Refuge home. Painted, softshell, and snapping turtles can be seen in wetland environments; Blanding's turtles are most frequently seen in upland savanna environments. Frog and toad species include leopard frogs, green frogs, wood frogs, grey tree frogs, spring peepers, and the American toad. Blue-spotted salamanders are fairly common and can be found in dark moist environments, such as under decaying logs or thick leaf litter.



Frank Durbian

3.3.1.5 Invertebrates

Invertebrates are abundant on the Refuge and play an integral role in maintaining the ecological balance of several Refuge ecosystems. Wisconsin has approximately 20,000 species of insects. The Refuge is home to the world's largest remaining population of the Federally listed endangered Karner blue butterfly and also to the rare Leonard's skipper. Other rare insects that use the Refuge include the phlox moth, frosted elfin butterfly, Persius dusky wing, ringed bog haunter dragonfly, and two species of tiger beetles.

3.3.1.6 Fish

Fish species are also important members of the Refuge ecosystem. They cycle nutrients in Refuge aquatic systems and serve as food sources for a variety of birds and mammals. Although many fish species are at a disadvantage due to the drainage of Refuge pools for waterbird management, many people travel to the Refuge for rewarding year-round fishing opportunities on Refuge pools and ditches. Northern pike, large mouth bass, yellow perch, black crappie, pumpkinseed, black, brown, and yellow bullhead are some of the species most sought by anglers.

3.3.1.7 Rare Plants

There may be rare species of plants that have not been identified on the Refuge, particularly those that may be living in remote locations. While several studies have been done on plant abundance and distribution, a comprehensive inventory of Refuge plants is needed. The Refuge and the Yellow River area have several populations of rare and declining plant species (Table 1).

3.3.1.8 Listed Species

Federally listed threatened or endangered species that utilize the Refuge and the adjacent Yellow River Area include the Bald Eagle, Eastern timber wolf, Karner blue butterfly, and Whooping Crane. The Eastern massasauga rattlesnake, which is currently a candidate for federal listing, is found in low numbers in the Yellow River Area. Chapter 4 discusses management actions aimed at restoring and protecting federally-listed species in these two areas.

Bald Eagle

The Bald Eagle, America's national symbol, experienced a drastic decline throughout the country from the 1950s into the early 1970s. This decline was caused by the bio-accumulation of organochlorine pesticides (DDT and dieldrin) in fish and habitat destruction. The use of pesticides which contained DDT or dieldrin were banned in 1972, and shortly thereafter the number of successful eagle nests increased steadily. Bald Eagles were listed as an endangered species in 1976. Due to successful

Table 1: Rare Plants Found on the Refuge and Within the Yellow River Focus Area¹

Common Name	Scientific Name	State Status*	Habitat/Location
Round-stemmed false foxglove	<i>Agalinus gattingeri</i>	State threatened (Federal status assessment in progress)	Southern Juneau County in dry prairies and bedrock glades
Wooly milkweed	<i>Asclepias lanuginosa</i>	State threatened	Dry savannas (oak barrens) in Juneau County, just south of Necedah Refuge
Brittle prickly pear	<i>Opuntia fragilis</i>	State threatened	Dry, sandy habitats in neighboring Adams County; may occur in similar habitats in Juneau County
Dwarf bilberry	<i>Vaccinium cespitosum</i>	State endangered	Sandy pine and oak savanna habitats, bracken grasslands
Sand violet	<i>Viola fimbriolata</i>	State endangered	Sandy pine and oak savanna habitats
Pale false foxglove	<i>Agalinus skinneriana</i>	State endangered	Dry savannas in Adams County
Tubercled or pale green orchid	<i>Plantanthera flava</i> var. <i>herbiola</i>	State threatened	Wet prairies and sedge meadows in Juneau and Adams counties
Umbrella sedge	<i>Fuirena pumila</i>	State endangered	Coastal plain species that inhabit peat and muck flats, wet sands, and fluctuating lake shores
Bald rush	<i>Psilocarya scirpoides</i>	State threatened	Coastal plain species that inhabit peat and muck flats, wet sands, and fluctuating lakeshores
Netted nut-rush	<i>Scleria reticularis</i>	State endangered	Coastal plain species requiring recently desiccated mud or sand lake beds with fluctuating water
Bog bluegrass	<i>Poa paludigena</i>	State threatened	Sedge meadows and tamarack bogs; has been documented in western Adams County.
Beak grass	<i>Diarrhena americana</i>	State endangered	Floodplain forest; may inhabit Yellow River bottoms, adjacent and east of Necedah NWR

1. No federally-listed plants are likely to occur on the Refuge.

conservation efforts, the Bald Eagle was recently upgrade to a threatened species. One occupied eagle nest currently occurs at the Refuge which is protected from human disturbance.

Eastern Timber Wolf

Eastern timber wolves lived throughout Wisconsin prior to the 1830s. As settlers transformed native habitat into farmland, prey species declined and wolves began feeding on livestock. In 1865, the Wisconsin Legislature paid a \$5.00 state bounty for every wolf killed. The wolf bounty was later increased to \$20.00 for adults and \$10.00 for pups to protect the dwindling deer herd. By 1960, few wolves remained throughout the lower 48 states and were declared extirpated from the State of Wisconsin.

In 1973, the wolf was listed as a federal endangered species and as a state endangered species in the State of Wisconsin in 1975. Between 1979-1986, studies showed that four to six wolf packs (15-25 animals) roamed two areas of northern Wisconsin. Since this period, wolf packs continue to increase throughout Wisconsin. Currently there are at least 66 confirmed wolf pack (248-259 animals) territories in northwestern and central Wisconsin and 11 established wolf packs in the central Wisconsin forest complex (Wydeven et al. 2000). Territories of four packs, Suk Cearney, Yellow River, Dead Creek, and South Bluff, may extend onto the Refuge. The Suk Cearney pack's territory appears to be concentrated on the southern end of the Refuge. This pack has numbered as many as seven individuals at one time. Based on winter wolf track surveys, there may be two dens and/or rendezvous sites on the Refuge, although howling surveys have not detected wolf pups as of yet. For the most recent map of wolf pack distribution in Wisconsin, see the Wisconsin Department of Natural Resources website at: <http://www.dnr.state.wi.us/org/>.

Karner Blue Butterfly

Karner blue butterflies have undoubtedly been longtime residence of the Refuge property. Savanna habitat was present on Refuge land at the time of the original land surveys. The butterflies most likely occurred on these savannas. However, definitive proof is lacking. Karner blue butterflies undoubtedly benefitted from the drainage and expanded burning that occurred in the area of the Refuge at the beginning of the 20th century. Presently, Karner blue butterflies are known to occur in 12 population complexes within the Refuge, which constitutes the world's largest remaining population of Karner blue butterflies. The butterfly was listed as an endangered species in 1993.

Whooping Crane

Whooping Crane chicks were introduced at the Refuge in the summer of 2001 as part of an experimental Whooping Crane reintroduction project aimed at establishing a migratory population in the eastern U.S. to contribute toward recovery of the species. The population has been designated as a non-essential population (NEP) in a rule making action finalized on June 26, 2001. The crane chicks were reared in a pen situation and trained to follow ultralight aircraft in migration to a selected wintering site at Chassahowitzka National Wildlife Refuge. Yearling cranes successfully returned to the Refuge in the spring of 2002. Annual Whooping Crane introduction, rearing, and release activities are expected to continue for 10 years with a goal of 25 breeding birds, 125 birds total.

Eastern Massasauga Rattlesnake

Eastern massasauga rattlesnakes have disappeared from most of Wisconsin. Once widespread and plentiful in southern and western Wisconsin, the Eastern massasauga has been reduced to just five populations in the state. One of those populations is located next to the Refuge in the Yellow River. The Yellow River was long considered Wisconsin's best massasauga population in terms of species abundance. Evidence of this is found in bounty records which indicate that bounty was paid on over 4,000 massasaugas between 1952 and 1972.



Frank Durbian

The Yellow River population produced 25 Eastern massasauga rattlesnakes in the 1990s. Nineteen of these snakes were neonates from two different clutches. Of the six adults, three were located during routine surveys and three were road-killed animals. No new snakes have been located in the Yellow River since 1995, despite intensive survey efforts by the Refuge and Wisconsin DNR. The Eastern massasauga was listed as a state endangered species in 1975.

The Refuge is currently working with landowners on the Yellow River to conserve snakes through habitat improvements. Similar efforts are under way with landowners around three other massasauga

populations. These populations are in LaCrosse, Monroe, and Buffalo counties. The Refuge is developing Candidate Conservation Agreements with landowners on all of these areas.

State Listed Species

State-listed threatened or endangered species that use the Refuge include the Bald Eagle, Red-shouldered Hawk, Blanding's turtle, Eastern massasauga rattlesnake, and Trumpeter Swan. The Refuge also supports several rare, threatened, or endangered species of plants. These include the prairie fameflower, small skullcap, oval-leaved milkweed, and wooly milkweed. Plant species that are necessary to support rare organisms include wild lupine and downy phlox.

3.3.2 Archaeological and Cultural Values

Archaeological records show evidence of human occupation in Juneau County since the end of the last Ice Age when Paleo Indians hunted large prehistoric animals. Every subsequent cultural period for the past 10,000 years is represented. The land now known as the Refuge was probably used by several cultures since the Ice Age. The peat-covered lowlands around the extensive marsh and shallow river environment contained a wide variety of food resources. Slightly higher ground would have been suitable for resource-extraction activities, but the people likely located their larger camps and villages on elevated land forms not found within the Refuge.

Archaeological investigations have covered 2 percent of the Refuge. The surveys and other sources have identified 27 prehistoric and historic sites. The earliest evidence of people on the Refuge has been dated to the Middle Archaic period of 5,000 to 3,000 years ago. The rest of the identified sites are camps from the Woodland period of 3,000 to 250 years ago, and farmsteads and cemeteries from the period of Western culture settlement and occupation. Prehistoric mounds, including effigy mounds, are reported near the Refuge. An inventory of Yellow River archaeological values and previous archaeological work within the Yellow River Focus Area has not been completed. As of November 1, 1998, the National Register of Historic Places contained seven properties in Juneau County and three properties in adjacent Jackson County. These properties include a bridge, houses, and prehistoric sites, including the Cranberry Creek Archaeological District 3 miles east of the Refuge. Early 20th century fires burned across the Refuge area, destroying the peat so that now the sandy subsurface is exposed or shallowly covered with silt. The slight elevations that might have been used for resource extraction or temporary camps are virtually indistinguishable. In consultations with the Wisconsin State Historic Preservation Officer, the more efficient method of identifying archaeological sites would be to conduct a geomorphological investigation of the Refuge to determine where land forms exist that could have supported human use. A similar study conducted at Fort McCoy, Wisconsin, could be a useful prototype.

Indian tribes may have interest in the Refuge area in terms of traditional cultural properties and sacred sites, as well as claims to human remains, funerary objects, and other cultural items. During the early historic period in Wisconsin, Indian tribes were in a great state of flux, many tribes from the east having moved from their ancestral land and pushed the aborigines from Wisconsin to the south and west. Thus connecting historic period tribes with their prehistoric cultural antecedents in Wisconsin is problematic. People of the Late Woodland Lakes phases may have become the Menominee tribe. Evidence from archaeological excavations indicates that ancestors of the Winnebago had lived in Eastern Wisconsin for hundreds of years; the Oneota of Eastern Wisconsin may have been prehistoric Winnebago. In any event, historic records place Winnebago and Potawatomi in the area at the time of Western contact. The Refuge is within the area recognized by the Indian Claims Commission as being part of Menominee and Winnebago aboriginal territory. The Ioway spoke a Siouan language, which likely links them to late prehistoric cultures of central and southern Wisconsin. To a limited extent the Illinois were indigenous tribes in southern Wisconsin, probably not as far north as the Refuge. By the 1600s, however, a variety of tribal groups were moving in and out of areas south of the Refuge and may have spent time within the vicinity. These included the Sauk, Fox, Potawatomi, Kickapoo, Miami, and Mascouten.

3.3.3 Hydrology

Water plays an important part in the history of the Refuge. The sandy sediments and flat topography of the area are a result of Glacial Lake Wisconsin, a pre-historic lake that developed when a glacier blocked the Wisconsin River near Baraboo, Wisconsin. This extensive lake occupied large parts of Juneau and Adams counties, and parts of Wood, Portage, Waushara, Marquette, Columbia, Sauk, Richland, Vernon, Monroe and Jackson counties. Glacial Lake Wisconsin drained catastrophically about 13,000 years ago when the glaciers retreated.

3.3.3.1 Refuge Watershed

Located in the Castle Rock Watershed, the Refuge is supported by an important hydrological system comprised of natural and man-made waterways in which materials and energy are transferred (Figure 6). Some, such as the Yellow River and its tributaries, provide an important ecological component to the Refuge by connecting biologically diverse food webs that provide important habitat features for wildlife. The Refuge, along with a series of other swampy basins such as Meadow Valley Flowage, Beaver Flowage, and numerous managed cranberry bogs, all contribute to the 7,800-square mile Middle Wisconsin River Basin. The Castle Rock Watershed drains 3,259 square miles, contains 27 rivers and streams, and has 3,358 total river miles.

3.3.3.2 Refuge Water Sources and Sinks

On average, approximately 85 percent of the water entering the Refuge comes directly from precipitation, either as rain or snow (Table 2) (USGS Report). Precipitation averages about 32.6 inches annually. Streams that flow into the Refuge contribute about 13 percent of the water, while groundwater flow into the Refuge accounts for about 2 percent of the water, due largely to the interception of ground water by the extensive drainage networks surrounding the Refuge. Surface-water inflow to the Refuge includes: Remington Ditch (60 percent), Neal Lateral (15 percent), EBR-Spencer (11 percent), Meadow Valley (6 percent), and un-gauged (8 percent).

Of the water leaving the Refuge, about 62 percent is lost to evaporation from the pools or transpiration of water vapor back to the atmosphere from plants. Evaporation from open-water surfaces is estimated to be about 28 inches annually, as determined from a regional map of average annual lake evaporation (Kohler and others, 1959). Surface-water outflows from the Refuge, mostly through Rynearson Pools 1 (28 percent) and 2 (59 percent) and Suk-Cerney Pool (10 percent), constitute about 36 percent of the total outflows; groundwater flows out of the Refuge are about 2 percent of the total annual outflows. This small amount of groundwater outflow, along with larger surface water outflows, demonstrates the efficiency of the extensive drainage network within the Refuge boundaries. A natural topographic fall of 50 feet occurs from north to south across the Refuge, or roughly 2-3 feet per mile.

From recent groundwater modeling of the Refuge, annual recharge was estimated to be 9.5 inches. Hence, evapotranspiration was 32.6 inches (precipitation) minus 9.5 inches (groundwater recharge), or 23.1 inches. This value agrees well with the findings of Weeks and Strangland (1971), who reported evapotranspiration values for nearby agricultural areas ranging from 15 to 20 inches per year, with higher rates expected in areas containing water-tolerant vegetation. Groundwater moves through the Refuge in a northwest to southeast direction traveling toward the Yellow and Wisconsin Rivers. Groundwater varies from 0 to 20 feet and is typically high in iron, with a pH of approximately 6.0, which is slightly acidic. Total dissolved solids and hardness are low. Groundwater recharge occurs primarily from percolation of precipitation through the loamy sands.

Water control structures within the Refuge regulate drainage. During high water flows such as spring floods, water control structures are monitored regularly and outflows are controlled to prevent damage to down-stream roads and culverts. Water is generally stored in Refuge pools during spring runoff and is used to refill pools that are drained in early June for moist soil seed production. Reflooding of moist soil units takes place during September and October. Stored water can also be used

Figure 6: Castle Rock Watershed, Necedah National Wildlife Refuge

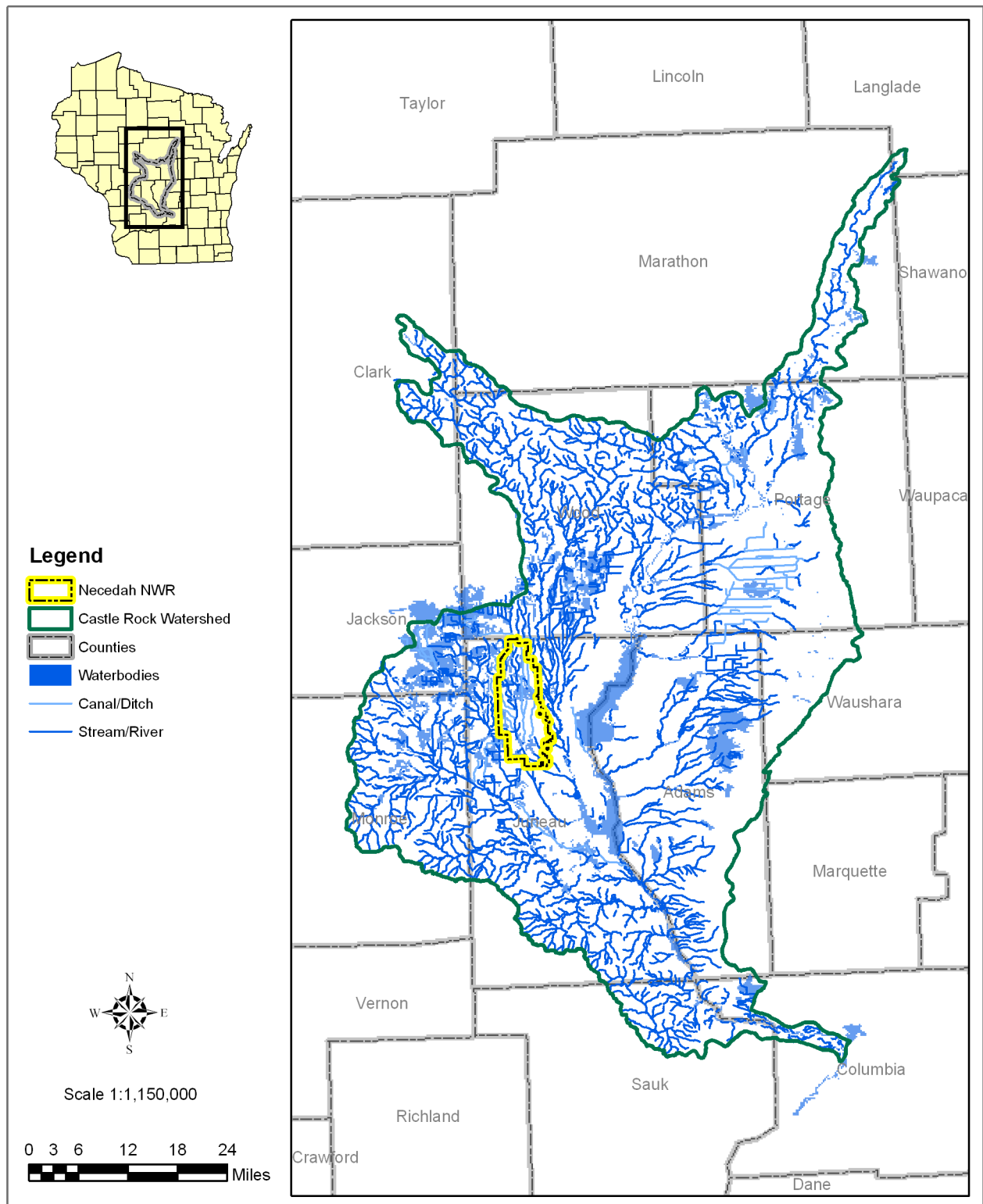


Table 2: Summary of Water Sources and Sinks for Necedah NWR, May 1988-April 1999¹

Water Sources and Sinks	Annual Flow (acre-feet)
Water Sources	
Precipitation	118,700
Surface Water Inflow	19,600
Ground Water Inflow	2,300
Total Water In	140,600
Water Sinks	
Evapotranspiration Loss	85,400
Surface Water Outflow	51,500
Ground Water Outflow	2,700
Total Water Out	139,600
Change in Storage (water inflow/water outflow)	1,000
Percent of Water Inflow	0.7

1. U.S. Geological Survey Fact Sheet, May 2000

to maintain water levels in pools that are managed at full pool to provide breeding and brood rearing habitat for migratory birds.

3.4 Physiography

3.4.1 Refuge Ecosystem

The Refuge is located in the Upper Mississippi River/Tallgrass Prairie Ecosystem (Ecosystem) which is one of eight hydrologically defined ecosystems that comprise the Great Lakes-Big Rivers Region of the Service (Figure 7). The Ecosystem is a large and ecologically diverse area that encompasses land in the states of Wisconsin, Illinois, Indiana, Iowa, Minnesota, and Missouri. The Mississippi River bisects the Ecosystem east and west. Other major rivers include the Minnesota, Chippewa, Black, Wisconsin, Iowa, Rock, Skunk, Des Moines, Illinois, and Kaskaskia.

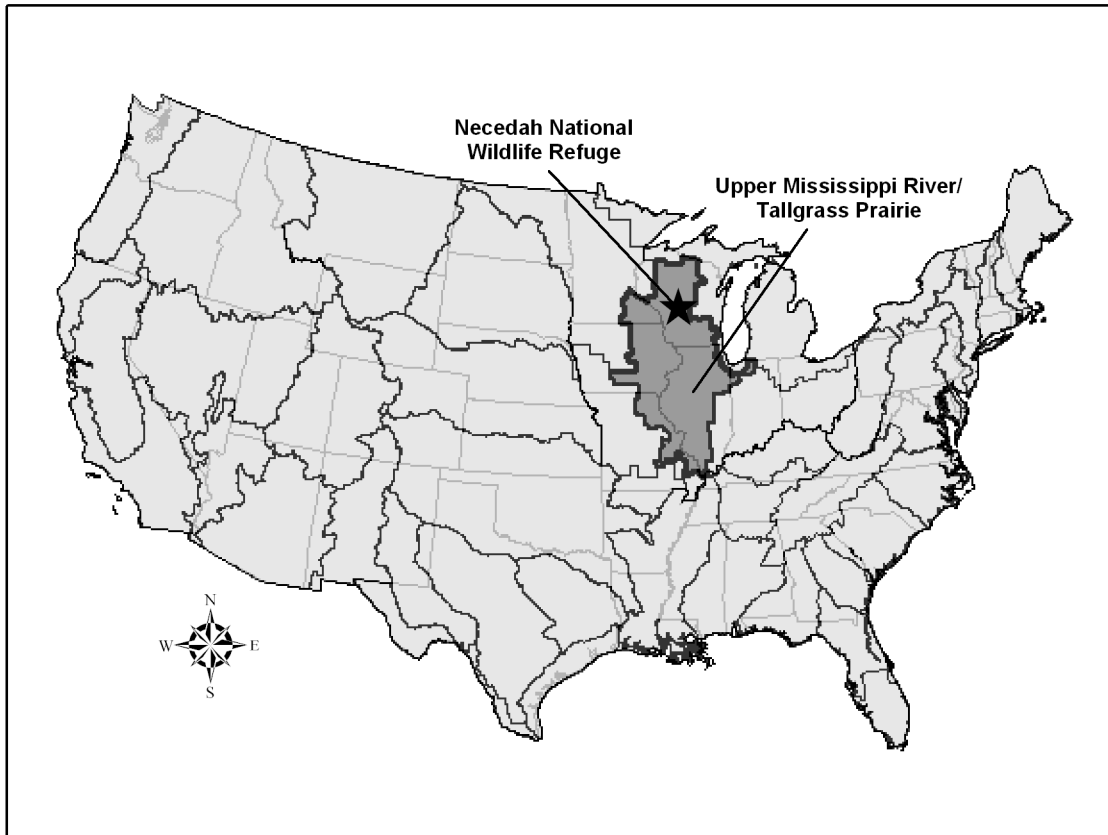
3.4.2 Bailey's Ecological Unit Classification System

Bailey's Ecological Unit Classification System (Keys et al., 1995) defines the Upper Mississippi River/Tallgrass Prairie Ecosystem as Laurentian mixed forest, eastern broadleaf forest, lower Mississippi riverine forest, and prairie parkland. The Refuge is located in the eastern broadleaf forest province within the central Wisconsin sand plain subsection (Figure 8).

3.4.3 Historic Condition

Historically, land in and around the Refuge was once a vast peat bog with some low wooded islands and savannas. The higher sand ridges were occupied by mature stands of pines and other species (Figure 9).

Figure 7: Ecoregion of Necedah NWR



3.4.4 Current Condition

Today the Refuge consists of roughly 43,700 acres of pine, oak, and aspen forests, grasslands and savannas, and wetlands and open water areas, all of which support a rich diversity of fish and wildlife (Figure 10). Table 3 is a summary of Refuge land cover.

Refuge forest communities (upland) include northern mesic forest (white and red pine, bigtooth aspen, trembling aspen, red maple) and mixed wet-mesic forest (jack pine, northern pin oak, red maple, trembling aspen, paper birch). Refuge forests provide excellent habitat for many neo-tropical migratory birds such as the Scarlet Tanager, Eastern Wood-pewee, and Ovenbird. Currently upland forests on the Refuge comprise roughly 16,500 acres.

Refuge grasslands, savannas, fallow fields, and shrublands comprise open landscapes on the Refuge. Refuge grasslands include prairies, fallow fields, and meadows. Tree cover on the grasslands ranges from little to none. Plant cover is a mixture of sedges, grasses, and forbs that attract nesting Bobolinks, Vesper Sparrows, Grasshopper Sparrows, and Upland Sandpipers. Some common grassland species on the Refuge include big bluestem, little bluestem, Kentucky bluegrass, and a wide variety of other grasses, sedges and forbs. Blackberry and spirea are scattered in grassland areas as well. Willow-dogwood communities are invading old farm fields and wet meadows in places where disturbance is rare. Refuge grasslands provide important nesting habitat for many migratory birds including ducks, geese, and Sandhill Cranes, and also serve as grazing sites for white-tailed deer.

Figure 8: Bailey's Ecoregions, Region 3 of the U.S. Fish & Wildlife Service

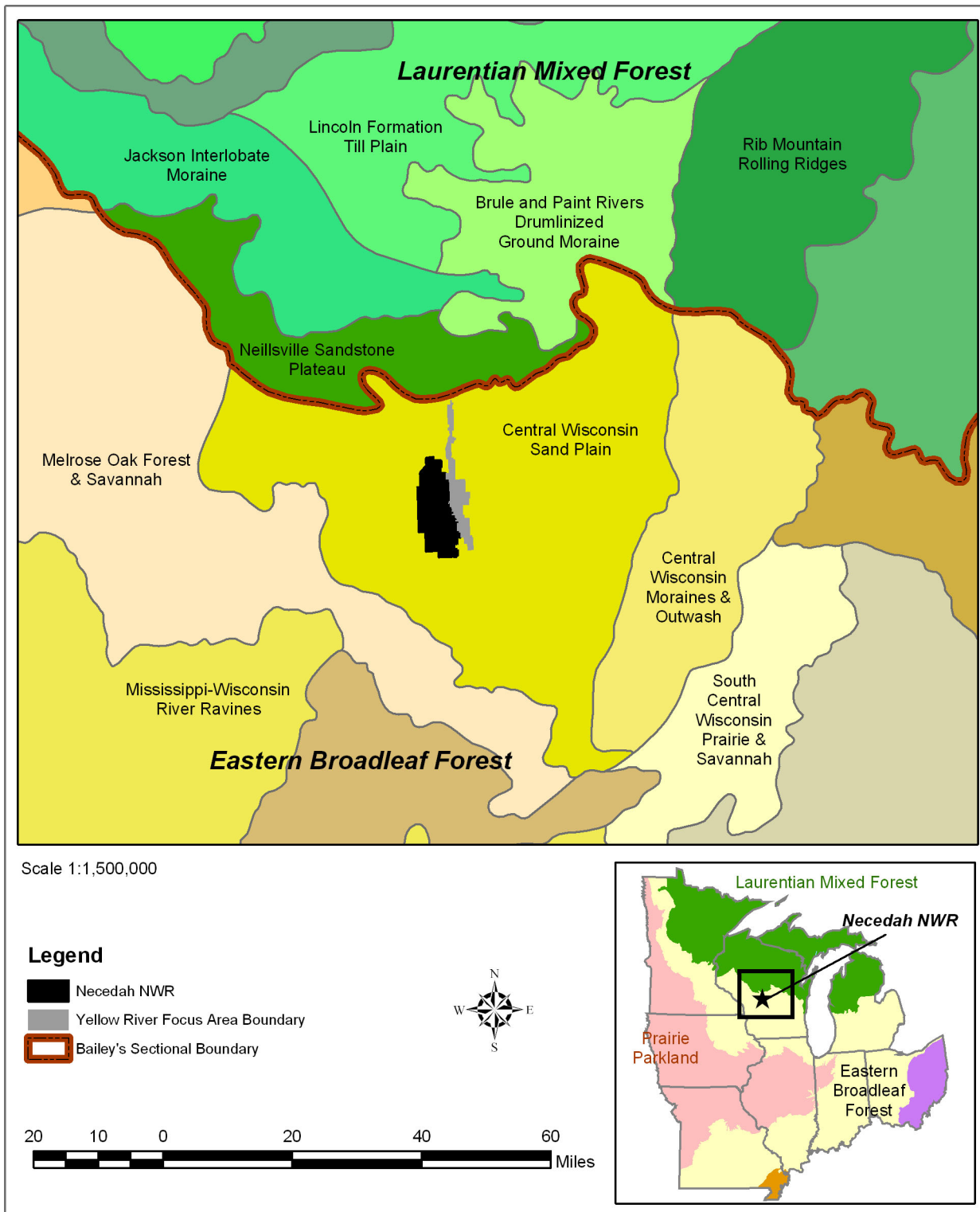


Figure 9: Historic Vegetation, Necedah NWR

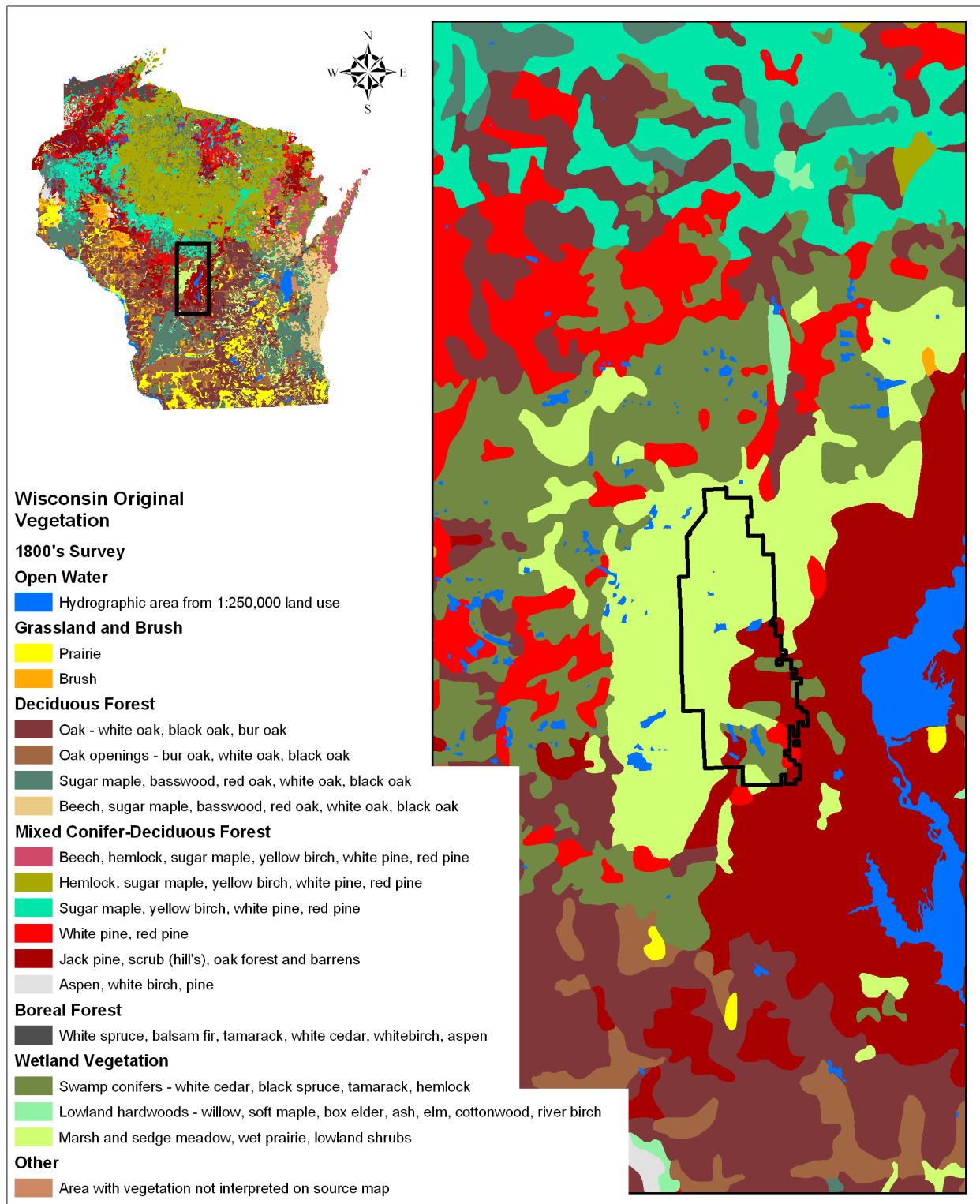


Figure 10: Current Land Cover, Necedah NWR

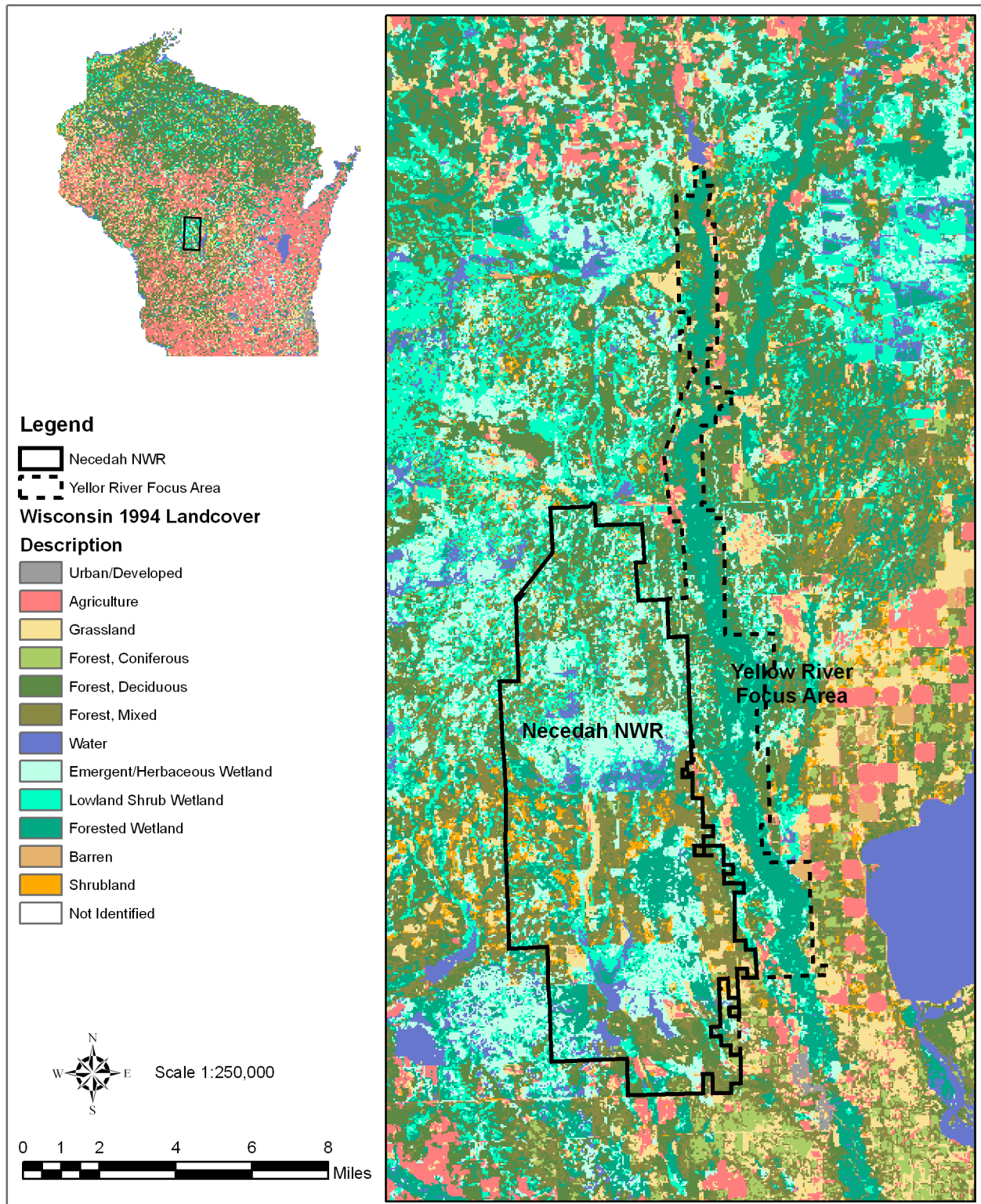


Table 3: Land Cover Types, Necedah NWR¹

Land Cover Type	Acres
Open Landscapes (grasslands, savanna, shrublands, old fields)	3,700
Coniferous Forests	900
Mixed Deciduous and Coniferous Forests	10,000
Broad-leaf Deciduous Forests	5,600
Emergent Wetlands and Wet Meadows	10,500
Forested Wetlands	5,700
Lowland Shrubs	5,500
Open Water Areas	1,800

1.Data Source: WISCLAND (1994)

Refuge savannas include northern pin oak, jack pine, warm season grasses, upland sedges, blueberry, goldenrod, and wild lupine. These savanna areas are also known as barrens, because fire and tree diseases such as oak wilt are more common in the droughty, sandy soils. These disturbances keep the trees small and scattered. Oak savanna has been defined as having at least one tree per acre, but less than 50 percent cover. Wisconsin historically had over 4 million acres of barren habitat covering 12 percent of the state. Today less than .14 percent remains. Refuge savannas support Eastern massasauga rattlesnakes, phlox moths, Blandings turtles, Karner blue butterflies, and over 110 species of birds. Currently, open landscape lands on the Refuge comprise roughly 3,700 acres.

Refuge wetlands include forested, non-forested, and open water wetlands. The majority of these occur within pools, streams, and ditches. Wetland plant species include pondweeds, rushes, elodea, coontail, milfoils, and duckweeds. Some Refuge pools are drawn down for part of the year to promote the growth of high energy waterfowl foods such as millet, smartweed, chufa, beggar ticks, rice, and spikerush. Ditches and streams also provide additional wetland habitat, although to a lesser extent than Refuge pools.

Wet meadows and marsh edges consist of bur-reed, smartweeds, beggar's ticks, bulrushes, blue-joint grass, and reed canary grass. Open sedge meadows comprise mixed sedges with invading jack pine, willow, and hardhack. Sedge meadows on the Refuge are home to Northern Harriers, Sedge Wrens, and Sora Rails.

Bottomland forested areas include jack pine, silver and red maple, green ash, northern pin and swamp white oak, river birch, and trembling aspen. Tamarack was historically present in these areas. Currently non-forested, forested, and open water wetlands comprise roughly 23,500 acres.

3.5 Geology

The Refuge is located in the central plain province of Wisconsin within an area known as the Great Central Wisconsin Swamp, an extensive alluvial lake plain that extends over 2,000 square miles. The Refuge is underlain by a Precambrian Crystalline bedrock complex which surface varies in elevation from approximately 860 Mean Sea Level at the north end of the Refuge to approximately 760 Mean Sea Level at the south end. The Precambrian bedrock is overlain by an estimated 30 to 100 feet stratum of late Cambrian sandstone.

3.5.1 Refuge Soils

Soils on and around the Refuge represent three major soil associations consistent with central Wisconsin landscapes: Aus Gres loamy sands and Morocco silt loams, Plainfield and Nekoosa loamy sands, and muck and peat soils (Figure 11). The dominant soil association is the Plainfield and Nekoosa loamy sands. Newson and Dawson peat soils are found in the impoundments, along drainage ditches, and in marshes. These soils are usually inundated and consist of partially decayed organic matter and mineral soils.

3.6 Social and Economic Resources

3.6.1 Economic Impact Assessment

In 1998, the Refuge contracted with Industrial Economics Inc. to complete an economic impact assessment to estimate the regional economic and national social welfare benefits of the Refuge. However, some of the data used to generate the economic report is associated with significant uncertainty, as well as dated. As a result, the estimates in the report should be interpreted with uncertainty in mind. Some of the values used to generate that report have been updated to reflect more current figures. Also, it should be noted that the report was not commissioned to support any of the action items contained in the CCP. It was prepared to facilitate a better understanding of the economic contribution national wildlife refuges in general have on local and regional economies.



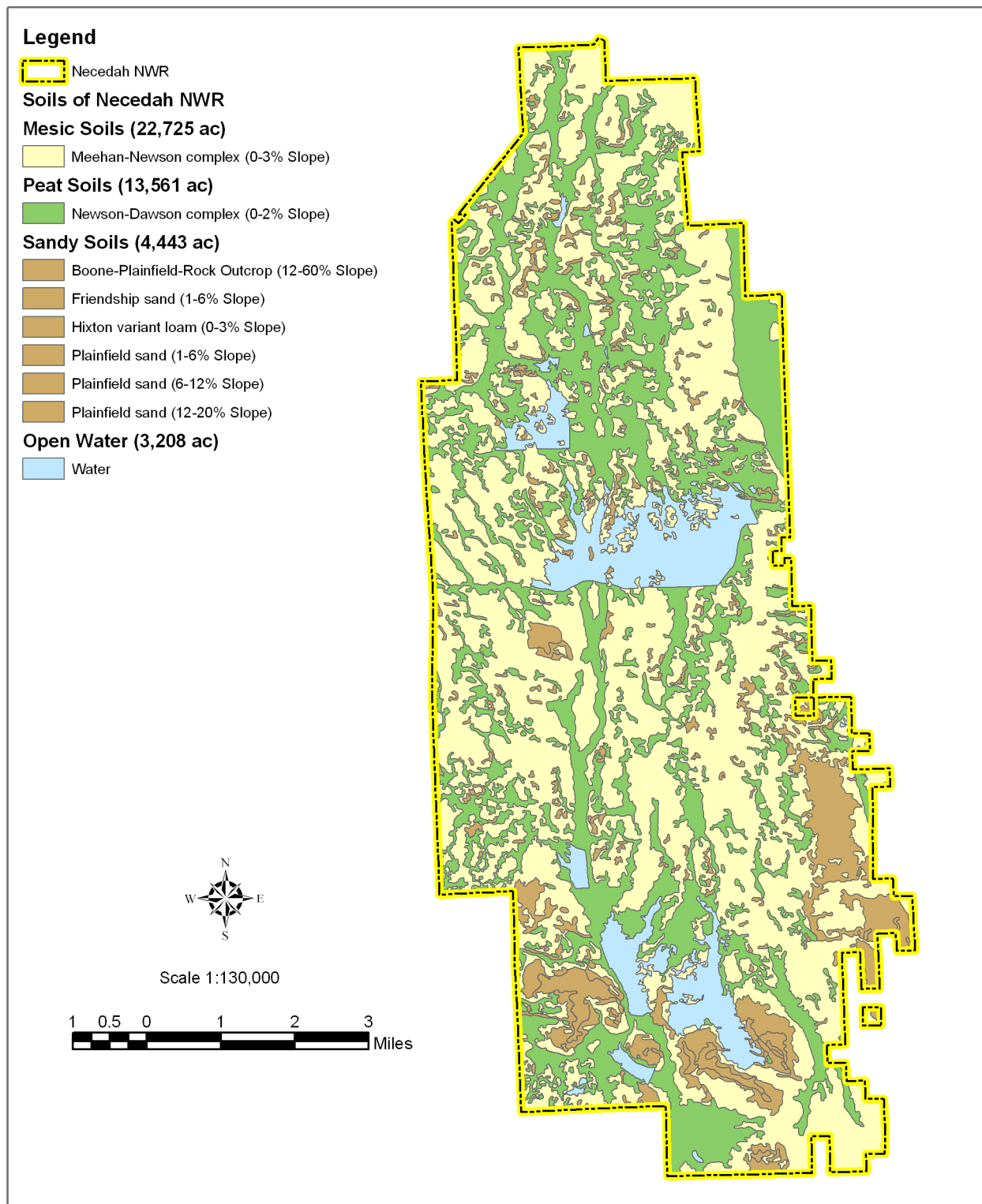
U.S. Fish & Wildlife Service

Within the four-county region surrounding the Refuge (Wood, Juneau, Adams, and Monroe counties), agricultural activities constitute an important component of the economy. This sector includes both dairy farms and farms that grow row crops (e.g., sweet corn, potatoes, snap peas). Cranberry production is also important, and is considered a premium crop in that it commands a high price in the market. Cranberry beds, while representing a small percentage of the total land area, are scattered throughout the region. The total acreage of cranberry beds currently in Juneau and Wood counties alone is estimated to be 4,500. Because the region has large tracts of both private and public forest land, the timber industry is important to the economy as well. Wood County is the most populous and strongest economically of the four.

These four counties offer a variety of recreational activities on both public and private land. Along with the Refuge, there are several other public recreation areas. These include Sandhill Wildlife Area, Wood County Wildlife Area, and Meadow Valley Wildlife Area. Other recreational and camping areas nearby include Buckhorn State Park, Castle Rock, and Petenwell County Parks, which are adjacent to the Refuge. These offer substitute sites and opportunities to the Refuge for hunting, fishing, wildlife viewing, photography, and other recreational activities.

Commercial activities on the Refuge include timber harvesting and trapping for pelts. Several of the surrounding towns maintain roadways that pass through the Refuge. Funding for road maintenance

Figure 11: Soils Found On Necedah NWR



on Federal property helps supplement the tax base used to fund road projects. The Refuge's annual budget (> \$1 million dollars in 2001) supports employee salaries, operation and maintenance, education, and improvement projects such as bridges, dams, and roads.

Commercial and Refuge management economic activities on the Refuge include:

- The annual budget for staff salaries, maintenance, operations, small capital purchases and educational programs exceeded \$1,000,000 in 2001.
- Each year, sections of the Refuge are selected for timber harvesting to maintain quality habitat for plants and animals. In 1996-97, 3,237 cords of wood were harvested worth \$155,758.
- Trapping is an important management tool used to reduce or prevent damage to Refuge roads, dikes, and water control structures. Trapping may also reduce predation on nesting birds. Trapping is also a recreational opportunity afforded by the Refuge. Trapped species include mink, beaver, muskrat, and raccoon. The annual average value of pelts taken between 1980 and 1995 was \$6,858.

In addition to maintenance of land by the Refuge, certain roads within the boundary of the Refuge are maintained by the surrounding townships of Necedah, Finley, Cutler, Remington, and Kingston. These townships spend, on average, approximately \$96,000 annually for road maintenance, with a large part of this cost for snow removal.

Conclusions drawn from Refuge-dependent commercial and Refuge management economic activities include:

- Refuge spending contributes over \$1 million and roughly 18 jobs to the regional economy.
- Refuge road maintenance and timber harvesting produce similar effects on the regional economy, accounting for approximately \$150,000 each year.
- Furbearer trapping plays a minor role in the overall regional economy, accounting for only \$7,000 of regional output and less than one job.
- Refuge fire support to the Necedah Fire Department accounted for \$9,500 in 2001 through Wildland Urban Interface Funding.

The Refuge also has an indirect economic impact on the local economy through recreational activities it supports. Among these are hunting, fishing, wildlife observation and photography, berry picking, and cross-country skiing. Although the Refuge charges no entrance fee, individuals that visit the Refuge and participate in these activities often purchase a variety of goods and services in the communities surrounding the Refuge (e.g., food, lodging, fuel, equipment). In 2000, Juneau County contributed \$84 million to Wisconsin's tourism industry (Wisconsin Department of Tourism).

Some of the more popular recreational activities on the Refuge are:

- Hunting for both large (white-tailed deer) and small game species (grey, red, and fox squirrel; rabbit; snowshoe hare; Ruffed Grouse; waterfowl; Wild Turkey; and raccoon). In 1996, an estimated 10,000 trips were made to the Refuge for the purpose of hunting.
- Fishing on Refuge waters, primarily for northern pike, bullheads, crappie, yellow perch, and sunfish. In 1996, approximately 7,000 trips were made to the Refuge for the purpose of fishing.
- Wildlife viewing accounted for over 106,000 trips to the Refuge in 1996.
- Blueberry, raspberry, and blackberry picking are popular during summer months.

Conclusions drawn from Refuge-dependent recreational activities include:

- Wildlife viewing has the greatest effect on the regional economy, accounting for between \$1.9 million and \$2.3 million of regional output and between 48 and 67 jobs.
- Recreational hunting has the second greatest effect on the regional economy, accounting for \$250,000 and 6.8 jobs.
- Fishing produces the third greatest regional economic effects, accounting for \$220,000 of regional output and 5.9 jobs.

3.7 Refuge Operations

3.7.1 Fish And Wildlife Management

3.7.1.1 Birds

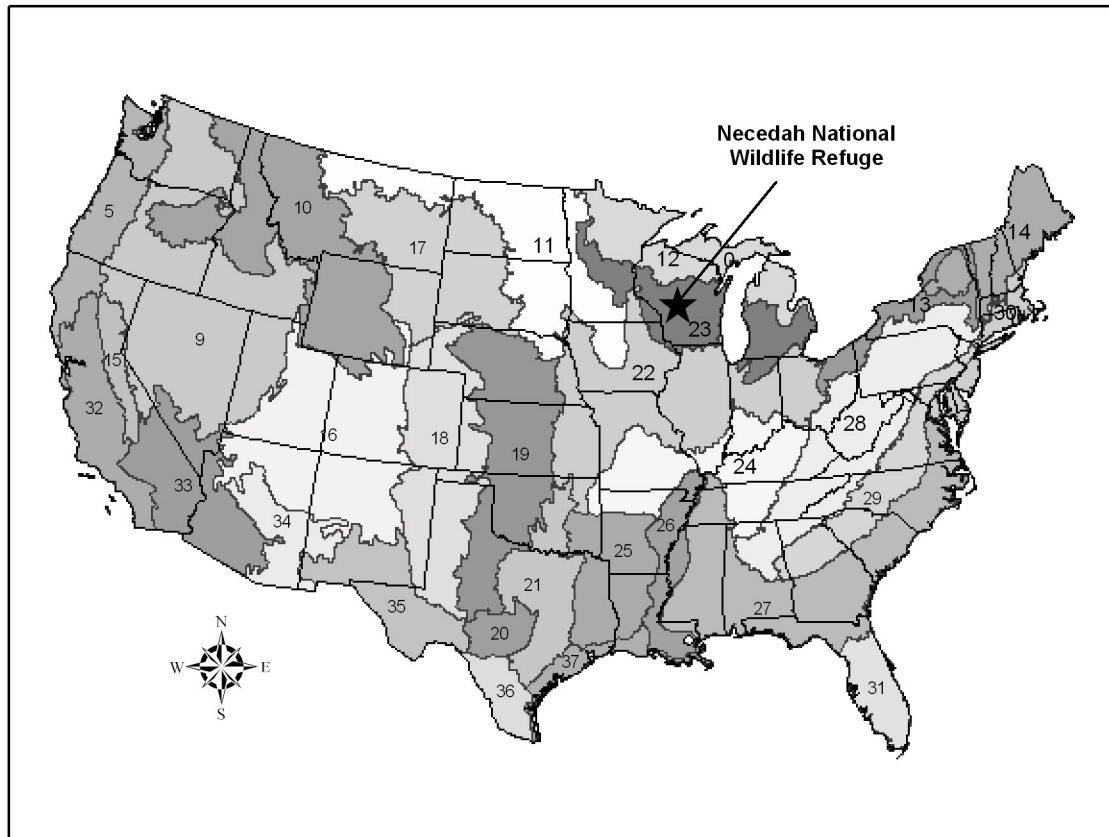
Most bird management on the Refuge is accomplished through habitat management. The Refuge's prescribed burning and savanna restoration programs are designed to directly benefit nesting grassland birds in open and semi-open landscapes. These programs were initially created to increase the amount of suitable waterfowl nesting habitat. The Refuge also attempts to attract waterfowl, shorebirds, and other marsh birds by managing water levels on most of its main pools. The purpose of water level manipulation on these pools is to grow food plants and to increase the availability of aquatic invertebrates that are favored by migrating water birds. In the mid-1960s to early 1970s, the Refuge created Woodcock habitat with its forestry program. This was accomplished by clear-cutting small linear strips of forest in successive years, which created young stands of aspen. Now, Meadow Valley Wildlife Management Area, immediately adjacent to the Refuge (see Figure 5 on page 18), maintains extensive areas of young forest, which is prime Woodcock habitat and habitat for many warblers. Wetland restoration and prescribed burning activities have been used to restore and maintain sedge meadows on the Refuge. This provides nesting habitat for birds including Sedge Wrens, sparrows, rails, and warblers.

The Refuge participates in several migratory bird conservation initiatives to the extent applicable and practical. The *North American Waterfowl Management Plan* (NAWMP) is a partnership effort to restore waterfowl populations to historic levels, with objectives and strategies evolving through NAWMP Updates (the latest produced in 1998). The Refuge is found within the Upper Mississippi River and Great Lakes Joint Venture area of the NAWMP and contributes to the achievement of waterfowl objectives outlined in the Implementation Plan for this area.

Several non-game bird initiatives are in the planning stage, with implementation beginning in the near future. Partners In Flight (PIF) is developing Bird Conservation Plans, primarily for landbirds, in numerous physiographic areas; these plans include priority species lists, associated habitats, and management strategies. The same elements will be by-products of ongoing planning efforts for shorebirds (U.S. Shorebird Conservation Plan) and colonial waterbirds (North American Colonial Waterbird Conservation Plan). The Refuge will strive to implement conservation strategies outlined in these plans as they are developed. The Refuge lies within PIF Physiographic Area 16 (Upper Great Lakes Plain) and 20 (Boreal Hardwood Transition).

The *U.S. Shorebird Conservation Plan* and the *North American Colonial Waterbird Conservation Plan* have identified priority species and conservation strategies, mostly focused around habitat, that will address the needs of those groups of birds. At some future point it is hoped that all migratory bird conservation programs will be integrated under the umbrella of the North American Bird Conservation Initiative. This is a continental effort to have all migratory bird initiatives operate under

Figure 12: Physiographic Areas for Necedah NWR



common Bird Conservation Regions and for implementers to consider the conservation objectives of all birds together to optimize the effectiveness of management strategies.

Nest Structures

In the past, the Refuge had an extensive Wood Duck and Bluebird nest box program that ran from the 1970s into the 1990s. During this time, approximately 200 nest boxes for both Wood Ducks and Bluebirds were placed on the Refuge. Success of the nest box program was monitored by Refuge volunteers. Wood Duck boxes have not amply contributed to Wood Duck production on the Refuge as most nesting occurs in abundant natural cavities. Therefore, it is anticipated that the Wood Duck nest box program will be phased out over the next 10-15 years and the Bluebird program maintained by outside interests.

The Refuge has one known active Bald Eagle nest that is protected during the nesting season by minimizing all human activity around it. This includes activity by the public, Refuge staff, and aircraft activity associated with the Hardwood Bombing Range located nearby.

Reintroductions

Reintroduction activities for three bird species have been conducted on the Refuge. Wild Turkeys that were trapped in Pennsylvania were released on the Refuge in the mid-1960s. Sandhill Cranes were hatched in captivity and released on the Refuge in the early 1980s. A similar project was conducted for Trumpeter Swans in the early 1990s. Eggs were collected in Alaska, the young were hatched in captivity and released at three different locations on the Refuge.

In 1999, the Refuge was selected as a reintroduction site for the endangered Whooping Crane. Whooping Crane chicks were introduced at the Refuge in the summer of 2001 as part of a Whooping Crane reintroduction project to establish a migratory population in the eastern U.S. to contribute toward recovery of the species. The population has been designated as a non-essential experimental population in a rule making action finalized on June 26, 2001. The crane chicks were reared in a pen situation and trained to follow ultra light aircraft in migration to Chassahowitzka National Wildlife Refuge. Annual Whooping Crane introduction, rearing, and release activities are expected to continue for 10 years with a goal of 25 breeding birds, 125 birds total.



U.S. Fish & Wildlife Service

3.7.2 Mammals

There is little active management for mammals on the Refuge. Public hunting and trapping are two management tools used to control certain mammalian populations. Small game hunters pursue gray and fox squirrels, cottontail rabbits, snowshoe hares, and raccoons. All other mammalian species that are otherwise legal small game are protected on the Refuge. Coyotes and red and gray foxes benefit from this policy more than any other mammalian species. White-tailed deer and black bear are the only big game mammals found on the Refuge, and only the white-tailed deer can be hunted within Refuge boundaries. Harvest levels on the Refuge are set by the Wisconsin DNR. The Refuge is currently part of deer management units 53 and 56.

Trapping by permit is allowed on the Refuge to aid in management of several mammal populations. Each fall, six trapping permits are awarded by drawing, and successful trappers then have exclusive rights to the area for which their permit is issued. Trappers are not allowed to make

dry-land sets and can only trap raccoon, beaver, muskrat, mink, skunk, and opossum. This policy has the greatest protective effect on otter, coyotes, and grey and red foxes.

3.7.3 Reptiles and Amphibians

Restoration of thousands of acres of wetlands on the Refuge has re-created reptile and amphibian habitat that had been lost due to drainage and farming. Savanna restoration efforts on the Refuge benefit the Blanding's turtle, which lays its eggs in these areas. Regulations prohibiting the collection of reptiles and amphibians are enforced on the Refuge.

3.7.4 Invertebrates

The only direct management the Refuge does for invertebrate populations is for the federally listed endangered Karner blue butterfly and gypsy moth. The Refuge monitors Karner populations and the populations of associated plant species, such as wild lupine, the Karner's sole larval food source. The Refuge modifies its prescribed burns and mowing plans so as not to disturb Karner habitat.

The Refuge also cooperates with the Department of Agriculture Trade and Consumer Protection, the Wisconsin DNR, and the U.S. Department of Agriculture Animal and Plant Health Inspection Service in their efforts to survey gypsy moth distribution, abundance, and spread.

3.7.5 Fish

Management of Refuge fish populations is currently limited due to shallow water and periodic draw-downs in most Refuge impoundments. Some Refuge impoundments are periodically sampled to determine which fish species are present. In the past, invasive species (e.g., carp) have been controlled by lowering pool levels in the winter, which freezes the fish out. During summer draw-downs, stranded native fish and/or fish that are passing through the dam have been transferred to other pools.

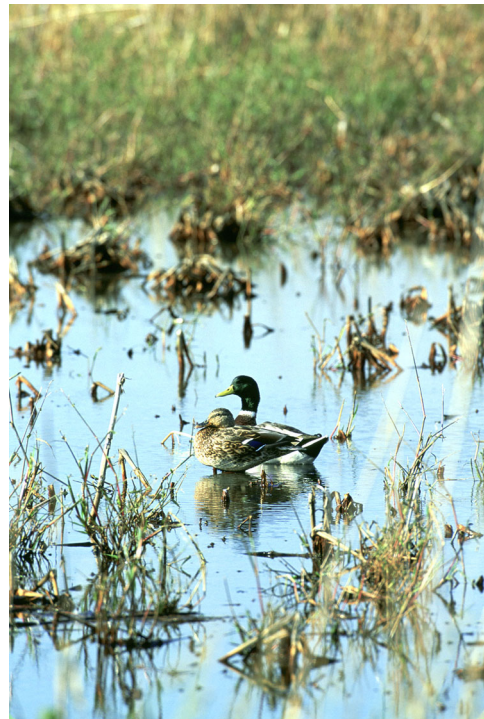
Two aspects of wetland management are problematic with respect to managing the Refuge for maximum fisheries benefits. First, managing quality open wetland systems is difficult because technology is currently limited to effectively control nuisance carp and encourage desirable fish utilization. Secondly, many controlled quality wetlands are regulated following water management regimes that tend to limit fish use and production.

3.8 Habitat Restoration

Habitat restoration at the Refuge involves using a variety of tools and techniques to enhance the composition, structure, and function of plant communities for the benefit of listed species, waterfowl and other migratory birds, and native biological diversity.

3.8.1 Wetland Restoration

The Refuge is located in an area historically known as the Great Central Wisconsin Swamp, a vast lowland area spanning hundreds of square miles. During European settlement, the majority of wetlands in the area were drained, logged, and farmed. Over the years, Refuge staff have restored many of these former wetlands for a variety of reasons, including to provide habitat for wildlife, to aid in flood control, and to provide recreational opportunities for the public. The two most common ways wetlands are restored on the Refuge are plugging drainage ditches and constructing new dikes with water control structures. If management objectives for an area require an open vista, timber harvest may be used to speed up the process (trees would eventually be eliminated by higher water levels anyway). Native wetland plants soon return to these restored areas, as seeds lie dormant in the soils. Woody vegetation is managed to maintain open or semi-open wetland habitats by regulating water levels in Refuge pools. Some restored wetlands are also burned or mowed to maintain the desired vegetation composition.



U.S. Fish & Wildlife Service

3.8.2 Upland Restoration

Restoration of upland habitats on the Refuge includes establishing and maintaining productive grasslands and savannas for migratory birds, threatened and endangered

species, and other wildlife and plants. Timber harvest is a tool used extensively on the Refuge to restore and maintain upland areas such as semi-open savanna habitats. Timber harvest is also used to eliminate hazardous standing dead trees and reduce fuel loading, especially along the southern edge of the Refuge near the Town of Necedah. Mowing is often used to maintain open areas, dikes, fire breaks, and safe roadside visibility conditions. Prescribed burning is used to restore and maintain semi-open and open habitats such as savannas, grasslands, and sedge meadows.



U.S. Fish & Wildlife Service

Marsh and Water Management Plan, dated June 1992, that provides guidance on day-to-day water management.

3.9 Habitat Management

3.9.1 Water Level Management

In most cases, management of wetland habitats at the Refuge involves the manipulation of water to achieve the desired successional stage of wetland plant communities. Hydrologic cycle maintenance plays an important role in the life cycle of wetlands. As wetland soils go through the drying process, nutrients are released and made available for plant growth. Upon re-flooding, the wetland is rejuvenated and results in an area thriving with insect life and aquatic vegetation. Forested wetlands are managed primarily by limiting human influence to maintain natural levels of hydrologic change. Sedge meadows are managed in this way and are also burned with prescribed fires to help maintain their open character. The Refuge has a

3.9.2 Moist Soil Management

Management of Refuge wetlands for moist soil plant production is a major part of wetland management activities on the Refuge. Moist soil habitats provide shallowly flooded food resources (seeds, invertebrates) for migrating dabbling ducks, shorebirds, other marsh birds, and Canada Geese. The greatest use by all waterbirds occurs in the fall, but moist soil units provide a variety of resources for waterbirds and other wildlife species throughout the year. Moist soil units usually remain flooded for 2 years and are drawn down during the spring of the third year to make conditions suitable for germination of native moist soil plant species such as smartweed, millet, beggars tick, rice cutgrass and chufa. Drained pools are partially re-flooded in September to a depth that encourages foraging by dabbling ducks. Mud flats and shallow pool edges enhance food availability for shorebirds and other marsh birds. From that point, flooding continues at 6-inch increments making additional food available as the earlier flooded food is consumed. By the end of migration, water levels are brought up to full pool elevation. Some Refuge pools are drained in early August for green browse production, which is used primarily by Canada Geese and Sandhill Cranes. Other pools are partially drained in October to concentrate and expose invertebrates, insect larvae, and minnows as an additional food source for shorebirds (Long-billed Dowitcher, Greater Yellowlegs, Dunlin), ducks, and geese.

3.9.3 Grazing, Haying, and Mowing

In the past, grazing was used on the Refuge as habitat management tools. During the mid-1970s, a cooperative grazing program was initiated to control woody vegetation on the Pharm-Becker field. However, maintaining suitable fences proved costly and grazing as a management tool was discontinued soon after.

Cooperative haying was also used as a management tool to maintain habitat for nesting birds and to provide green browse for Canada Geese during fall migration. Harvesting typically began after July 15th and was completed by September 1. Application of lime and fertilizer was required to maintain legume crops due to the Refuge's sandy soil. Because of this, the activity proved cost prohibitive and was later discontinued. Currently there is no interest in haying Refuge land.

Mowing is regularly used as a habitat management tool on the Refuge. Each year Refuge staff mow about 300 acres to maintain the smaller open areas on the Refuge. Dikes, roadsides, and firebreaks are also mowed. A hydro-axe is used in areas containing large woody vegetation. As a precaution to ground nesting birds, no mowing occurs before July 15.

3.9.4 Farming

In the past the Refuge actively farmed 150 acres of Refuge land to supply migratory waterfowl and white-tailed deer with food. Clover, rye, millet, and buckwheat were the primary crops. Farming as a program was phased out on the Refuge beginning in the early 1990s in favor of more ecologically sound ways of providing food for wildlife. In place of row crops, the Refuge now focuses on increasing the availability of native food plants, such as oak shrubs for woody browse, releasing competition between mature oaks to increase mast production, native forbs as green browse, and moist soil management, which produces native seed crops for migratory birds. Certain farming practices may be used occasionally on the Refuge as a tool to achieve some of the above-mentioned natural foods.

3.9.5 Forest Management

Management of Refuge forests are guided by the Refuge's "1994 Forest Management Step-down Plan." The primary objectives for forest management are to provide and restore endangered species habitat, reduce wildfire hazard, and manage existing pine plantations to phase out monoculture management. This is accomplished through savanna and sedge meadow restoration and reducing the density of jack pine on the Refuge's eastern border, as well as other areas, to reduce the risk of wildfires spreading beyond the Refuge boundary. Commercial timber sales and firewood cutting are used to accomplish management objectives.

Timber sales accomplish Refuge ecological objectives and contribute to the local economy. Refuge staff mark boundaries and trees to ensure that sales meet ecological objectives. Staff also determine timber volumes for each stand. Timber is cut and removed from the Refuge by private wood contractors. Contracts for all sales are selected by sealed bid.

Archaeological surveys are required if any part of the timber harvest operation will disrupt the soil to a depth of 6 inches or more. If haul roads and/or yarding areas are to be constructed, an archaeological survey will be required in those areas. The surveys are funded and arranged by the wood contractor. The cost of these surveys is reflected in the bid price for the timber. When no other source of funding is available and the cut is necessary to meet ecological objectives, the Refuge supports the cost of the surveys. The establishment of firebreaks is also written into timber contracts when prescribed fire is a part of planned management. Refuge roads used for haul routes are required to be rehabilitated by grading and 4 inches of gravel, at the completion of the logging operation. The contractor is responsible for this cost which is reflected in the bid.

In recent years, the Refuge has conducted approximately two to four timber sales per year. Sales usually are between 40 and 400 acres. Jack pine, red pine, aspen, and Northern pin oak (Hill's oak) are the species with the greatest quantities harvested. Contractors are generally allowed 1 to 2 years to complete each sale. Most harvesting is done during the winter months when the ground is frozen to prevent damage to soil, vegetation, and archaeological resources. No harvesting is done in areas

where pin oak is present during the months of April through July when trees may be infected with the oak wilt fungus.

Refuge timber resources are also available to the general public in many locations by special use permit. Permits to harvest dead and down wood cost \$5.00 for a 6-month period. Firewood cutting removes dead wood left over from timber harvest operations, thus reducing wildfire danger, and provides an inexpensive source of firewood for people in the surrounding communities who do not own firewood-producing lands of their own.

Timber stand improvement (TSI) is a forest management practice used at the Refuge aimed at improving the health and vitality of a timber stand and generating more income at a faster rate from the wood produced. The major benefit from TSI at the Refuge will be realized in pine plantations. Over a period of the first 20 years of a pine plantations life some of the trees will become overgrown by others. These smaller trees can be harvested in a thinning cut to allow the other trees adjacent to them to grow more vigorously. These remaining trees may be pruned of lower limbs to a height of about 20 feet to promote a larger and clearer bowl that is free of knots. The improved quality of the lower two logs of the tree are of greater value to the logging contractor and produce a healthier tree. Other TSI practices remove any remnant or invading vegetation such as oak sprouts, aspen and other hardwood species that also compete for nutrients.

Although the Refuge's desired future condition favors eliminating most monoculture pine plantations, the Refuge plans to use TSI practices in these plantations until such time that the plantation is completely harvested.

Although TSI in other mixed pine/hardwood forest stands is possible, it is impractical from an economical standpoint because of the vast area of these types of stand on Refuge lands and the minimal affect TSI would have. More importantly, TSI is not in keeping with the Refuge's primary mission, the conservation and management of fish, wildlife, and plants.

3.9.6 Fire Management

Over many centuries, wildland fire has influenced the life cycles of plants and plant communities. History shows that wildland fires were once common in a variety of ecosystems, including those found on the Refuge. Many ecosystems adapted to fire, and some are even dependent on fire for critical functions such as seed germination and growth, return of nutrients in dead foliage to the soil, control of competing plants and plant communities, and prevention of stagnation in the last stage of the fire cycle. Fire is the key that starts the cycle again. It gives many plants and animals a chance to reproduce and grow again. The renewed supply of nutrients and light produces forage and cover used by wildlife. Under appropriate circumstances, prescribed fire can be reintroduced into many ecosystems. Such application of fire to natural or modified wildland fuels is done under specific, preplanned conditions. The fire is confined to a specific area, is planned to produce the intensity required to attain desired objectives, and is carried out by trained burn managers.

The Refuge is located in an area that is at a high risk for wildfires. This is caused by the dry sandy soil, which promotes the growth of jack pine and light fluffy grasses and shrubs that carry fire well. Jack pine is especially adaptable to fire. Although all other species of trees and vegetation will burn, the jack pine-oak ecosystem, which is characteristic of central Wisconsin, is one of the most fire-prone areas of the country. Forest management practices are used on the Refuge with wildfire prevention in mind.

Since 1948, 63 wildfires have occurred on the Refuge. Eliminating the occasional large and small fires, the average size appears to be about 10 acres. The cost to Federal and state forces responsible for their suppression is about \$7,000 each. The highest fire danger periods occur in the spring and fall when temperatures are mild, humidity is low, and fuels are dry. Regular precipitation during the

summer months and green vegetation usually lead to moderate to low fire danger. Snowfall during the winter usually eliminates any fire danger during that period.

Refuge staff annually burn an average of 2,000 acres of Refuge land to enhance habitat for upland game, waterfowl, and endangered species. The periodic burning of savannas, grasslands, and sedge meadows reduces encroaching vegetation such as oak sprouts and willow. It also encourages the growth of more desirable species like blueberry, big and little bluestem, and wild lupine (a plant necessary for the survival of the endangered Karner blue butterfly).

All prescribed burns are carried out by highly trained and qualified personnel who perform the operation under very precise plans. No burning takes place unless it meets the qualifications of the prescription for each unit. A prescription is a set of parameters that define the air temperature, fuel moisture, wind direction and velocity, soil moisture, relative humidity, and several other environmental factors under which a prescribed burn may be ignited. This insures that there is minimal chance the fire will escape the unit boundaries and that the fire will have the desired effect on the plant community.

3.9.7 Pest Management

Invasive weeds are the primary pest species of concern at the Refuge. Spotted knapweed, leafy spurge, and purple loosestrife are of greatest concern. Spotted knapweed occurs mostly on roadsides near the Refuge's boundary, and to date has not invaded higher quality interior habitats. Control includes mowing dike-tops and spot-spraying with Roundup and 2,4-D. Leafy spurge occurs in one isolated pocket near the road entrance to Suk Cerny Pool. The Wisconsin Conservation Corps crew assigned to the Refuge has been clipping the plants before they flower. Purple loosestrife occurs in areas around the Refuge, but has not yet been found on the Refuge. Refuge staff regularly monitor wetland areas for signs of loosestrife invasion.

The Refuge has two notable forest pests, oak wilt and the IPS beetle. Oak wilt, caused by the fungus *Ceratocystis fagacearum*, is a primary cause of red oak mortality on the Refuge and in south central Wisconsin. A study by the U.S. Forest Service in 1979 concluded that oak wilt accounts for less than 1 percent of volume loss of red oaks on the Refuge. Research on oak wilt ecology was conducted on the Refuge in the mid 1990s; this research showed that oak wilt was a natural disturbance process that actually helps maintain savanna habitats on the Refuge. Therefore, the Refuge does not implement oak wilt control methods. The IPS beetle is another pest that occasionally infests red pine. Infestation sites are usually less than 2 acres in size. Since wood production is not a purpose of the Refuge, IPS beetle control is a low priority.

Carp is another notable pest species found on the Refuge. Carp retard the growth of aquatic vegetation by consuming it and by roiling the water and causing turbidity, which reduces photosynthetic efficiency, an essential component of wetland food chains. Several pools are drawn down as a part of the Refuge's moist soil management program, which keeps carp populations in check. No other active management occurs for this species.

On occasion, beaver dams obstruct water flow along Refuge drainage ditches, sometimes threatening to flood Refuge or township roads. Beaver are occasionally trapped as a part of the Refuge's public use (trapping) program and Refuge staff eliminate beaver dams as problems arise.

3.10 Resource Conservation

The Refuge conserves its fish, wildlife, plant, archaeological, and cultural resources through enforcing laws and regulations, pursuing the conservation and acquisition of additional land, investigating and cleaning up contaminants, and ensuring adequate receiving waters through the enforcement of water rights.



U.S. Fish & Wildlife Service

3.10.1 Law Enforcement

The purpose of the Refuge's law enforcement program is to offer protection for Refuge resources and the public through the efforts of highly trained professional officers. The Refuge currently employs two staff members whose law enforcement duties are concurrent with their other primary duties.

The authorities for law enforcement on refuges originate from several Federal statutes, but primarily are derived in the Archaeological Resources Protection Act of 1979; the Lacey Act (1981 Amendments); the Endangered Species Act; the Migratory Bird Treaty Act; the Migratory Bird Hunting and Conservation Stamp Act; and the National Wildlife Refuge Administration Act. Federal regulations

specific to Refuges are derived from the National Wildlife Refuge Administration Act, including Refuge authority for enforcing state laws governing hunting, fishing, and motor vehicle use. Some common law enforcement activities on the Refuge include:

- Assisting visitors in understanding Refuge laws and regulations.
- Protecting Refuge property and its fish, wildlife, plant, cultural, and archaeological resources from illegal activities by visitors or trespassers.
- Protecting Refuge visitors and their possessions from disturbance and harm by other visitors or themselves.
- Ensuring compliance with Refuge and state regulations governing the use and enjoyment of the Refuge.
- Cooperating and coordinating with other local law enforcement agencies, including the Wisconsin DNR, Juneau County Sheriff, Wisconsin Highway Patrol, and the Juneau County Office of Emergency Management.
- Enforcement and compliance issues on 46 conservation easements in the Refuge Management District, which by policy, requires a two-officer response.
- Protecting high-hazard dams regarding terrorist threat, vandalism, or emergency action.
- Preventing illicit drug use, possession, sale, or manufacture on Service-owned land.
- Protecting endangered species, including Karner blue butterfly habitat and the newly established Whooping Crane population.
- Immediate response for building security and fire alarm systems.

3.10.2 Permits and Economic Use Management

All uses and activities of the Refuge that are not available to the general public are controlled through a permitting system. Contract labor and construction is regulated through work orders, purchase orders and contractual agreements. Other uses are controlled through the issuing of special use

permits. These permits regulate firewood cutting, biological research and specimen collecting, commercial photography, special access for individuals with disabilities, trapping, and commercial timber harvest. Allowed activities and special conditions are detailed on the Permit.

Within the Refuge Management District, (See Figure 5 on page 18), special use permits have been used to allow limited grazing, haying, firewood harvesting for personal use, and fence construction that are deemed compatible with the purposes of Conservation Easements developed as part of the Service's Private Lands program.

3.10.3 Contaminant Investigations and Cleanup

The Service has adopted a Contaminant Assessment Process (CAP) to provide a systematic, cost-effective approach for evaluating whether environmental contaminants pose threats to all National Wildlife Refuge System lands. Recently, contaminant-related information was gathered for the Refuge and a data base was established to assist in land management decisions. The database contains physical and biological descriptions of the Refuge as well as potential contamination sites off the Refuge. Application of the process will also identify areas vulnerable to spills or releases of oil or hazardous substances that will lead to baseline data collections. The CAP for the Refuge is complete.

The Service completed one contaminant cleanup in April 1995 in which three barrels with unlabeled contents were removed from a former Civilian Conservation Corps work site and properly processed. Any contaminated soils were also removed from the site and incinerated. As a precautionary measure, all unused Refuge underground fuel storage tanks were removed in 1986, and remaining tanks in use were taken out of service and removed in 1993. No soil contamination was detected at these sites.

Before the Service acquires an interest in any property, either fee purchase or easement, an Environmental Site Assessment is completed. This assessment is used to ascertain the likelihood and extent of hazardous substances or other environmental problems associated with a property, and any needed remediation or cleanup costs. This analysis was performed on the last Refuge tract purchased in 1994, and on all conservation easements within the Refuge Management District. There are currently two Refuge staff trained to perform these investigations.



U.S. Fish & Wildlife Service

3.10.4 Water Rights Management

The Refuge contains approximately 23,500 acres of wetlands. Much of this wetland consists of impoundments created to approximate wetland values that existed prior to agricultural drainage in the early 1900s. About 70 percent of the Refuge surface water supply enters the Refuge from the north, through the Remington diversion structure in the northwest and the Spencer-Robinson ditch in the northeast.

The Remington diversion structure was built around 1940 to allow additional inflows to the Yellow River to run a small hydroelectric generator. The structure was designed with a maximum stop-log elevation of 958.0 Mean Sea Level. The Refuge has a long history dating back to at least the mid-1970s of setting these stop-logs to 957.5 and diverting all water that passed between the 957.5 and 958.0 elevations. Water below the 957.5 or above the 958 level is diverted to the Yellow River; even though the power generating facility no longer exists. This setup prevents flood waters from damaging Refuge or township culverts and water control structures. During the late 1980s, cranberry operations were developed both along the Remington diversion ditch and the Spencer-Robinson ditch north of Refuge property. This placed demands on traditional Refuge water uses. The Refuge has

obtained a Field Solicitor's opinion (from the Service's legal branch) regarding the established use along the Remington diversion structure that affirmed the Service's right to continue this established use even though state law gives agricultural users and cranberry farms a priority use.

The primary conflict in water use comes in August, September, and early October, when the Refuge re-floods moist soil impoundments for migrating waterfowl use. This is also the time that cranberry growers typically flood their beds for harvest. The Refuge has had requests from growers to change its water discharge to accommodate agricultural needs. Therefore, it is critical that the Service document existing water rights to provide a solid informational and legal basis for making future management decisions regarding source waters.

3.10.5 Cultural Resource Management

Archaeological investigations and collecting are performed only in the public interest by qualified archeologists working under an Archaeological Resources Protection Act permit issued by the Regional Director. Refuge personnel take steps to prevent unauthorized collecting by the public, contractors, and Refuge personnel. Violations are reported to the Regional Historic Preservation Officer.

The Refuge has museum collections (art, documents, botany, zoology) that are managed under a Scope of Collection Statement (10-31-94). To date, three archaeological investigations have produced 40 artifacts from Refuge lands; artifacts are or will be stored at the Mississippi Valley Archaeology Center under a cooperative agreement.

3.10.6 Special Designations

There are four established natural areas on the Refuge. The 100-acre Necedah Jackpine-Oak Research Natural Area is located in Section 34 of the southeast quarter of the Refuge, north of Becker Road. It is designated an SAF-14, Northern Oak-Pine type ecosystem. This area is managed as an oak-jack pine forest. No logging or prescribed burning is permitted, and the area is protected from wildfire to the extent practical. The Wisconsin Scientific Areas Preservation Council refers to this area as the Necedah Oak-Pine Natural Area (No. 14).

The 240-acre Sandstone Research Natural Area is located in Section 12 in the southwest quarter of the Refuge, just south of Sprague-Mather Road. It is designated a Kuchler K18 Oak Savanna type ecosystem. Fire is an integral part of the management of this area with prescribed burning done about once every 5 years.

On January 20, 1987, two more areas on the Refuge were approved for inclusion into the Natural Area Land Bank. The Tomezek Research Natural Area is a 100-acre area located in Section 20 (T20N, R3E) of the Refuge. The Sand Ridge Public Use Natural Area is a 74-acre area located in Section 18 (T20N, R3E) of the Refuge. All types of land manipulation are withheld from these two areas.

It should be noted that lands within the legislative boundaries of the Refuge were reviewed for wilderness suitability as part of the CCP process. No lands were found suitable for designation as Wilderness as defined in the Wilderness Act of 1964. The Refuge does not contain 5,000 contiguous roadless acres nor does the Refuge have any units of sufficient size to make their conservation practicable as designated Wilderness.

3.10.7 Land Acquisition

Currently there is no active land acquisition program at the Refuge. With the completion of this CCP/EA, the Refuge will initiate an effort aimed at purchasing conservation easements and fee-title interests in lands from willing sellers in the Yellow River Focus Area (Appendix L). Funding for land

acquisition (conservation easements and fee-title purchases) will come from the Land and Water Conservation Fund, using the authority of the Fish and Wildlife Act of 1956. However, no funding for land acquisition is currently available, and no money was requested by the Service for either of the years 2004 or 2005. When and if money is received for land acquisition, all land acquisition by the Service will be from willing sellers and all land acquired by the Service will be administered and managed by the National Wildlife Refuge System, Necedah National Wildlife Refuge. Additional information on Service land acquisition policies and procedures can be found in at www.fws.gov.

The Yellow River Focus Area project provides a unique opportunity for the Refuge to assist landowners in the restoration and conservation of rare and declining bottomland forest and adjacent upland habitat for the benefit of migratory birds, threatened and endangered species, and public recreation and environmental education. Many landowners within this 21,953-acre area have approached the Refuge in recent years in search of technical assistance and/or to sell an interest in their land. In response to this interest, the Refuge obtained two grants to provide technical assistance to private landowners in the area. Between 2000 and 2002, 121 landowners owning 17,308 acres received technical assistance from the Service in managing their land. Interest in conserving this important natural area is high among landowners, local residents, conservation organizations, and state and local governments (USFWS personal communication). However, there are a number of landowners in the area who are opposed to any land acquisition by the Service in the Yellow River Focus Area.

3.11 Monitoring and Studies

The support and implementation of scientifically rigorous monitoring and research creates a foundation for quality management decisions at the Refuge.

3.11.1 Surveys and Censuses

Each year, beginning in August, Refuge staff band approximately 1,000 ducks to assess population levels and monitor migration patterns through band returns and band recaptures. Other species that have been banded in the past include: Woodcock, Red-winged Blackbirds, Black-capped Chickadees, White-breasted Nuthatches, Upland Sandpipers, Blue Jays, Eastern Towhees, Brown Thrashers, Vesper Sparrows, Bay-breasted Warblers, Brown-headed Cowbirds, Cooper's Hawks, Canada Geese, Rose-breasted Grosbeaks, White-throated Sparrows, White-crowned Sparrows, Brewer's Blackbirds, Barn Swallows, Fox Sparrows, and Sandhill Cranes.



U.S. Fish & Wildlife Service

The Refuge also participates in several national, regional, and local wildlife surveys. These include spring waterfowl breeding pair surveys, fall waterfowl surveys, Sandhill Crane fly-out surveys, Mourning Dove coo surveys, Woodcock surveys, fall Sandhill Crane roost surveys, songbird point counts, Karner blue butterfly surveys, wolf howling surveys, wolf tracking surveys, and massasauga rattlesnake population surveys. Data from several of the bird surveys are pooled with other national and regional data to determine population trends for the species. The population trends are then used to set harvest limits for states where these species are hunted.

3.11.2 Studies and Investigations

The Refuge also participates in numerous regional studies in partnership with other government agencies and/or universities, with graduate students and faculty from the University of Wisconsin

(Stevens Point and Madison campuses) being the most numerous. However, graduate students and faculty from Bowling Green University (Ohio), the University of Michigan, Ripon College (Wisconsin), the University of Wisconsin-Platteville, and Ohio State University have all participated in research activities on the Refuge. Staff from the U.S. Forest Service, National Park Service, the Wisconsin DNR, and U.S. Fish and Wildlife Service have conducted research on the Refuge. Research topics have included the ecology of oak wilt in savannas, invertebrate inventories, and bluebird nesting success studies, to name a few.

The Refuge currently takes part in a wide variety of monitoring and research projects. Most activities center around determining the effects of Refuge management actions on songbirds, savanna habitats, and species associated with savannas, although water quality issues are becoming higher research and monitoring priorities. Management activities currently being monitored include prescribed burning, water level manipulations, and forestry practices.

The Refuge also conducts studies to determine the effects of prescribed burning and savanna restoration on plant communities and their associated bird species. Many of the Refuge's research and management efforts have been supported by private organizations. These organizations include Ducks Unlimited, the Milwaukee County Zoo, the National Fish and Wildlife Foundation, The Sand County Foundation, the Prairie Chicken Society, and the Wisconsin Waterfowl Association.

In recent years, the Refuge has dedicated a substantial amount of research effort toward the Karner blue butterfly. Refining monitoring methods for this butterfly, determining the effects of Refuge management activities on the species, and determining the butterfly's dispersal ability, have been and will continue to be major research efforts.

The Refuge has also studied a variety of turtles including the Blanding's, softshell, painted and snapping turtle. Snake species including hognose, smooth green, garter, and the Eastern massasauga rattlesnake are among the species that have been studied on the Refuge and in the Yellow River Area. The Refuge has done several surveys for insects and spiders. There have been no surveys for other invertebrate groups on the Refuge. Bald Eagle nests are monitored for success rates.

In 1999, 15 massasauga rattlesnakes that were reared in captivity were radio-marked and temporarily released into two closed areas of the Refuge. The purpose of the study was to determine survival, habitat use, dispersal, and home range information for the radio-marked snakes. Snakes were monitored until mid-May 2001, at which time all surviving snakes were captured and returned to educational institutions. No attempt to reestablish massasauga rattlesnake populations on the Refuge will occur without future public input.

3.12 Coordination Activities

Cooperative working relationships with other Federal agencies, the State of Wisconsin, universities, elementary and secondary educational institutions, and non-government organizations are key assets to the Refuge's success.

3.12.1 Interagency Coordination

The U.S. Geological Survey (USGS Upper Mississippi Science Center) has assisted the Refuge with research on massasauga rattlesnakes, which are endangered in the State of Wisconsin and a candidate species for Federal listing. Similarly, Refuge staff have cooperated with USGS staff at the Indiana Dunes National Lake Shore conducting Karner blue butterfly research and invertebrate inventories on restored savannas. The Refuge is currently working with USGS to create maps for the Refuge (GIS support).

The Department of Army (Fort McCoy) and the U.S. Forest Service (Huron, Manistee, and Chequamegon National Forests) are Federal cooperators involved with Karner blue butterfly research and savanna restoration efforts. The U.S. Forest Service also conducts national forest inventories on Refuge land.

The U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) assists Refuge staff in providing technical assistance to landowners interested in restoring wetlands on their property through the Service's Partners for Fish and Wildlife Program. Refuge staff also work with the Farm Service Agency and the NRCS on Farm Bill issues (Swampbuster violations and wetland delineations) and administration of the Wetland Reserve and Conservation Reserve Programs. The U.S. Army Corps of Engineers and the Wisconsin DNR are also cooperators on Farm Bill issues and wetland determinations.

The Central Wisconsin Basin Partnership (Partnership) is a Wisconsin DNR-coordinated group of agencies, private organizations, university faculty, and others interested in natural resource management. The Partnership chooses projects that support land and water resource management priorities within Juneau, Adams, Wood, and Portage counties. Support for the Partnership comes from endorsement of projects, networking with individual partners to achieve project goals, and financial assistance with projects from the Wisconsin DNR. The Refuge brought its interest in working with private landowners within the Yellow River Focus Area to the Partnership in 1998. As a result, the Yellow River has been adopted by the Partnership as a focus for regional management efforts.

Management of portions of the Necedah Wildlife Management Area (Figure 5 on page 18) was transferred to the State of Wisconsin on June 29, 1940, with the signing of a Cooperative and License Agreement. The area is currently managed by the Wisconsin DNR under a 15-year extension of the original agreement granted in 1990. In addition to the Cooperative and License Agreement, the Refuge has a Memorandum of Understanding with the State that transfers management of the portion of the Refuge north of Finley Road to the Wisconsin DNR in exchange for a block of the Necedah Wildlife Management Area south of Grand Dike Road.

Other cooperative efforts involving the Wisconsin DNR include:

- Three State Natural Areas (areas set aside for their unique natural features, forest health and inventory efforts)
- Karner Blue Butterfly Habitat Conservation Plan
- Technical assistance with Karner blue butterfly and other endangered species issues
- Coordination efforts (comments on Hardwood Bombing Range issues)
- Butterfly and moth inventories (gypsy moth inventories)
- Weather data collection
- Suppression and control assistance with wild and prescribed fires
- Air quality monitoring using aspen plots

3.12.2 Tribal Coordination

Tribal coordination primarily occurs through the Refuge's Private Lands Program. Private Lands biologists have worked cooperatively with Ho-Chunk Nation members on four wetland and upland habitat restoration projects in Juneau, Monroe, LaCrosse, and Richland counties. The Refuge will continue to coordinate with Tribes as opportunities arise.

Figure 13: Private Lands District, Necedah NWR



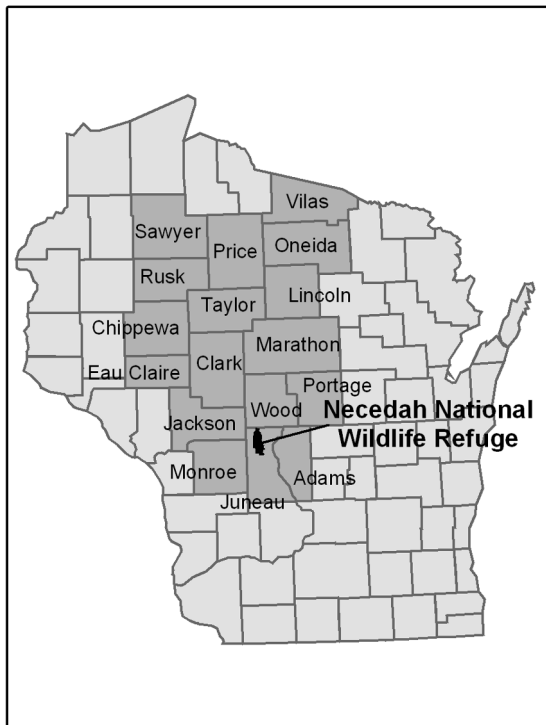
3.12.3 Private Lands Activities

The Refuge and its cooperating partner, the Wisconsin DNR, have focused considerable effort over the past few years on encouraging and assisting private landowners in restoring converted and degraded wetlands and associated upland habitats through private land efforts.

The Refuge's Partners for Fish and Wildlife Program offers technical assistance and financial assistance to private landowners to voluntarily restore wetlands and other fish and wildlife habitats on their property. The program emphasizes the reestablishment of native vegetation for the benefit of fish and wildlife, but also takes the needs and desires of private landowners into consideration. Although the Refuge's primary partners are private landowners, the Refuge also works with a variety of groups and agencies to restore habitat. These partners include other Federal agencies, Tribes, the State, local governments, conservation organizations, academic institutions, businesses, and school groups. Participation in this program is voluntary.

In a 12-county area (Figure 13), over 400 wetland basins totaling nearly 2,000 acres have been restored since 1986. Interest in the Partner's for Wildlife Program and wetland restoration remains high. Requests for restoration and technical assistance averages over 200 annually. At current funding levels, Refuge private lands staff anticipate completing 25 restorations per year in the 12-county area of responsibility. Approximately \$150,000 has been spent to-date by the Refuge Partners for Fish and Wildlife Program to benefit fish and wildlife on private land. Approximately \$700,000 is needed to complete all restoration requests from private landowners. Predictions for future demand for wetland restorations on private land within the District remain high. The Refuge's Partners for Fish and Wildlife Program is one of the Refuge's most successful outreach tools.

Figure 14: Wildlife Management Area, Necedah NWR



Refuge staff also conserve, restore, and manage habitat within the Necedah Refuge Management District, which is a 17-county area in central and north central Wisconsin (Figure 14). The Necedah Refuge Management District is an area where the Refuge has obtained land conserved through conservation easements (the easement protects wetlands and other sensitive habitats from development through deed restrictions). The Refuge currently oversees 41 conservation easements totaling 2,475 acres in 11 of the 17 counties, with another four easements with 418 acres waiting to be finalized. Wetland restorations have been completed on several of these easement lands; old farm fields have been seeded to permanent cover; boundaries have been posted, and fencing has been constructed as needed to restrict cattle grazing. Management plans will be developed for these areas to ensure additional conservation and enhancement of the land.

3.12.4 Cooperative Events/Friends Organizations

One of the Refuge's most successful cooperative events is the Wisconsin Federal Junior Duck Stamp Program. Brochures are sent to over 2,900 public, private, and home schools statewide. Students from kindergarten through high school create original drawings or paintings of North American waterfowl and their surroundings and submit them for judging. The Wisconsin Best of Show winner moves on to the national competition. A display of winning entries travels to throughout the state for public viewing.

3.13 Visitor Services

Providing recreational opportunities and educating and interpreting the unique natural features of the Refuge for visitors are important elements of the Service's mission and the goals and objectives of

the Refuge. In the National Wildlife Refuge Improvement Act of 1997, six wildlife-dependent recreational uses were determined priority public uses on national wildlife refuges. These are: hunting, fishing, wildlife observation and wildlife photography, environmental education and interpretation. These six uses, when compatible with the Refuge purpose, are the focus of the Refuge's public use activities.



U.S. Fish & Wildlife Service

3.13.1 Recreation

3.13.1.1 Hunting

The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, identifies hunting as a priority public use of the National Wildlife Refuge System. Hunting programs on Refuges promote understanding and appreciation of natural and cultural resources and their management. Hunting is also an integral part of a comprehensive wildlife management program. Hunting programs on the Refuge are administered in consultation and in cooperation with the State. Programs are conducted, to the extent practicable, in accordance with applicable State and Tribal regulations. Service objectives for hunting programs on refuges

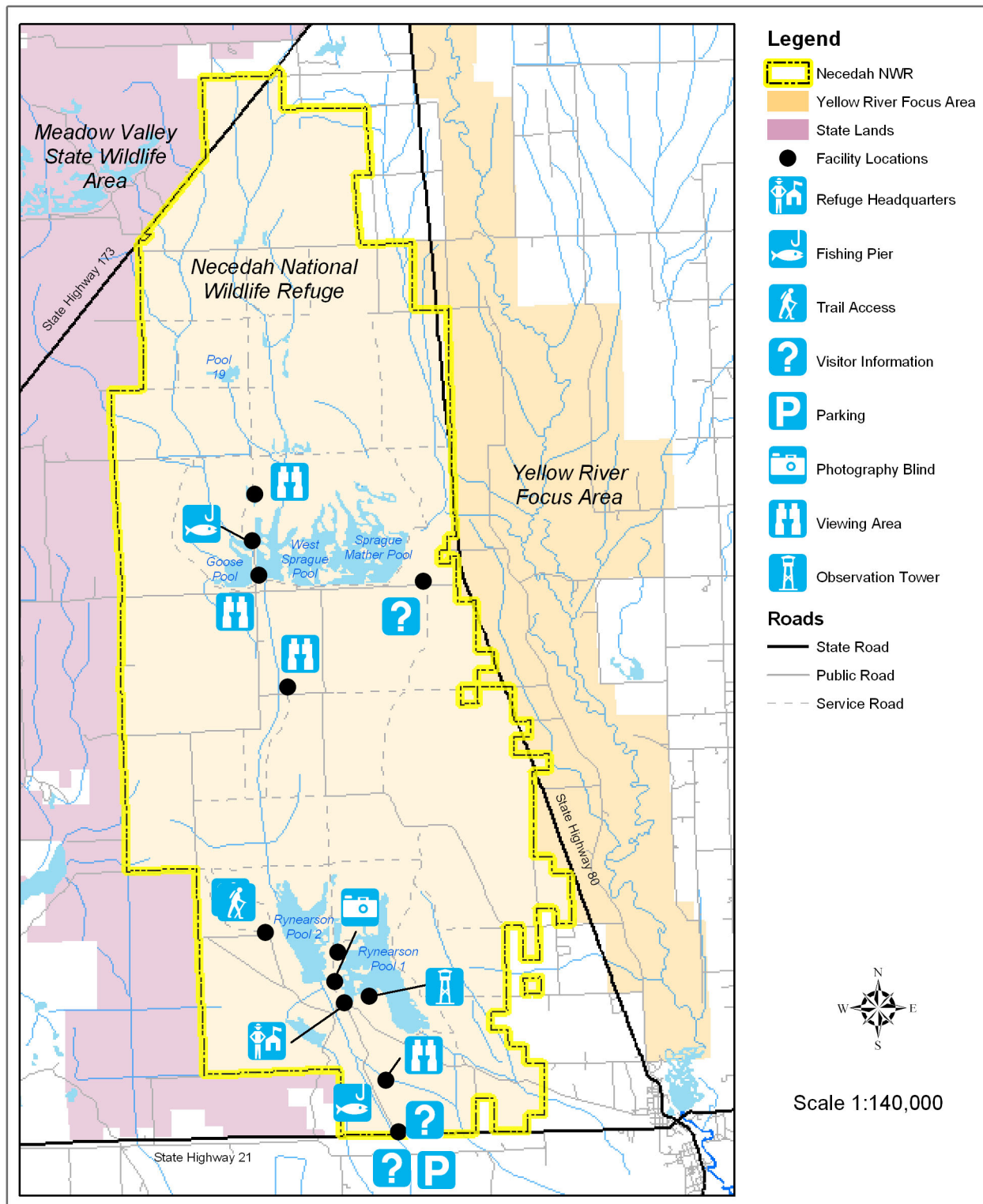
are to promote public understanding of and increase public appreciation for America's natural resources, to manage wildlife populations at optimum levels, and to provide opportunities for quality recreational and educational experiences.

The Service defines a quality hunting experience on a national wildlife refuge as one that:

- Maximizes safety for hunters and other visitors;
- Encourages the highest standards of ethical behavior in taking or attempting to take wildlife;
- Is available to a broad spectrum of the hunting public;
- Contributes positively to or has no adverse affect on population management of resident or migratory species;
- Reflects positively on the individual refuge, the System, and the Service;
- Provides hunters uncrowded conditions by minimizing conflicts and competition among hunters;
- Provides reasonable challenges and opportunities for taking targeted species under the described harvest objective established by the hunting program. It also minimizes the reliance on motorized vehicles and technology designed to increase the advantage of the hunter over wildlife;
- Minimizes habitat impacts;
- Creates minimal conflict with other priority wildlife-dependent recreational uses or refuge operations; and
- Incorporates a message of stewardship and conservation in hunting opportunities.

Hunters have been primary supporters of the Refuge since its creation in 1939. However, as a migratory bird refuge (authorized under the Migratory Bird Conservation Act of 1929), the Refuge has a large percentage of its managed pools closed to migratory bird hunting during fall bird migration (a requirement of the Migratory Bird Conservation Act). Twenty percent of the Refuge is open to all small game, waterfowl, and deer hunting (except October Zone T, if applicable). The remaining 80 percent, except for a 2-square-mile safety zone around the office complex, is open for

Figure 15: Facilities, Necedah NWR



gun deer, late archery deer, and small game. One large pool, Suk-Cerney, receives substantial waterfowl hunting use and also has a universally accessible waterfowl hunting blind. The Refuge's hunting brochure provides information on seasons, open and closed areas, and Refuge regulations.

Refuge visitors participate in hunting small game, migratory birds, and deer in designated areas. Hunters pursue Ruffed Grouse, Wild Turkey, and all migratory game birds with the exception of Sandhill Cranes. Dogs can be used when hunting small game and migratory birds. No permit or quota system is used to regulate the number of hunters on the Refuge or the number of birds killed. However, the take of all these species is regulated by state and Federal law. Ring-necked Pheasant, Northern Bobwhite, and Sharp-tailed Grouse are not hunted on the Refuge due to low population numbers. The Refuge currently does not hold any special hunts, but offers opportunities for hunters with disabilities. Nearly 12,140 visits were made to the Refuge in 2001 for the purpose of hunting.

3.13.1.2 Fishing

Fishing as a traditional outdoor pastime is deeply rooted in America's natural heritage. As such, fishing is a legitimate and appropriate public use of the National Wildlife Refuge System, and along with the five other priority public uses in the National Wildlife Refuge Improvement Act, will receive enhanced consideration over other uses. Refuge staff rely on close cooperation and coordination with State fish and wildlife management agencies in managing fishing opportunities on refuges and in setting Refuge population management goals and objectives. Regulations permitting fishing on refuges are, to the extent practicable, consistent with State fish and wildlife laws, regulations, and management plans. Service objectives for fishery programs on refuges are to effectively maintain healthy and diverse fish population resources through the use of scientific management techniques; to promote public understanding of, and increase public appreciation for, America's natural resources and the Service's role in managing the System; to provide opportunities for quality recreational and educational experiences; and to minimize conflicts between anglers and other visitors.

The Service defines a quality fishing experience on a national wildlife refuge as one that:

- Maximizes safety for anglers and other visitors;
- Causes no adverse impact on populations of resident or migratory species, native species, threatened and endangered species, or habitat;
- Encourages the highest standards of ethical behavior in regard to catching, attempting to catch, and releasing fish;
- Is available to a broad spectrum of the public that visits, or potentially would visit, the refuge;
- Provides reasonable accommodations for individuals with disabilities to participate in refuge fishing activities;
- Reflects positively on the System;
- Provides uncrowded conditions;
- Creates minimal conflict with other priority wildlife-dependent recreational uses or refuge operation;
- Provides reasonable challenges and harvest opportunities; and
- Increases the visitors understanding and appreciation for the fisheries resource.

Recreational fishing is a popular pastime on the Refuge. In 2001, over 3,600 visits were made to the Refuge for the purpose of fishing. The Refuge promotes recreational fishing by hosting annual National Fishing Day events. Activities for past National Fishing Days have included a children's fishing contest with prizes donated by area businesses, a "create a fish" art contest, and presentations by local fishing professionals. Most Refuge pools are managed as resting and feeding sites for migratory birds, which means that water levels are lowered every third year in each pool. This limits

management for desirable fish species that inhabit the Refuge, such as northern pike, large mouth bass, bluegill, yellow perch, and black crappie.

Anglers fish the Refuge in accordance with state regulations. The Refuge's fishing brochure provides information on seasons, open and closed areas, and other Refuge-specific regulations. The Refuge recently developed a universally accessible fishing pier around Harvey's Pond to promote quality fishing opportunities. A new trail at this same location is currently in development.

3.13.1.3 Wildlife Observation and Wildlife Photography

Wildlife observation, including the observation of plants and other natural features, is the single most popular recreational use of the Refuge, with over 154,000 visits made in 2001. The Refuge is a designated watchable wildlife site and has a wildlife viewing "hot spots" brochure that highlights the most productive wildlife viewing areas, including the Rynearson Wetlands Observation Tower and Trail, the Pair Ponds Trail, and the Lupine Loop.

The Service defines a quality wildlife observation experience on a national wildlife refuge as one that:

- Observations occur in a primitive setting or use safe facilities and provide an opportunity to view wildlife and its habitat in a natural environment;
- Observation facilities or programs maximize opportunities to view the spectrum of wildlife species and habitats of the refuge.
- Observation opportunities, in conjunction with interpretive and educational opportunities, promote public understanding of and increase public appreciation for America's natural resources and the role of the System in managing and protecting these resources;
- Viewing opportunities are tied to interpretive and educational messages related to stewardship and key resource issues;
- Most facilities blend with the natural setting, station architectural style, and provide viewing opportunities for all visitors, including persons with disabilities;
- Design of observation facilities minimize disturbance to wildlife while facilitating the visitor's views of the spectrum of species found on the refuge;
- Observers understand and follow procedures that encourage the highest standards of ethical behavior;
- Viewing opportunities exist for a broad spectrum of the public; and
- Observers have minimal conflict with other priority wildlife-dependent recreational uses or refuge operations.

Wildlife photography is another popular public use related to wildlife observation. Visitors often take advantage of the Refuge's observation tower, observation platforms, and photo blind to capture special moments of nature's beauty. The photo blind is a place where wildlife observers can get up-close views and pictures of waterfowl, eagles, coyotes, and other wildlife species. Over 25,000 visits were made to the Refuge in 2001 to photograph wildlife and nature.

3.13.2 Education, Interpretation, and Outreach

Environmental education, interpretation, and outreach are important tools that Refuge staff use to inform and remind the public about Refuge issues and opportunities, such as bird migrations, special events, or to call attention to Refuge resources, such as rare oak savanna or threatened and endangered species such as the Karner blue butterfly and Whooping Crane. Refuge staff participate in education, interpretation, and outreach efforts both on and off the Refuge. Refuge staff give slide shows, lead interpretive tours and hikes, create educational exhibits, conduct activities and contests that offer hands-on learning opportunities, provide demonstrations and workshops, write educational

articles, and give informational interviews. There are over 20 interpretive kiosks and signs on the Refuge to enhance visitor education and enjoyment. Over 300,000 people are reached through the Refuge's environmental education and interpretation efforts annually (both on-site and off-site, excluding media).



U.S. Fish & Wildlife Service

Refuge education, interpretation, and outreach programs focus on assisting youth and adults with becoming more environmentally literate and action oriented. Five primary functions or goals provide the framework for these goals: creating environmental awareness, knowledge, values, skills, and action. Because environmental education is part of a formal, structured method of teaching, there is an opportunity to work with people over several years. Programs are typically structured to begin with awareness in earlier years, and move through the higher goals in succeeding years. Interpretation, on the other hand, is more of an informal method of teaching directed at casual audiences, such as individuals or families who take part in programs on their own initiative rather than as part of a structured program. Interpretative programs often focus on

awareness and knowledge in a fun and thought-provoking manner. Refuge outreach consists of communication with internal and external publics using a variety of different mediums aimed at specific communication tasks designed to inform, persuade, or remind. Refuge outreach goals aim to build a stronger base of public understanding, appreciation, and support of the Refuge, National Wildlife Refuge System, and Service trust resources beyond that portion of the American public that visits the Refuge.

Refuge staff recognize the crucial link between public awareness and understanding of environmental issues and effective stewardship of the Refuge, the National Wildlife Refuge System, and Service trust resources. Currently Refuge education, interpretation, and outreach programs focus on the following target five audiences as prompted by the Service's 100 by 100 Outreach Campaign:

- Congress
- Conservation Organizations
- Communities surrounding the Refuge, with a focus on school-age children and their educators, Yellow River landowners, and local residents.
- Communications media
- Corporations

Some of the more popular environmental education, interpretation, and outreach activities and tools the Refuge utilizes include:

- Wildlife Signs slide show
- Reptiles and amphibians of Wisconsin presentations
- Educator workshops
- Waterfowl banding workshops
- Radio telemetry demonstrations

- Guided hikes highlighting major Refuge themes
- Wolf awareness programs
- National Fishing Day events
- Earth Day activities
- Yellow River landowner technical support (through the Refuge's Private Lands Program)
- Print and broadcast media, including the Refuge's web page
- Volunteer programs, including the Refuge Friend's group
- Publications
- Over 20 interpretative kiosks and signs

Through these tools, three general themes provide the focus for the Refuges education, interpretation, and outreach efforts:

The Necedah National Wildlife Refuge

- The Refuge as a “good neighbor”
- The Refuge as an enduring asset to the community
- The Refuge as a federal land base managed by the U.S. Fish and Wildlife Service

The National Wildlife Refuge System

- Refuges are part of a national system of refuges comprising the worlds largest collection of land and water managed specifically for wildlife
- Refuges are national treasures
- Refuges are places where wildlife come first

Service Trust Resources

- Listed species management (e.g., Karner blue butterflies, Eastern massasaugas, gray wolves, Whooping Cranes, and Bald Eagles).
- Waterfowl and other migratory bird management (e.g., providing resting, nesting, and feeding habitat for wetland, open landscape, and forest migratory bird species of concern).
- Ecosystem management (e.g., wetland, open landscape, and forest ecosystems) with a focus on restoration and management of sedge meadows, savannas, bottomland forests, and native biological diversity.
- The Yellow River as an exceptional natural resource and a place worth conserving.

Table 4: Refuge Step-Down Management Plans

Step-down Management Plan	Last Revised	Current Status
Refuge Management Plan, Parts 1 and 2	1/5/87	Replaced by CCP/Habitat Management Plan
Refuge Management Plan, Part 3	9/15/89	Replaced by CCP/Habitat Management Plan
Forest Management Plan	7/29/94	Review
Marsh and Water Management Plan	6/24/92	Review
Cropland Management Plan	11/24/86	Review and Revise
Grassland Management Plan	5/3/88	Review and Revise
Fire Management Plan	1/6/87	Review and Revise
Visitor Services Plan	12/5/79	Review and Revise
Sign Plan	2/17/88	Review and Revise
Law Enforcement Plan	1/7/86	Review and Revise
Fur Management Plan	3/11/88	Review and Revise
Disease Contingency Plan	7/24/87	Review and Revise
Integrated Pest Management Plan		To be Developed
Cultural Resource Management Plan		To be Developed
Habitat Management Plan		To be Developed

3.14 Planning and Administration

3.14.1 Step-down Management Plans

Step-down management plans (Table 4) are an important component of Refuge management. These detailed plans serve as guiding documents for the day-to-day operation of the Refuge. Step-down management plans differ from CCPs in that they provide more detail relative to Refuge management subjects (e.g., habitat management, public use, fire, safety) or groups of related subjects. In many cases, step-down management plans will serve as an implementation tool to describe specific strategies and implementation schedules for meeting CCP goals and objectives. In other cases, step-down plans provided the general framework for developing the CCP (the Refuge's Forest Management Plan helped affirm future management direction for forest land and savannas on the Refuge). The referenced plans in Table 4 are currently utilized and/or will be developed in support of the goals and objectives set forth in this document, either in their current or updated form.

3.14.2 General Administration

Many administrative functions support the operation and maintenance of the Refuge. These include payroll, accounting, budgeting, procurement, acquisition, contracting, and planning. Some of these functions were formerly handled at the Regional Office in Minnesota. With Regional Office staff downsizing in the early 1990s, a greater amount of this activity was shifted to field stations, including this Refuge. It is anticipated that the complexity of the administrative support function will continue to increase.

Maintenance of the Refuge infrastructure includes 13 buildings, 62 water control structures, six bridges, over 20 miles of dikes, and more than 20 miles of roads that need regular maintenance. There are over 35 miles of boundaries to maintain, as well as decks, towers, trails, signs, and parking areas. Maintenance of some of these facilities has fallen behind due to inadequate personnel and funding.

3.15 Work Force

The ultimate success of the Refuge in carrying out its mission depends on staffing patterns (Table 5) and funding levels. Staff support is provided by a Regional Office in Fort Snelling, Minnesota, an Ecological Services Field Office in Green Bay, Wisconsin, a Fisheries Field Office in LaCrosse, Wisconsin, a Private Lands Office in Madison, Wisconsin, and a National Office in Washington, D.C.

Table 5: Current Staffing Patterns, Necedah NWR

Position	Status
Refuge Manager	1.0 FTE (full time equivalent)
Refuge Operations Specialist	1.0 FTE
Refuge Operations Specialist	1.0 FTE
Refuge Operations Specialist	1.0 FTE
Biologist	1.0 FTE
Park Ranger	1.0 FTE
Fire Management Officer	1.0 FTE
Range Technician	0.6 FTE (permanent seasonal)
Biological Technician	0.6 FTE
Range Technician	1.0 FTE
Administrative Technician	1.0 FTE
Maintenance Mechanic	1.0 FTE
Equipment Operator	1.0 FTE
Office Automation Clerk	P-INT (intermittent)
Office Automation Clerk	PPT

Chapter 4: Management Direction

4.1 Core Values and Guiding Principles

The Refuge holds the core values of quality, credibility, reliability, integrity, and responsiveness as the basis for all Refuge activities. They will be guided by these core values as well as the following guiding principles:

An Ecosystem Approach:

The ecosystem approach is a vision of desired future conditions developed in collaboration with a diverse group of stakeholders that integrates ecological, economic, and social factors. It is applied within a geographic framework (usually watershed) and founded primarily on ecological factors.

Results through Partnerships:

Partnership initiatives require extensive coordination and communication between Federal agencies; state, tribal, and local governments; and stakeholders and customers. Partnerships promote the pooling of resources and expertise to obtain results more quickly and efficiently. Results also tend to be longer lasting because consensus is built over a wide range of stakeholder interests.

Public Involvement:

Refuge management will include a clear, credible, and meaningful role for public input from the full spectrum of social and cultural backgrounds, and will receive full consideration in Refuge decision-making. The Refuge serves local, state, and national constituencies, therefore, public input at each of these levels will be solicited and incorporated into the Refuge's decision making process.

Cornerstones of Biology:

The Refuge will conserve existing, relatively intact ecosystems first, for they are the cornerstones for providing biota and other natural materials needed for future restoration.

Ecological Integrity:

The Refuge will restore ecological integrity, particularly the structure, composition, and natural processes of native biotic communities and physical environments.

Design for Self-Sustainability:

The Refuge will design for self-sustainability of natural systems. The best way to ensure long-term viability of habitat is to minimize the need for continuous maintenance.

Within a Watershed Context:

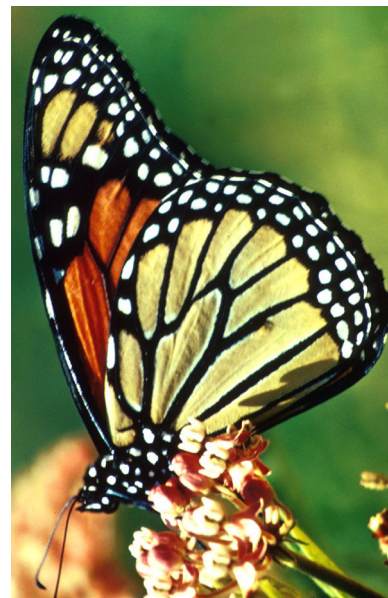
The Refuge will focus within the watershed and/or broader landscape level context and seek to understand its biological potential. A watershed/landscape has the capacity to become only what its physical and biological setting will support. This

	includes climate, geology, hydrology, and biological characteristics.
<i>Address Degradation:</i>	The Refuge will address ongoing causes of habitat degradation. Conservation, restoration, and management activities will fail if the sources of degradation persist.
<i>Have Clear Goals and Objectives:</i>	The Refuge will have clear, up-to-date goals, objectives, and strategies, and will include a diverse array of expertise and interests in their development.
<i>Use Passive Restoration:</i>	The Refuge will use passive restoration and management when appropriate. Where possible, simulate natural hydrological process using low input, low impact, and sustainable measures that capture the energies of the system to perpetuate the resources in question.
<i>Use Reference Sites:</i>	The Refuge will, whenever available, use reference sites when restoring habitat. Reference sites are areas that are comparable in structure and function to the proposed restoration before it was degraded.
<i>Adaptive Management Processes:</i>	An adaptive management approach features a structured, iterative process that recognizes that most information used in decision making is incomplete. Adaptive management guides managers in efficiently collecting and using better information, thus enabling appropriate changes in management direction.

4.2 Compatibility

The requirement that an activity or use of a refuge be compatible with the refuge purpose governs whether or not an activity or use can be allowed on the refuge. “Compatible use” means a proposed or existing wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Refuge Manager, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the major purposes of the affected refuge (the mission of the Refuge System and the purposes of Necedah NWR are described in Chapter 1).

All proposed actions in this CCP are considered compatible based upon site-specific evaluations of the anticipated impacts with the Refuge purpose and Service policies.



USFWS

4.3 Strategic Framework

To facilitate the development of future Refuge management direction, the planning team utilized a strategic framework (e.g., purpose, vision, mission, goals, objectives, strategies, projects). For the purpose of this CCP, we define strategic framework as a pattern of purposes, policies, programs, actions, decisions, or resource allocations that define what the Refuge is, what it does, and why it does it. Goals refer to broad-based statements of direction or positions to be achieved. Objectives represent intermediate-term targets

necessary for the satisfaction of goals. Strategies and projects are the means, methods, and approaches used to achieve Refuge objectives.

However, it should be noted that detailed management scenarios and budgets were not developed for each Refuge operational component (e.g., fish and wildlife management, habitat restoration and management, resource conservation, etc.). The planning team instead chose to provide a general overview of future Refuge programs and projects and leave the details of scheduling and budgets to be developed as opportunities for funding and staffing develop. Step-down management plans (e.g., habitat management plan, fire management plan, integrated pest management plan) will be used and/or developed by Refuge staff to provide detailed scenarios and budgets associated with most objectives, strategies, and projects. Projects are described in detail in Chapter 5 and differ from objectives and strategies in that they require additional funding beyond the current station budget.

4.4 Refuge Goals, Objective, Strategies and Projects

4.4.1 Fish and Wildlife Management

4.4.1.1 Waterfowl and Other Migratory Birds

Goal 1: The Refuge will actively conserve, restore, establish and manage diverse and productive populations of waterfowl and other migratory birds within the Refuge and the Yellow River Focus Area, with an emphasis on regional and national species of management concern.

- Objective 1.1:** By 2019, increase the breeding pair population of waterfowl on Refuge land to 700 pairs (e.g., Mallard, Teal, and Pintail) through additional grassland habitat management, in accordance with the North American Waterfowl Management Plan (see Open Landscape Objective 1 and associated strategies). The Refuge currently supports roughly 400 breeding pairs of waterfowl.
- Objective 1.2:** By 2007, eliminate Wood Duck houses on Refuge land in favor of natural nesting cavities (the Refuge will maintain existing Wood Duck houses until they become unusable).
- Objective 1.3:** By 2019, increase the breeding pair population of grassland species of concern (e.g., Dickcissel, Upland Sandpiper, Grasshopper Sparrow, Bobolink) on Refuge land through additional grassland habitat restoration and management, in accordance with the North American Waterfowl Management Plan, Karner Blue Butterfly Recovery Plan, and guidelines developed by Sample and Mossman (1997). See Open Landscape Objective 1 and associated strategies.
- Objective 1.4:** By 2019, increase the breeding pair population of savanna species of concern (e.g., Red-headed Woodpeckers, Field Sparrow, Northern Flicker) on Refuge land through additional savanna habitat restoration and management, in accordance with the North American Waterfowl Management Plan, the Karner Blue Butterfly Recovery Plan, and guidelines developed by Sample and Mossman (1997). See Open Landscape Objective 2 and associated strategies.
- Objective 1.5:** By 2008, increase the breeding pair population of Black Terns on Refuge land to eight nesting pairs through additional wetland habitat management (Region 3 priority species) (see Wetlands Objective 1, strategy D). The Refuge currently supports four nesting pairs.

Objective 1.6: By 2008, increase the breeding pair population of Goshawks on Refuge land (Region 3 priority species)(see Forests Objective 3.7). In the past, the Refuge has supported one nesting pair of Goshawks in select red and white pine plantations.

4.4.2 Listed Species

Goal 2: The Refuge will provide a federal leadership role in the conservation, recovery, and where appropriate the reintroduction of federally listed species (e.g. Karner blue butterfly, Whooping Crane, Eastern timber wolf, Eastern massasauga rattlesnake, Bald Eagle) throughout central Wisconsin over the life of the CCP.

Objective 2.1: Establish and maintain one large population of Karner blue butterflies on the Refuge as stated in the Karner Blue Butterfly Recovery Plan (see Open Landscape Objective 2 and associated strategies). In this context, “large population” refers to >6,000 second flight adults consisting of 25 sub-populations and dispersed over at least 10 square miles. The following strategies pertain to Refuge lands only.

Strategies:

1. Restrict all construction activities in Karner blue butterfly habitat located on Refuge land. The only exception to this will be for the graveling or paving of two hiking trails (Cranberry Loop and Lupine Loop).
2. All silviculture activities in occupied Karner blue butterfly habitat will be designed to avoid or minimize impacts to butterflies. Conservation measures will be written into timber sale contracts when necessary to conserve Karner blue habitat from timber operations. Slash and stumps will not be placed in occupied Karner blue habitat. Skid trails and hauling roads will be designed to avoid or minimize impacts to lupine and butterflies.
3. Refuge visitors will be advised to avoid disturbing lupine plants in occupied Karner blue butterfly areas.

Objective 2.2: Provide technical assistance and staff support to the Whooping Crane Reintroduction program throughout the life of this CCP.

Strategies:

1. Should an experimental population of Whooping Cranes establish themselves on or near the Refuge, manage select Refuge pools and associated habitats to support the population, as directed by the Whooping Crane Recovery Team.
2. Where Whooping Cranes exhibit territorial, breeding and/or nesting behavior, maintain or adjust pool levels to create optimum conditions.
3. Preclude prescribed burning in or near a unit containing an active Whooping Crane nest site.
4. Prohibit human and vehicular traffic in or near Whooping Crane nest sites.
5. Implement any additional Whooping Crane guidelines that may be developed for nest protection.

Objective 2.3: Maintain resident packs of Eastern timber wolves on public lands in central Wisconsin, in accordance with the Eastern Timber Wolf Recovery Plan.

1. All new wolf den and rendezvous sites verified by wildlife biologists as well as den and rendezvous sites used within the last 2 years will be protected through

implementation of the “Management Policy for Wolf Den and Rendezvous Sites” (Wydeven and Schultz 1993).

2. Preclude land use activities, including timber harvest, within 100 meters of a wolf den at any time of the year.
3. Restrict human activity within 100 meters of a den to those activities specifically related to wolf research and which generally are done only when wolves are not active in the area.
4. Maintain volunteer tracking efforts of wolves on the Refuge.
5. Continue to keep Refuge roads closed to public vehicular traffic and continue berming access roads upon completion of timber sales.
6. Continue prohibiting coyote hunting and trapping year-round on the Refuge.
7. Collaborate with the Wisconsin DNR on wolf trapping and radio tracking.
8. Issue an annual press release prior to gun deer season advising hunters of the coyote hunting closure.

Objective 2.4: Continue international management efforts for the Eastern massasauga rattlesnake, including research, to help preclude the need for federal listing (see open landscape habitat objectives and associated strategies).

1. If the Eastern massasauga rattlesnake is listed as federally threatened or endangered, the Refuge will cooperate and support the Federal Recovery Team.
2. Should the Eastern massasauga rattlesnake occur on the Refuge, the protective measures in “The Eastern Massasauga Rattlesnake: A Handbook for Land Managers 2000” (Johnson et al. 2000) will be implemented.
3. Continue to assist landowners in the Yellow River Area, Monroe County, LaCrosse, and Buffalo County with Eastern massasauga rattlesnake management support and surveys, in accordance with “The Eastern Massasauga Rattlesnake: A Handbook for Land Managers 2000.” (Johnson et al. 2000).

Objective 2.5: Protect Bald Eagles nesting on the Refuge from human disturbance throughout the life of this CCP

1. Enforce protective buffer zones around Bald Eagle nests in accordance with the Refuge’s “Water Management Plan” and the “Northern States Bald Eagle Recovery Plan,” including a one-half mile no fly zone for Air National Guard aircraft.
2. Restrict prescribed burning and water level drawdowns within one-quarter mile of Bald Eagle nests.
3. Continue monitoring Bald Eagle nesting success on the Refuge throughout the life of the CCP

4.4.3 Habitat Restoration and Management

Goal 3: The Refuge will, in partnership with others, conserve, restore, establish and manage diverse and productive wetland, open landscape, and forest habitats on Refuge land and within the Yellow River Focus Area that benefits listed species, waterfowl and other migratory birds, and native biological diversity.

Table 6 describes desired future conditions by soil type, and Figure 16 and Figure 17 illustrate the future desired vegetation and vegetation management on the Refuge.

Wetlands

Objective 3.1: Emergent Wetlands/Wet Meadows: By 2008, maintain on Refuge land 12,500 acres of emergent wetland (e.g., palustrine) and wet meadow habitat (e.g., sedge meadows) to support nesting, resting, and feeding waterfowl, all types, associated bird species of concern (e.g., Black Terns, American Bittern, Henslow's Sparrow, Sedge Wren), and to promote native biological diversity. The Refuge currently has roughly 10,500 acres of emergent wetlands and wet meadows.

Strategies/Projects

1. Restore and maintain two additional palustrine emergent wetland complexes (approximately 1,000 acres each) on the Refuge by converting 2,000 acres of lowland shrubs (Low Priority). (Project 1)
2. Manage palustrine emergent wetlands for dense annual and perennial vegetation. Burn, mow, and disk as necessary.
3. By 2009, sub-divide Sprague-Mather Pool, the largest impoundment on the Refuge, into three units to enhance water management capability to provide moist soil food production and/or invertebrate availability for migrating waterfowl (High Priority). (Project 2)
4. Beginning in 2005, provide stable water and emergent vegetation for Black Terns by leaving Pool 19 (east and west), Carter-Woggon Pool, Upper Rice Pool, and Rice Pool at "full pool" except for maintenance purposes, in accordance with guidelines developed by Naugle et al. 2000.
5. By 2005, develop internal guidelines for acceptable amounts of woody vegetation in existing Refuge pools. Control as necessary.
6. By 2005, acquire and install staff water gauges in Refuge pools for accurate water level readings (High Priority). (Project 3)
7. By 2006, install a shallow well and a solar-powered pump as a supplemental water source for the Ducks Unlimited Wetland Project (High Priority). (Project 4)

Objective 3.2: Forested Wetlands: For the life of this CCP, maintain on Refuge land 5,700 acres of forested wetland habitat to support forest-nesting waterfowl (e.g., Wood Ducks) and associated bird species of concern (e.g., American Woodcock, Veery, Northern Flicker) and to promote native biological diversity. The Refuge currently has roughly 5,700 acres of forested wetland habitat.

Strategy:

1. Maintain large blocks of forested wetland habitat with mature trees, sparse understory, and within one-half mile of water. Implement disturbance regimes

Table 6: Management Strategies and Vegetation Composition

		Management Strategies		
Soil	Natural Areas	Minimum Management Areas	Maintenance Areas (includes state-managed lands)	Open Landscape Areas
Sandy	<i>Oak and Pine Woodland</i> (26 acres): Oak and pine woodland consisting of Hill's oak, jack pine, red pine, white oak; understory of Pennsylvania sedge, blueberry, huckleberry, sweet fern.	<i>Oak and Pine Woodland</i> (389 acres): Oak and pine woodland consisting of Hill's oak, jack pine, red pine, white oak; understory of Pennsylvania sedge, blueberry, huckleberry, sweet fern.	<i>Oak and Pine Woodland</i> (1,698 acres): Oak and pine woodland to oak and pine savanna/barrens, depending on burning frequency and intensity. Overstory of oak and pine woodland, same as in Natural and Minimum Management Areas; oak and pine savanna/barrens with scattered Hill's oak, jack and red pine, with an understory of little bluestem, big bluestem, Indian grass, Pennsylvania sedge, cricaceous shrubs (e.g. blueberry), goldenrods, and milkweeds.	<i>Oak and Pine Savanna Barrens</i> (2,399 acres): Oak and pine savanna/barrens with scattered Hill's oak, jack, and red pine, with an understory of little bluestem, big bluestem, Indian grass, Pennsylvania sedge, cricaceous shrubs (e.g. blueberry), goldenrods and milkweeds.
Mesic	<i>Mature Hill's Oak, Eliminate Aspen</i> (404 acres): Mature Hill's oak, white oak, red maple, black cherry, bigtooth and trembling aspen, jack, red and white pine; early successional species such as aspen will be slowly eliminated as the stand ages. The understory consists of dewberry, raspberry, mosses, club-mosses, blueberry, Pennsylvania sedge, and wintergreen.	<i>Mature Hill's Oak, Eliminate Aspen</i> (5,875 acres): Mature Hill's oak, white oak, red maple, black cherry, bigtooth and trembling aspen, jack, red and white pine; early successional species such as aspen will be slowly eliminated as the stand ages. The understory consists of dewberry, raspberry, mosses, club-mosses, blueberry, Pennsylvania sedge, and wintergreen.	<i>Mature Hill's Oak, Maintain Aspen</i> (10,997 acres): Mature Hill's oak, white oak, red maple, black cherry, bigtooth and trembling aspen, jack, red and white pine; early successional species such as aspen will be maintained for the diversity of wildlife and plant habitat they provide. The understory consists of dewberry, raspberry, mosses, club-mosses, blueberry, Pennsylvania sedge, and wintergreen.	<i>Young, Shrubby Hill's Oak</i> (5,712 acres): Young, shrubby Hill's oak, white oak, red maple, willow, bigtooth and trembling aspen; pines will be slowly eliminated over time. The understory consists of wool grass, spirea or hardhack, goldenrods, dewberry, raspberry, mosses, club-mosses, blueberry, Pennsylvania sedge, wintergreen and bracken fern.
Peat	<i>Jack Pine/Tamarack</i> (375 acres): Some jack pine and tamarack, sedge meadows, bogs with sphagnum, leatherleaf, cranberry, and cotton grass.	<i>Jack Pine/Tamarack</i> (3,862 acres): Some jack pine and tamarack, sedge meadows, bogs with sphagnum, leatherleaf, cranberry and cotton grass.	<i>Jack Pine/Tamarack and Willow and Reed Canarygrass</i> (5,768 acres): Some jack pine and tamarack, sedge meadows, bogs with sphagnum, leatherleaf, cranberry, and cotton grass. Where the watertable has been significantly altered, willow and reed canarygrass are dominant.	<i>Jack Pine/Tamarack and Willow and Reed Canarygrass</i> (6,847 acres): Some jack pine and tamarack, sedge meadows, bogs with sphagnum, leatherleaf, cranberry, and cotton grass. Where the watertable has been significantly altered, willow and reed canarygrass are dominant.

Figure 16: Desired Future Vegetation, Necedah NWR

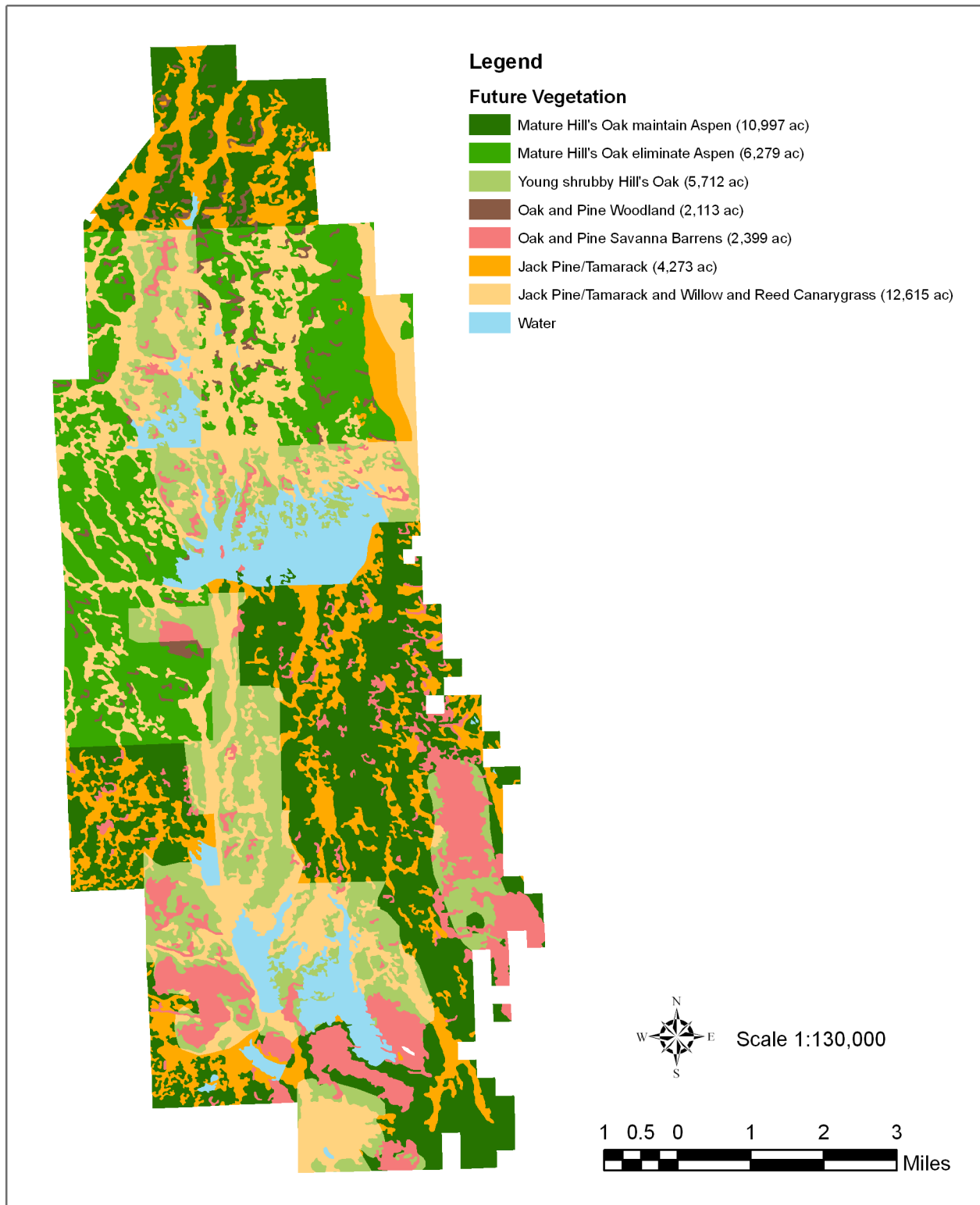
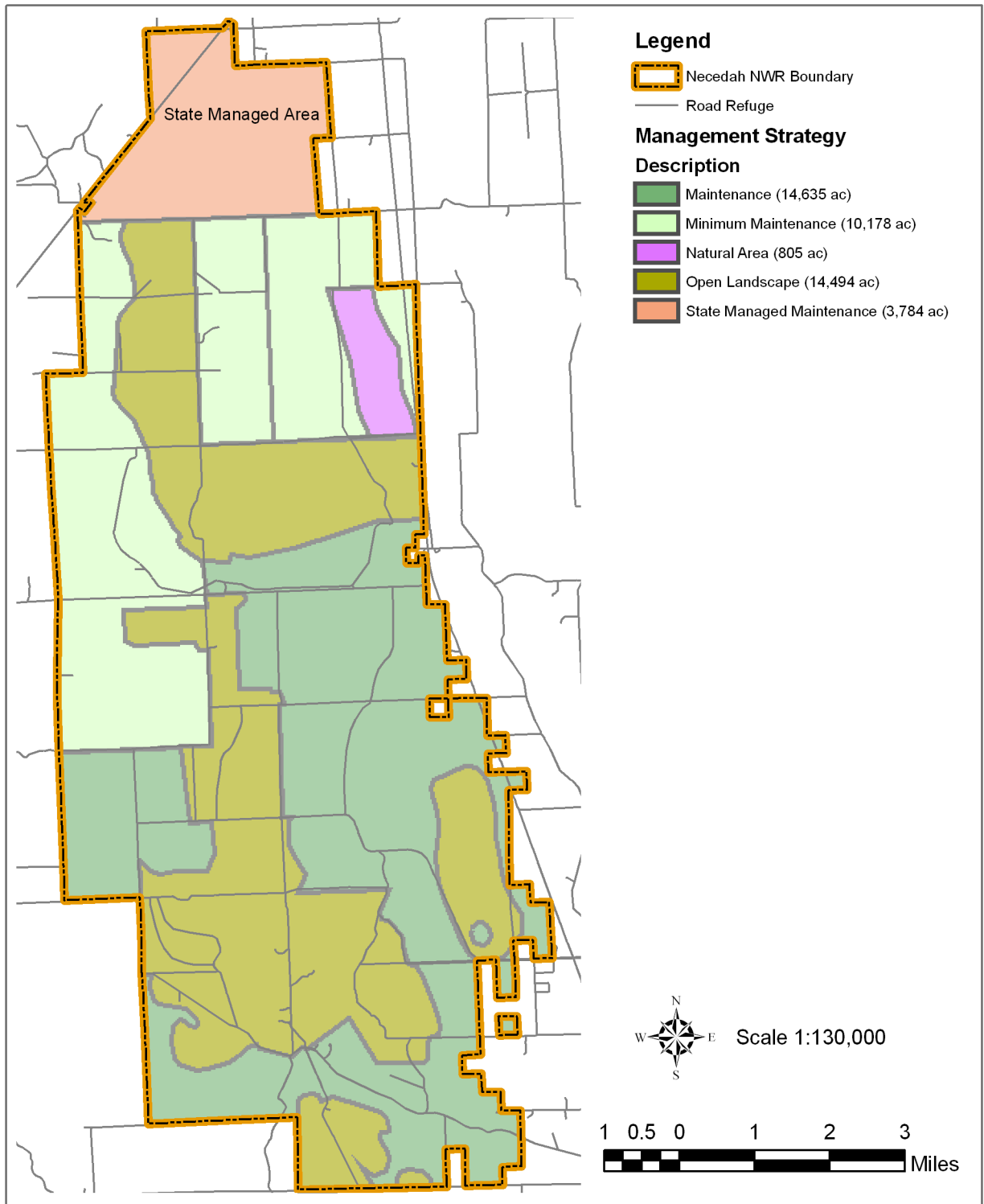


Figure 17: Desired Future Management, Necedah NWR



(e.g., mechanical thinning, burning, mowing) to maintain the desired herbaceous understory (sparse), as necessary (High Priority). (Project 5)

Objective 3.3: Lowland Shrubs: By 2009, maintain on Refuge land 3,500 acres of lowland shrub habitat to support associated bird species of concern (e.g. Blue-winged Warbler, Golden-winged Warbler, Willow Flycatcher) and to promote native biological diversity. The Refuge currently has 5,500 acres of lowland shrubs.

Strategy:

1. Establish and maintain large blocks of lowland shrub habitat with a range of young to mature shrubs and dense understory. Maintain hydrology and active wildfire suppression.

Objective 3.4: Open Water: For the life of this CCP, maintain on Refuge land 1,800 acres of open water habitat to support nesting, resting, and feeding waterfowl (all types), other associated bird species of concern (e.g., Common Loon) and to promote native biological diversity. The Refuge currently has 1,800 acres of open water.

Strategy:

1. Maintain the current water management regime on Refuge pools, which includes leaving pools flooded at full-pool 2 out of 3 years (to setback woody vegetation).

Open Landscapes

Objective 3.5: Grasslands: By 2019, establish and maintain on Refuge land 6,200 acres of native grassland habitat (e.g., midgrass and tallgrass prairies characteristic of the central Wisconsin sand plain subsection (Keys et al., 1995) to support nesting waterfowl (e.g., Mallard, Teal, Pintail), other associated bird species of concern (e.g., Dickcissel, Upland Sandpipers, Grasshopper Sparrows, Bobolink), and to promote native biological diversity, in accordance with the North American Waterfowl Management Plan and guidelines developed by Sample and Mossman (1997). The Refuge currently has roughly 2,700 acres of grasslands.

Strategies:

1. Establish and maintain a mosaic of small (40 acres to 1,000 acres) and medium-sized (1,000 to 5,000 acres) native grasslands comprised of short, medium, and tall height-density patches containing diverse structure (e.g., bare soil, stiff-stemmed forbs, sparse woody vegetation) to provide nesting, brood-rearing, and foraging habitat for grassland birds and to enhance biological diversity. The Refuge will focus on creating blocks of grassland habitat that are structurally open and free of major linear woody edges. In most cases, woody cover will represent less than 5 percent of the grasslands habitat.
2. Convert 200 acres of existing non-native grasslands to native grasslands for the purpose of enhancing native biological diversity. The Refuge currently has roughly 945 acres of non-native cool season grasses.
3. Implement disturbance regimes such as grazing, burning and mowing on all Refuge grasslands to establish and maintain the desired herbaceous covers (e.g., composition, height/density), as necessary (High Priority). (Project 5)

Objective 3.6: Savannas: By 2019, restore and maintain on Refuge land 3,600 acres of native savanna habitat (e.g., oak savanna) characteristic of the central Wisconsin sand plain subsection (Keys et al., 1995) to support Karner blue butterflies, associated bird species of concern (e.g., Red-headed Woodpeckers, Field Sparrows, Flicker), and to promote native biological diversity in accordance with the Karner Blue Butterfly Recovery Plan, Refuge Forest Management Plan, and guidelines developed by Sample and Mossman (1997). The Refuge currently has roughly 1,000 acres of savanna.

Strategies:

1. Restore and maintain an additional 640 acres of oak and pine woodlands and sedge meadow wetlands on the Refuge distributed over at least a 10-square-mile area by 2015, in accordance with the Karner Blue Butterfly Recovery Plan.
2. Implement disturbance regimes (e.g., mowing, burning) to establish and maintain herbaceous cover, as necessary (High Priority).
3. Maintain a mature oak component in savanna restoration units to provide nesting cavities for Red-headed Woodpeckers.
4. Enhance and maintain a warm-season grass component in savanna restoration units to provide nesting cover for Field Sparrows.
5. By 2013, construct an additional 30 miles of firebreaks around savanna restoration units and along the Refuge's eastern boundary, an area with concentrations of hazardous fuels, to allow for periodic fire (High Priority). (Project 6)
6. By 2007, acquire a hydro-axe to maintain open landscape habitats for Karner blue butterflies and other savanna-dependent species (High Priority). Hydro-axe operation in Karner blue butterfly management units will be conducted between August 15 and April 15, and no more than one time per year. (Project 7)

Forests

Objective 3.7: Coniferous Forest: By 2019, maintain on Refuge land 550 acres of coniferous forest habitat to support associated bird species of concern (e.g., Northern Goshawks) and to promote native biological diversity. The Refuge currently has roughly 900 acres. Timber harvest will only occur in areas designated open landscape (Figure 17), except in pine plantations or for safety, operations, or fuel reduction purposes.

Strategies:

1. Maintain select red and white pine plantations as monotypic, even-aged stands to support nesting Goshawks, in accordance with Rosenfield et al. 1998.
2. Within designated maintenance areas of the Refuge (Figure 17), employ approved Timber Stand Improvement techniques, such as proper thinning and harvest schedules, to transition monocultural stands (primarily red and white pine plantations) to mixed composition, uneven-aged stands. Treat stands at least once over the life of this CCP.
3. Prepare and advertise for selective timber harvest on 350 acres of Refuge coniferous forest land, in support of the Refuge's savanna and grassland restoration efforts.

Objective 3.8: Mixed Deciduous/Coniferous Forests: By 2019, maintain on Refuge land 4,500 acres of mixed deciduous and coniferous forest habitat to support associated bird species of

concern (e.g., Pine Warblers, Scarlet Tanager, Whip-poor-will, Black-and-white Warbler) and to promote native biological diversity consistent with the Refuge's Forest Management Plan. The Refuge currently has roughly 10,000 acres. Timber harvest will only occur in areas designated open landscape (Figure 17), except in pine plantations or for safety, operations, or fuel reduction purposes.

Strategies:

1. Maintain large mature stands of oak forest with a white pine component to provide nesting habitat for Scarlet Tanagers and Least Flycatchers.
2. Maintain large mature stands of jack pine with an oak component for nesting Pine Warblers, Whip-poor-wills, and Black-and-white Warblers.
3. Conserve 640 acres of mesic mixed oak/pine forest with interspersed sedge meadows free from active human manipulation to provide a control area (reference site) where successional changes can be monitored and compared to other managed areas. Wildfires will be suppressed in the area to protect adjacent landowners.

Objective 3.9: Broad-Leaf Deciduous Forests: By 2019, maintain on Refuge land 5,350 acres of broad-leaf deciduous forest habitat to support associated bird species of concern (e.g., Wood Thrush) and to promote native biological diversity. The Refuge currently has roughly 10,000 acres. Timber harvest will only occur in areas designated open landscape (Figure 17), except in pine plantations or for safety, operations, or fuel reduction purposes.

Strategy:

1. Maintain large mature stands of oak forest with a diverse, dense understory component, to provide nesting habitat for Yellow-billed Cuckoo, Chestnut-sided Warbler, and Wood Thrush.

4.4.3.1 Other Habitat Management Actions

Objective 3.10: Fire Program

Strategies:

1. Maintain a fire management program that supports habitat objectives and reduces damage associated with wildfires throughout the life of this CCP. Contain 100 percent of wildfires occurring on the Refuge before they cross Highway 80 moving east and Highway 21 moving south.
2. By 2007, acquire an additional pump engine to increase the effectiveness of both prescribed burning and fire suppression (Medium Priority). (Project 8)
3. By 2007, construct a storage building that can be heated to protect fire management vehicles from the weather (Medium Priority). (Project 9)
4. Reduce the density of jack pine and remove slash from at least one unit with significant overmature and standing dead timber biannually with emphasis on the Refuge's eastern boundary to aid in fire control. All treated units will be within designated Maintenance Areas of the Refuge Figure 17.

Objective 3.11: Pest Management

Strategies:

1. By 2005, develop an Integrated Pest Management step-down plan that will reduce populations of exotic and invasive species from current levels, restrict the distribution of pest plants (e.g., leafy spurge, spotted knapweed, reed canary grass) to their current acreage, and reduce the impact pest plant species have on rare plant communities, throughout the life of this CCP.
2. Beginning in 2006, complete a rare plant inventory, and inventory every 5 years thereafter (Medium Priority). (Project 10)

Special Refuge Management Areas

Restoration and management of the above mentioned habitats will be accomplished through the development of six special management areas on the Refuge Figure 17. Figure 17 represents a blueprint (long-term) for what the Refuge landscape might consist of within these special management areas. Table 7 describes how these areas would be managed to achieve the Refuges wildlife, habitat, and people commitments.

4.4.4 Resource Conservation

Goal 4: The Refuge will, in partnership with others, conserve Refuge resources (e.g., fish and wildlife, cultural and archaeological, water and visitor experiences) for future generations.

4.4.4.1 Law Enforcement

Objective 4.1: Increase compliance of Refuge regulations on Refuge land throughout the life of this CCP.

Strategies:

1. By 2007, review and revise Refuge visitor regulations for consistency and compatibility.
2. Increase the public's knowledge of Refuge visitor regulations and the boundaries of Fish and Wildlife Service lands, throughout the life of this CCP.
3. By 2007, add one full-time law enforcement officer.

4.4.4.2 Land Conservation

Objective 4.2: By 2019, conserve 3,750 acres of wetland, upland, and riparian habitats within the Yellow River Focus Area (willing seller only). (Table 4 on page 15).

Strategies:

1. Maintain working relationships with landowners in the Yellow River Focus Area.
2. By 2006, ensure landowners in the Yellow River Focus Area have viable options for restoring, enhancing, and conserving their land for the benefit of wildlife.
3. Acquire voluntary partnership agreements, conservation easements, and fee-title ownerships on approximately 250 acres per year from willing landowners within the Yellow River Focus Area (High Priority). The Service will acquire the minimum interest necessary to accomplish natural resource goals and only acquire land from willing sellers. (Project 11)

Table 7: Special Refuge Management Areas

Management Area	Description of Management
<i>Set-aside Area</i>	This area will be set aside to serve as a wilderness-like area for Refuge visitors. The area currently has two unpaved roads that will be maintained as hiking trails, with the possibility of being connected in the future to form a loop. The only management activities that will occur in this area will be trail maintenance and alteration of drainage ditches to restore a natural hydrologic regime wherever possible. Prescribed fire will be allowed in this area if it is determined to be an ecological benefit and if it will assist in maintaining the wild character of the area. Standards for fire breaks and rehabilitation options have yet to be developed.
<i>Minimal Management Areas</i>	These are areas where manipulative management activities, such as timber harvest, prescribed fire, and water management are only practiced on a limited basis. Prescribed fire will be allowed in this area on a limited basis, if determined to be ecologically beneficial. Standards for fire breaks and rehabilitation options will not be as stringent as those for the Wildland Set-Aside Area.
<i>Maintenance Areas</i>	These areas are subject to manipulative management for the benefit of wildlife, plants and public use. This includes timber harvest, prescribed fire, mowing, and water management, and any other activity deemed necessary to maintain the desired habitat. Except for small, isolated openings that will be allowed to close, these areas will be maintained close to their current character and condition.
<i>Open landscape Areas</i>	Due to the significant nation-wide decline in many grassland and barrens species, the Refuge has designated several areas to be managed as an open landscape. Most of these areas expand upon existing open lands to provide suitable habitat for those species that need large, open vistas. The area running from Sprague Pool to Pool 2 will serve as a corridor, connecting the northern and southern blocks of grassland and barrens habitat. These areas will be subject to timber harvest, prescribed fire, mowing, water management, and other manipulative management for the purpose of creating and maintaining open habitat for rare and declining trust species.
<i>Full-pool Management</i>	These pools will be maintained as full, except when drainage is necessary for maintenance.
<i>Variable Pool Management</i>	These pools will be maintained at various water levels, both seasonally and yearly.

4. By 2008, develop a land stewardship and natural history slide presentation for the Yellow River to raise awareness of its unique ecological value and need for conservation (High Priority). (Project 12)

Objective 4.3: By 2011, actively manage 100 percent of all existing Farm Service Agency Conservation Easement land under the jurisdiction of the Refuge.

Strategies:

1. By 2007, develop habitat management plans for all Conservation Easements.

2. By 2008, survey and post all of the Refuge's conservation easement lands (High Priority). (Project 13)
3. By 2011, implement active management, according to developed plans, on 50 percent of existing conservation easements, and on 100 percent of easements by 2015 (Medium Priority). (Project 14)
4. Beginning in 2006, annually monitor each of the Refuge's easement lands for posting and compliance (Medium Priority). (Project 15)

Objective 4.4: *Archaeological and Cultural Resource Management:* By 2019, in accordance with the Archaeological Resources Protection Act, protect 100 percent of the known archaeological and cultural resources on the Refuge.

Strategies:

1. By 2007, develop a step-down plan to fulfill requirements of Section 14 of the Archaeological Resources Protection Act for surveying lands to identify archaeological resources; and Section 110(a)(2) of the National Historic Preservation Act for a preservation program.
2. By 2008, contract with a cultural resources professional to complete a Cultural Resources Management Plan including a geomorphological study of potential living surfaces (Medium Priority). (Project 16)
3. Notify the Regional Historic Preservation Officer early in the planing process for each construction and development action and upon receiving requests for archaeological investigations on Refuge land.

Objective 4.5: *Contaminant Investigations/Cleanup:* Maintain a contaminant status on Refuge land that does not negatively impact fish and wildlife populations, human health, or create liability issues, throughout the life of this CCP.

Strategies:

- A. Investigate all potential contamination sites on Refuge lands within 2 weeks of their discovery.
- B. Conduct a level I contaminant investigation on all land considered for acquisition.

Objective 4.6: *Water Rights Management:* Maintain 1997 baseline water flows throughout the Refuge over the life of this CCP.

1. By 2008, research and document Refuge water rights and establish baseline water quality/quantity standards for receiving waters (Medium Priority). (Project 17)

4.4.5 Monitoring and Studies

Goal 5: Quality scientific research and monitoring will guide Refuge management decision making.

Objective 5.1: *Studies and Investigations:* Ensure that research conducted on the Refuge is published in an appropriate scientific journal no later than 2 years after the completion of the field work.

Objective 5.2: By 2007, establish coordinated research programs to expand our understanding of the Refuge and Yellow River Area natural resources.

Strategies:

1. By 2008, conduct at least two studies of rare sedge meadow habitat (Medium Priority). (Project 18)
2. By 2007, complete a baseline inventory and cover type mapping for the Refuge and the Yellow River Focus Area (High Priority). (Project 19)

Objective 5.3: Surveys and Censuses: In accordance with the Refuge's wildlife inventory step-down plan, the Refuge will continue to conduct/support the following surveys throughout the life of this CCP:

- Spring Waterfowl Breeding Pair Surveys
- Fall Waterfowl Surveys
- Waterfowl Banding
- Sandhill Crane Fly-out Surveys
- Mourning Dove Coo Surveys
- Woodcock Surveys
- Songbird Point Counts
- Karner Blue Butterfly Surveys
- Massasauga Rattlesnake Population Surveys
- Wolf Howling Surveys
- Wolf Tracking Surveys
- Midwest Sandhill Crane Counts

4.4.6 Coordination Activities

Goal 6: Strong, long-term, mutually-beneficial working relationships with Refuge stakeholders will lead to healthy sustainable fish and wildlife populations within the Refuge and the Yellow River Focus Area.

Objective 6.1: *Interagency Coordination:* Beginning in 2005, hold annual joint management plan reviews with the Wisconsin DNR to facilitate management and coordination of Meadow Valley Wildlife Area, Wood County Wildlife Area, Sandhill Wildlife Area, and scattered parcels in Jackson County.

Objective 6.2: Enhance communications with the Air National Guard by participating in at least one meeting per year to discuss the routing of low-flying aircraft in relation to wildlife and visitor use impacts.

Objective 6.3: Work with natural resource management agencies in Juneau, Wood, and Adams counties to enhance Service trust resource management throughout the life of this CCP.

Strategies:

1. Conduct one coordination meeting per year with Juneau County forestry personnel (including the county's advising Wisconsin Department of Natural Resources forester).

2. Participate in the annual Adams County and Juneau County interagency meeting.
3. Beginning in 2005, meet annually with Wisconsin DNR Bureau of Endangered Resources staff to enhance cooperation in identification of rare species on the Refuge.

Objective 6.4: Tribal Coordination: Ensure open communication and provide technical assistance to local Tribal Nations, as requested, throughout the life of this CCP

Objective 6.5: Private Lands Activities: Restore a minimum of 15 wetlands per year on private land within the Necedah Private Lands District to provide for a diversity of fish and wildlife values throughout the life of this CCP.

Objective 6.6: Private Lands Activities: Restore a minimum of 60 acres per year of native grasslands on private land within the Necedah Private Lands District to provide for a diversity of wildlife values throughout the life of this CCP.

Objective 6.7: Cooperative/Friends Organizations: Actively support the “Friends of Necedah National Wildlife Refuge, Inc.” throughout the life this CCP.

Strategies:

1. Maintain a staff liaison to the Friends of Necedah National Wildlife Refuge, Inc.
2. Provide office space and use of office equipment to Friends volunteers over the life of this Plan.

4.4.7 Visitor Services

Goal 7: The Refuge will provide the public quality wildlife-dependent uses of the Refuge (e.g. wildlife observation and photography, hunting, fishing, environmental education and interpretation) to foster the public’s understanding and appreciation of the Refuge, the National Wildlife Refuge System, and Service trust resources, and to expand the role the public plays in their stewardship.

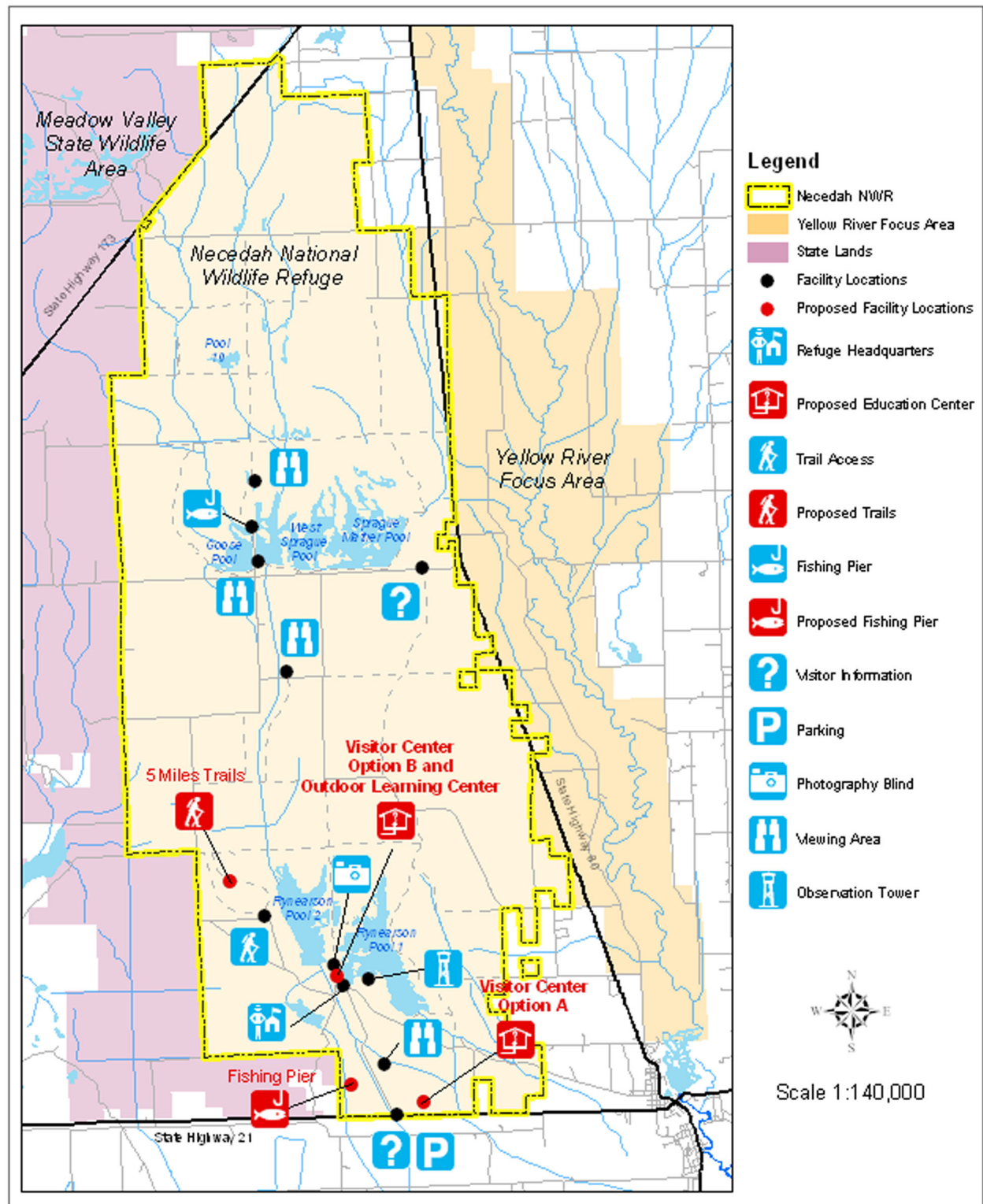
Objective 7.1: *Wildlife Observation and Wildlife Photography:* By 2012, increase wildlife observation and wildlife photography use-days on Refuge land by 20 percent (in 2001, roughly 154,000 visits were made to the Refuge for wildlife observation and 25,000 for photography).

Strategies:

1. In partnership with local, regional, and national tourism groups, promote the Refuge as a “Watchable Wildlife” destination in central Wisconsin.
2. Increase/establish new signage on Interstate 90/94.
3. Develop a local Intelligent Transportation System (radio messaging) to inform motorists about the Refuge and Refuge events.
4. By 2008, develop an observation tower at Carpenter Field to enhance wildlife viewing opportunities (Medium Priority). (Project 20)

Objective 7.2: *Hunting:* Provide the public safe, quality hunting opportunities on Refuge land where hunters will have a reasonable chance of success for waterfowl and other migratory birds, deer, turkey, and small game, throughout the life of this CCP.

Figure 18: Future Desired Conditions, Visitor Services, Necedah NWR



Strategies:

1. Beginning in 2005, coordinate with the Wisconsin DNR to participate in local annual hunter education program.
2. By 2006, determine appropriate Refuge deer hunter use-day numbers from safety, deer population, and hunter satisfaction standpoints. Incorporate findings into the Visitor Services step-down plan (hunting plan).
3. By 2007, develop and maintain two additional off-road parking areas on the Refuge (Low Priority). (Project 21)
4. Continue to emphasize special Refuge hunts for the disabled and youth.

Objective 7.3: *Fishing:* By 2014, increase fishing use-days on Refuge land by 10 percent (in 1999, roughly 3,500 fishing visits were made to the Refuge for the purpose of fishing).

Strategies:

1. Promote and host National Fishing Day events in coordination with the Wisconsin DNR and other partners.
2. Cooperate and coordinate with Wisconsin DNR and Service fishery biologists on Refuge fishery management issues.
3. By 2006, develop a fishing pier and trail at Harvey's Pond to enhance Refuge fishing opportunities (Medium Priority). (Project 22)

Objective 7.4: *Education and Interpretation:* By 2010, expand the Refuge's education and interpretation efforts by 20 percent over 1999 estimates (in 1999, the Refuge reached an estimated 300,000 people through its on-site and off-site efforts, excluding media contacts).

Strategies:

1. By 2005, complete the Ellen Allen Outdoor Learning Center to facilitate additional on-site outdoor learning opportunities (High Priority). (Project 23)
2. Enhance coordination with local and regional educators and partner organizations to promote Refuge-specific themes and the National Wildlife Refuge System.
3. Develop a comprehensive guide to interpretation and education for teachers and other community members interested in Refuge wildlife and nature. The guide will list slide shows, videos, activities, and "topic trunks" like the wetlands trunk, as well as appropriate audiences and running times.
4. By 2007, design and print a nature guide, coloring book, and activity guide for elementary students that features endangered species and unique habitats to increase knowledge of and interest in the Refuges fish, wildlife, plants, and their interrelationships (Medium Priority). (Project 24)
5. By 2009, in partnership with the Wisconsin DNR, develop and install new signage that welcomes and orients visitors to the Necedah Wildlife Management Area (Low Priority). (Project 25)
6. By 2006, develop five additional miles of interpretive trails on the Refuge (High Priority). (Project 26)
7. By 2007, develop and install new interpretative signs on the Refuge, including two interpretive kiosks and site interpretation signage (High Priority). (Project 27)

8. The Refuge, in conjunction with the Friends of Necedah, will coordinate at least five public events per year.

Objective 7.5: *Outreach:* By 2007, develop and maintain a comprehensive communication strategy for the Refuge (communication step-down plan) focusing on five target audiences (e.g., Congress, conservation organizations, communities, communications media, corporations). The communication plan will focus on achieving the following outcomes:

- By 2019, 75 percent of landowners within the four townships surrounding the Refuge will perceive the Refuge as an enduring asset to their community.
- By 2019, 50 percent of landowners within the four townships surrounding the Refuge will know the Refuge is a federal property managed by the Service.
- By 2019, 50 percent of high school seniors taking biology within the 17-county Refuge Management District will perceive 1) the National Wildlife Refuge System as a national treasure, 2) the Refuge as a place where wildlife come first, and 3) the Refuge as part of a national system of refuges comprising the world's largest collection of land and water managed specifically for wildlife.
- By 2010, 85 percent of landowners in the Yellow River Focus Area will recognize that ecosystem as an area worth conserving.
- By 2005, all elected officials representing the Refuge area will be aware of all large or important Refuge events (prior to happenings).

Strategies:

1. Enhance cooperation with local and regional media. Issue a minimum of one news release per month and one news release for every Refuge special event to all local written and broadcast media. Hold an annual media event focusing on the Refuge and the National Wildlife Refuge System.
2. Develop and maintain (update quarterly) the Refuge's web site over the life of this CCP.
3. Annually, brief Wisconsin's conservation organizations about the National Wildlife Refuge System and how any changes may affect their organizations.
4. Participate with the Juneau County Economic Development Committee and work with local corporations on natural resource-related projects that will benefit local communities.

Objective 7.6: In conjunction with the Wisconsin Waterfowl Association, maintain sponsorship (and funding) for the Wisconsin Federal Junior Duck Stamp contest throughout the life of this CCP (Project 28)

Strategies:

1. Maintain a database of teachers and individuals that have participated in or expressed interest in the Federal Junior Duck Stamp program.
2. Attend conferences and special events, and follow up on referrals to increase awareness of the Federal Junior Duck Stamp program.
3. Acknowledge the contributions of the Wisconsin Waterfowl Association to the Federal Junior Duck Stamp program's success through various medias.

4.4.7.1 Facilities and Services

Objective 7.7: By 2019, 75 percent of Refuge visitors completing a Refuge “customer service feedback form” will rate their overall Refuge experience as good to excellent.

Strategies:

1. Maintain and develop Refuge facilities and services that encourage quality visitor experiences.
2. By 2006, in cooperation with other federal, state, and local partners, complete site selection and preliminary planning for a visitor center that will serve as a first point of contact for Refuge visitors, office space for Refuge staff, and classrooms and meeting space for educators. Construction could occur in 2008. (Figure 18 on page 76) (High Priority). (Project 29)
3. By 2008, facilitate the development of housing to accommodate Refuge volunteers and other stakeholders living outside the commuting area. (Project 38)

Objective 7.8: By 2010, improve the accessibility of Refuge visitor groups with special needs.

Strategies:

1. By 2010, construct one additional universally accessible blind, and hard surface trail or boardwalk (High Priority). (Project 30)
2. By 2009, have available at the Refuge universally accessible versions of select brochures (braille) and videos (close-captioned) (Medium Priority). (Project 31)

4.4.8 Planning And Administration

Goal 8: Necedah NWR will be a safe and healthy environment for employees, volunteers and visitors and will be pro-active in addressing a wide-range of conservation opportunities and issues.

Objective 8.1: By 2009, review and revise all Refuge step-down management plans.

Objective 8.2: Hold the number of work-related injuries to two per year or less.

Strategies:

1. Support a trained safety officer that will conduct annual safety inspections.
2. Hold monthly safety meetings for Refuge staff and volunteers.
3. By 2006, construct suitable containment facilities for hazardous materials such as petroleum-based products, laboratory supplies, and pesticides (Medium Priority). (Project 32)

Objective 8.3: Maintain a safe and palatable water supply for Refuge staff and visitors.

Strategies:

1. Maintain and test the Refuge’s new drinking water treatment system consistent with Service policies (High Priority). (Project 33)
2. By 2005, install a carbon filter to supplement the Refuge’s drinking water treatment system.

Objective 8.4: By 2005, identify all property stewardship needs and complete the following projects that have already been identified.

Strategies:

1. By 2006, construct a 50-foot by 100-foot storage building to protect vehicles, heavy equipment, and other maintenance implements (Medium Priority). (Project 34)
2. By 2006, update the Refuge's security system (Medium Priority). (Project 35)

4.4.9 Work Force

Goal 9: Technically skilled and diverse employees with high morale and job satisfaction will achieve high levels of stakeholder satisfaction.

Objective 9.1: Provide all Refuge staff members with an opportunity to participate in 40 hours of training annually.

Objective 9.2: Hold weekly staff meetings to facilitate staff communication and coordination of Refuge activities.

Objective 9.3: Fill all staff vacancies within 1 year of creation.

Objective 9.4: Ensure diverse candidates are on every hiring certificate, in compliance with Region 3 diversity directives.

Strategies:

1. Utilize the Student Temporary Employment Experience Program and the Student Career Experience Program whenever possible.
2. Maintain contacts with colleges.

Objective 9.5: By 2006, hire one additional full-time Private Lands employee (Medium Priority). (Project 36)

Objective 9.6: By 2005, hire one additional full-time Wage Grade employee (Medium Priority). (Project 37)

Objective 9.7: By 2005, add one full-time Refuge law enforcement officer.

Objective 9.8: By 2008, increase Refuge volunteer participation by 20 percent over 1999 levels.

Strategies:

1. By 2008, remodel the Annex Building to make it suitable housing for volunteers and interns (High Priority). (Project 38)
2. By 2006, complete a kit of volunteer recruitment and orientation tools, including a volunteer slide show, volunteer opportunities leaflet, and a list of volunteer recruitment outlets (Medium Priority). (Project 39)

Objective 9.9: Continue to support work training programs such as the Youth Conservation Corps and the Private Industry Council's youth training program each year throughout the life of this CCP.

Objective 9.10: By 2010, hire one additional park ranger interpretative specialist in conjunction with the new visitor center and increased public use.

Chapter 5: Implementation

Implementation of this CCP will depend on the full involvement of Refuge staff, support staff, cooperating partners, and volunteers. However, in recognition of the fiscal atmosphere under which Federal agencies operate, we recognize that optimal funding to carry out the various Refuge programs may not be realistic. Therefore, rather than layout a detailed scenario and budget for implementation of each Refuge operational component and project, we have chosen instead to provide a general overview of future Refuge programs and projects and leave the details of scheduling and budgets to be developed as funding levels and staffing patterns become clearer. A description of each project follows in section 5.6.2, as does a table that describes annual funding needs (Appendix F).



USFWS

5.1 Tools

5.1.1 Staffing Patterns

Obtaining the necessary staff to implement the CPP will be essential to realizing the Refuge vision in 15 years. Appendix F reflects the staff needed to fully implement the action items and projects in this CCP.

Table 8: Future Staffing Needs, Necedah NWR

Position Title	Full-time Equivalent (FTE) Value
Refuge Manager	1.0
Refuge Operations Specialist	1.0
Refuge Operations Specialist	1.0
Refuge Operations Specialist	1.0
Biologist	1.0
Biologist* ¹	1.0
Park Ranger*	1.0
Law Enforcement Officer*	1.0

Table 8: Future Staffing Needs, Necedah NWR (Continued)

Position Title	Full-time Equivalent (FTE) Value
Fire Management Officer	1.0
Range Technician	0.6
Biological Technician	0.6
Range Technician	1.0
Forester*	1.0
Administrative Technician	1.0
Maintenance Mechanic	1.0
Maintenance Worker*	1.0
Equipment Operator	1.0
Student Trainee*	.33 TFT
Office Automation Clerk	1.0 P-INT
Office Automation Clerk	.6 PPT

1. New position indicated by “*”

5.2 Step-Down Management Plans

Step-down management plans are an important component of the day-to-day management of national wildlife refuges. They are designed (in most cases) to provide detailed guidance on refuge management areas (e.g., habitat, public use, fire, safety, new construction, etc.) or groups of related subjects. Step-down management plans describe strategies and implementation schedules for meeting CCP goals and objectives. In other cases, step-down management plans provided a general framework for CCP actions. Table 4 on page 57 illustrates the plans that will be employed in support of the goals and objectives set forth in this document, either in their current or updated form.

5.3 Partnerships

Partnerships with federal, state, and local agencies; private organizations; and individuals will be essential to the successful implementation of this CCP. Refuge staff will seek out partnerships to fulfill the goals and objectives outlined in this plan and create the desired future habitat condition illustrated by Figure 17 on page 67. Natural resource issues extend beyond social and political boundaries. Stakeholders with a variety of interests and backgrounds need to be included in the day-to-day management of the Refuge, and take ownership in its development.

Voluntary participation from private landowners will be an essential part of the Refuge’s new focus in the Yellow River area. Nearly all the land in the Yellow River area is in private ownership. In fact, nearly 70 percent of all available fish and wildlife habitat in the United States is in private ownership. With increased demographic trends toward urbanization and suburbanization, there is a tendency for people to lose touch with the land and the goods and services it provides. The Refuge’s approach to

sustainable management of public and private land will be to actively support a network of lands and waters dedicated to fish, wildlife, and plant conservation. This means that partnerships are not only desirable for accomplishing Refuge objectives, they are necessary.

Also, natural resources do not organize themselves according to political boundaries. Clean air and water, sustainable populations of wildlife and plants, and positive aesthetic and recreational experiences are a community-wide effort involving multiple Federal, state, and local jurisdictions. The Refuge will support other governmental agencies, private organizations and industries, and private landowners in managing natural resources in ways that enhance Service Trust Resources for present and future generations. The Refuge will contribute staff expertise, equipment, and monetary resources, where possible, to individuals and groups requesting assistance with:

- Sustainable timber management
- Game management
- Habitat management
- Conducting rare species inventories
- Water management, including wetland restorations, water level management, and water quality issues
- Real estate transfers and easement information
- Education and outreach

5.4 Volunteer Program

The Refuge's volunteer program is vital to the fulfillment of the Refuge's vision. Volunteers assist the Refuge with fish and wildlife management, habitat management, education and outreach, administration, and maintenance - in other words, in nearly every aspect of the Refuge's operation. In 1998, volunteers contributed over 7,000 hours at the Refuge. Some volunteer projects have included:

- Tracking pileated woodpeckers using radio telemetry
- Building new Refuge hiking trails
- Assisting with the Wisconsin Federal Junior Duck Stamp Contest
- Burning brush piles for the Refuge's savanna restorations
- Creating a savanna demonstration area in proximity to the Refuge Headquarters

5.5 Land Acquisition

Land acquisition is one method the Refuge can use to facilitate restoration and conservation of the Yellow River Focus Area. With the completion of this CCP and associated environmental assessment, the Refuge will initiate the purchase of conservation easements and fee-title land acquisition from willing sellers in the Yellow River Focus Area. Presently, the Refuge has no money to purchase land (including conservation easements) in the Yellow River Focus Area.

The Yellow River Focus Area project, which has undergone significant changes since it was initially conceptualized in 1994, is a 21,953-acre project designed to conserve quality bottomland forest and associated habitat in the area. The project was first conceptualized in 1994 as a potential addition to the Refuge, with fee title land acquisition as the primary conservation tool. However, as the project evolved, Refuge and regional planning staff recognized that extensive land acquisition was not needed at this time as much of the area is currently conserved under state wetland regulations. This has also

been the view of many of the landowners within the area. Therefore, the project currently emphasizes outreach, technical assistance, and conservation easements as the primary conservation tools, with fee title acquisition of land the least preferred option. Landowner participation in any Service program, including selling their land to the Service, is strictly voluntary. Also, it should be noted that the Service did not request money for land acquisition (including conservation easements) in the Yellow River Focus Area for the years 2004 or 2005. It is anticipated that the Service will request land acquisition money for this area in fiscal year 2006.

5.6 Budget and Schedule

5.6.1 Station Budget

The costs to implement the objectives, strategies, and projects identified in this CCP are captured in Service budget databases, including the Refuge Operating Needs System (RONS), Maintenance Management System (MMS), and Land Acquisition Priority System (LAPS). However, obtaining additional operating funds for the Refuge will be the single most important part of implementing this CCP.

The Refuge budget consists of base funding – the base varies in actual dollar amounts, but includes all approved permanent salary positions plus an allocation to cover minimum needs of utilities and minor supplies. This base budget is then supplemented through an application process for additional funding for specific needs. The needs and deficiencies are identified and add-on funding is applied for through Partners for Fish and Wildlife, Fire Pre-Suppression, Prescribed Fire, Maintenance Management, Refuge Operating Needs, Non-Game Bird, Challenge Cost Share both on and off-refuge, Clean Water Action, Fisheries, Roads, etc. Other funds that may become available as a result of refuge activities are funds for volunteers, contributions, and partnership match donations. Without these add-on fund sources which amount to a 30-40% increase over the base budget, the Refuge would not be able to carry out day-to-day operations, many of which are mandated for resource conservation and safety.

5.6.2 Project Descriptions

5.6.2.1 Habitat Restoration and Management Projects

1. *Restore two additional wetland complexes (approximately 1,000 acres) on the Refuge to provide migration and breeding habitat for water birds (shorebirds) (Low Priority) (2006-2017).* A large portion of the Refuge was drained in the early 20th century. The hydrology has been restored on about half of the original wetland acreage. These restorations will be accomplished by blocking existing ditches and installing water control structures. Some existing impoundments could also be managed more efficiently with the addition of water control structures. The engineering ditch plugs and water control structures will be completed by seasonal Refuge staff and private contractors.

Estimated Cost: \$162,000

2. *Sub-divide Sprague-Mather Pool (the largest impoundment on the Refuge) into three units that can be managed and drawn-down independently for moist soil food production and/or invertebrate availability for migrating waterfowl and shorebirds (High Priority) (2006 - 2009).* The Sprague-Mather Pool (1,400 acres) serves as a resting and feeding area for migratory waterbirds. This project will construct dikes and water control structures to sub-divide the pools into three sub-units that can be managed and drawn down independently for moist soil food production and/or invertebrate availability. This will allow more flexibility in the management of this impoundment and greatly increase the chances for success. U.S. Fish and Wildlife Service engineer will design the dikes and construction will be by a private contractor.

Estimated Cost: \$1,169,000

3. Acquire and install staff water gauges for accurate water level readings (High Priority) (2005).

Nearly half of Refuge wetlands are in impoundments which have managed water levels. To fine tune the water level management for maximum benefit, it is necessary to have each water control structure surveyed to Mean Sea Level Elevation and have a staff water gauge installed for accurate water level readings. The survey work would be completed by a private contractor. The water gauges will be installed by seasonal staff.

Estimated Cost: \$75,000

4. Acquire and install a shallow well and a solar-powered pump to serve as a supplemental water source for the Ducks Unlimited Wetland Project by 2006 (High Priority). The Refuge provides valuable habitat for a variety of migratory bird species. This wetland restoration project, a partnership with Ducks Unlimited, will restore 350 acres of wetland in seven impoundments on the southern portion of the Refuge. Due to wetland drainage in the past and other Refuge water supply needs, it may be necessary to supplement gravity flows of water into the impoundments with pumping from sub-surface water supplies. The Refuge will investigate the feasibility of a shallow well and a solar powered pump will serve as a reliable supplemental water source. The pumps and wells would be installed by private contractors.

Estimated Cost: \$80,000

5. Implement disturbance regimes such as prescribed fire to establish and maintain herbaceous cover within savanna, grassland, and other habitat units to support nesting birds and the Karner blue butterflies throughout the life of this CCP (High Priority). The implementation and maintenance of this habitat represents a significant increase in the Refuge's workload and operating costs.

Maintaining barrens habitat is essential for the federally endangered Karner blue butterfly, several species of migratory birds that have recently experienced severe declines, and a diverse variety of other plant and animal species that are not found in closed-canopy savanna. This will be accomplished using Refuge staff.

Estimated Cost: \$451,000

6. Construct an additional 30 miles of firebreaks around savanna restoration units and along the Refuge's eastern boundary (an area with concentrations of hazardous fuels) by 2015 to allow for periodic fire (High Priority). The completion and maintenance of 30 miles of adequate firebreaks is necessary for the Refuge's wildfire and prescribed fire management programs. The creation of the firebreaks also serves the safety of the public, especially adjacent landowners, by protecting their structures and other resources from escaped fire. Construction of firebreaks, by additional staff and contractors, will facilitate the access of equipment and suppression of wildfires and prescribed fires.

Estimated Cost: \$160,000

7. Acquire a hydro-axe to maintain openings for migratory birds, resident wildlife, and endangered species by 2007 (High Priority). Necedah Refuge has nearly 20,000 acres of upland habitat, as well as over 5,000 acres of forested wetland habitat. Both are important for a number of resident, migratory, and endangered species. It is essential that succession be controlled on some of this by setting back the encroachment of willow and other brush and tree species. The use of a hydro-axe would complement the station prescribed burning program and would also be used to a lesser degree to construct and maintain firebreaks. The machine will be operated by additional Refuge staff, and could be shared, at times, with other nearby Refuges.

Estimated Cost: \$201,000

8. Acquire an additional pump engine to increase the effectiveness of both prescribed burning and fire suppression activities by 2007 (Medium Priority). Necedah NWR's important habitats for migratory and native wildlife includes upland and wetland habitats which are dependent upon the use of periodic fires for maintenance. The acquisition of a fire pump unit would increase the effectiveness of both burning and fire suppression activities. An effective fire suppression capability is needed to protect Refuge buildings, structures, the general public, and other resources. There are also many

homes adjacent to Refuge boundaries that could need protection. In addition, the pump engine will support the Service's cooperative agreement with the Wisconsin DNR to work together in local fire suppression efforts.

Estimated Cost: \$108,000

9. Construct a 40-foot x 70-foot storage building that can be heated to protect fire management vehicles from the weather by 2007 (Medium Priority). The Refuge manages a variety of important habitats which benefit from prescribed fire. These areas are home to federally listed endangered Karner blue butterflies, rare migratory songbirds, and nesting waterfowl. The Refuge has two fire tank trucks, a fire pump truck, and a fire bulldozer that require a secure storage area that can be heated to prevent water from freezing in winter months. This equipment is vital to the Refuge prescribed fire program, as well as for wildfire suppression.

Estimated Cost: \$100,000

10. Complete a rare plant inventory beginning in 2005 and every 5 years thereafter for the life of this CCP (Medium Priority). The Refuge has never done a comprehensive inventory of plant species on Refuge lands. Common plants are less likely to be eliminated, therefore, rare plants are priority. Rare plant inventories will be completed on Refuge lands by seasonal staff or a qualified private contractor beginning in 2006 and every 5 years thereafter for the life of this plan.

Estimated Cost: \$15,000

5.6.2.2 Resource Conservation Projects

11. Acquire voluntary partnership agreements, conservation easements, and fee-title ownerships on approximately 250 acres per year from willing sellers within the Yellow River Focus Area (High Priority). This project will emphasize voluntary private land stewardship agreements, technical assistance, conservation easements, and fee title purchases within the Yellow River Focus Area in order to facilitate restoration and conservation of this. Estimated Cost: \$3,000,000 over 12 years.

12. Develop land stewardship and natural history slide presentations for the Yellow River by 2008 (High Priority). The Yellow River is a quality example of bottomland hardwood habitat, which is home to a variety of rare species. The area provides ecosystem services that are valuable to human beings too, such as flood control and water quality maintenance. The Refuge will develop slide presentations to increase public awareness of the area and to promote land stewardship.

Estimated Cost: \$5,000

13. Survey and post all of the Refuge's conservation easement lands by 2008 (High Priority). The Refuge holds easements and deed restrictions on over 3,400 acres of land on the Necedah Wildlife Management District. To maintain a responsible stewardship role in the management of this land, it is necessary to have it accurately surveyed and posted. A private contractor will do the surveys, and seasonal staff and/or volunteers will install signs.

Estimated Cost: \$450,000

14. Implement active management, according to developed plans, on 50 percent of existing conservation easements by 2011 and on 100 percent of easements by 2015 (Medium Priority). The U.S. Fish and Wildlife Service has management responsibility for over 3,500 acres of conservation easements on the Necedah Wildlife Management District. These easements are protected from development and provide valuable habitat for wildlife. However, they are not actively managed and do not have well-developed land stewardship objectives.

Estimated Cost: \$120,000

15. Beginning in 2006, monitor each of the Refuge's easement lands for posting and compliance at least once per year (Medium Priority). The Necedah Wildlife Management District covers a 17-county area for easement management and private lands assistance. Complete coverage of the

District is necessary to check for violations on over 60 Conservation Easements through aerial photography and site visits. This project includes annual contact with each landowner through correspondence and in person. It also includes fencing and posting of easement boundaries. Contacts, inspections, fencing, and posting will be completed by additional Refuge staff, such as a seasonal biological technician and new Refuge law enforcement staff. The aerial photography will be completed by a contractor.

Estimated Cost: \$654,000

16. Contract with a cultural resources professional to complete a Cultural Resources Management Plan by 2008 (Medium Priority). A major component should be a geomorphological study of landforms that could have supported human use and left archeological materials in meaningful context for the prehistoric and proto-historic periods (i.e., the Fort McCoy model). Other components would be the Section 14 and Section 110(a)(2) surveys, analysis of early Refuge facilities such as the dams and water control structures and CCC activities, and a determination if any significant conservation or wildlife activities occurred on the Refuge.

Estimated Cost: \$500,000

17. Research and document Refuge water rights and establish baseline water quality standards by the year 2008 (Medium Priority). The Refuge is an important area for migratory waterfowl and other wetland-dependent species. Over 10,000 acres of wetland exist on the Refuge, with plans for restoring more acreage to pre-drainage hydrology. One of the threats to the Refuge is the expansion of the cranberry industry in the Refuge's watershed adjacent to the north Refuge boundary. Documentation of legal water rights is needed to resolve and/or avoid potential future disputes with other water users in the watershed, primarily cranberry growers. Additional research is needed to establish baseline water quality standards also. Research and monitoring will be completed by contractors.

Estimated Cost: \$258,000

5.6.2.3 Monitoring and Studies Projects

18. Complete at least two studies of rare sedge meadow habitat by 2008 (Medium Priority). Providing and managing wetland habitat for a wide variety of wetland-dependent species is a priority for the Refuge. Sedge meadow is a habitat present in abundance on the Refuge that is becoming regionally rare. Research may be oriented toward species using sedge meadows, studying the hydrology of these areas, or analyzing the management of these valuable areas. This research will be completed by a graduate student with staff, volunteer, logistical, and/or monetary support from the Refuge.

Estimated Cost: \$20,000

19. Complete baseline inventory and cover type mapping, including a description of plant species composition and relative abundance, litter cover and depth, and height and canopy cover for the Refuge and the lower Yellow River watershed by 2007 (High Priority). Necedah NWR and the Yellow River Focus Area comprise over 60,000 acres of important wildlife habitat. To effectively plan and manage these areas, vegetation mapping is essential. This project would be accomplished through the efforts of additional Refuge staff, student interns, contractors, and volunteers.

Estimated Cost: \$103,000

5.6.2.4 Visitor Services

20. Develop an observation tower at Carpenter Field by 2008 (Medium Priority). The creation of additional viewing locations will allow visitors to experience new places on the Refuge, and new wildlife found in those areas.

Estimated cost: \$30,000

21. Develop and maintain at least two new off-road parking areas by 2007 (Low Priority).

Recreational activities such as nature observation, hiking, hunting, and fishing are popular uses of Refuge lands. Additional parking areas will allow visitors easier access to recreational opportunities and will help eliminate safety issues created by hazardous parking. New off-road parking areas will

also reduce human impact on roadsides, by concentrating usage onto areas designed to handle such impacts.

Estimated Cost: \$5,000

22. Develop a fishing pier and trail at Harvey's Pond to enhance fishing opportunities by 2006 (Medium Priority). The fishing facility will allow universal access and enable the public to utilize a great fisheries resource on site.

Estimated Cost: \$15,000

23. By 2005, complete the Ellen Allen Outdoor Learning Center (High Priority). Necedah NWR does not have adequate facilities to handle school groups or meetings with more than 20 participants. Construction has begun on an outdoor classroom that will serve as a group project area and meeting area. An old, single-car garage has been expanded with a 26-foot by 30-foot addition. The concrete floor and structural shell has been completed. Additional supplies needed to complete the project are siding, storage, decking, heating, and materials for a restroom. The cost for these remaining supplies totals \$12,000. Labor for this project has been supplied by Refuge staff, WCC, and Friends volunteers. Estimated cost: \$12,000

24. Design and print a nature guide, coloring, and activity booklet for elementary students featuring Refuge wildlife and habitats to increase knowledge of and interest in fish, wildlife, plants, and their inter-relationships by 2007 (Medium Priority). Necedah NWR is visited annually by several thousand school-aged children as an outdoor classroom. There is a need for Refuge-specific printed materials to educate this group. This project will design and print a nature guide/coloring and activity booklet featuring Refuge wildlife and habitats. The booklet will be geared toward elementary students to peak their interests in the opportunities offered at the Refuge to view and learn about fish, wildlife, plants, and their inter-relationships. The booklet will be designed by contractors with input from Refuge public use staff and printed commercially.

Estimated Cost: \$10,000

25. In partnership with the Wisconsin DNR, develop and install new signage for the Necedah Wildlife Management Area by 2009 (Low Priority). Visitor awareness of the ownership and management of the Necedah Wildlife Management Area is limited, at best. This project will promote recognition of the identity of the U.S. Fish and Wildlife Service and the relationship between the Service and the Wisconsin DNR. It will also assist visitors in distinguishing between the Refuge proper and adjacent public lands, which have different public use regulations.

Estimated Cost: \$20,000

26. Develop five additional miles of recreational/interpretive trails on the Refuge by 2006 (High Priority). Necedah NWR is an important wildlife viewing area and destination for over 150,000 visitors annually. New trails will enable visitors to enjoy the Refuge year-round. The longer trail length will help reach an additional audience currently being overlooked at the Refuge. The trails would help reach a segment of visitors interested in a longer visit and a more rigorous tour of the Refuge provided by a lengthier hiking trail. This project will provide for the construction of visitor trails (at least one recreational/interpretive trail, approximately 5 miles). These facilities will also improve opportunities for visitors and expand options for creating enjoyable educational experiences on the Refuge. Facilities development will be completed by a combination of new seasonal Refuge staff and contracted services. Some facilities will be designed for accessibility.

Estimated Cost: \$55,000

27. Develop and install new interpretative signage, including two interpretive kiosks, boundary signage, and site interpretation signs by 2007 (High Priority). This CCP has identified a need to update, complete, and create interpretive and informational signage to improve visitors' outdoor

experiences. Design and construction of signs will occur through a combination of Regional Office and Refuge public use staff, and private contractors. Signs will be installed by Refuge staff.
Estimated Cost: \$112,000

28. In conjunction with the Wisconsin Waterfowl Association, sponsor the Wisconsin Federal Junior Duck Stamp contest yearly for the life of this CCP (Medium Priority). The Wisconsin Federal Junior Duck Stamp art contest supports appreciation for the importance of wildlife, natural resources, and artistic intelligence and expression. Necedah NWR, in cooperation with the Wisconsin Waterfowl Association, will sponsor the Wisconsin Federal Junior Duck Stamp art contest. Funds will be used for the administration of the program, including the following strategies.
Estimated Cost: \$75,000

29. By 2008, design and build a visitor center which will serve as the first point of contact for Refuge visitors, office space for Refuge staff and classrooms and meeting space for educators (High Priority). Located near three major highways, the Refuge attracts thousands of visitors each year. No current space has been set aside to deal with the needs of current or projected visitation. The Refuge's Whooping Crane project will attract many more visitors from within and outside the area. There is strong support for construction of a visitor center and related public use facilities. By 2006, we will select a site and complete preliminary design for a visitor center that would be located on Refuge property.
Estimated Cost: \$3,000,000

30. Construct one additional universally accessible hunting blind, and hard surface trail or boardwalk by 2010 (High Priority). Necedah NWR attracts nearly 150,000 visitors each year. Several thousand require special accommodations to fully enjoy the Refuge. Facilities and services are needed to better meet the needs of the public. These would include one universally accessible hunting blind, and a hard surface trail or boardwalk by 2000. These facilities would be planned by new public use staff and contractors.
Estimated Cost: \$80,000

31. Provide universally accessible versions of brochures (braille) and videos (close-captioned) by 2009 (Medium Priority). Necedah NWR provides services to a diverse group of public, including those that have special needs regarding interpretive materials such as brochures and videos. The Refuge will develop universally accessible versions of brochures (braille) and videos (close-captioned) by 2007. These materials will be planned by new public use staff and contractors.
Estimated Cost: \$35,000

5.6.2.5 Planning And Administration Projects

32. Construct suitable containment facilities for hazardous materials such as petroleum-based products, laboratory supplies, and pesticides by 2006 (Medium Priority). During the course of managing Necedah NWR, it is necessary to handle and store some products that have the potential to cause environmental damage or a health hazard. It is necessary to have a storage facility appropriate for such items. This facility will be designed by U.S. Fish and Wildlife Service engineers and constructed by a private contractor.
Estimated Cost: \$105,000

33. Maintain and test the Refuge's new drinking water treatment system for the life of this CCP (High Priority). The need for safe drinking water for the Refuge for staff and visitors is critical. Funding needed in Operations and Maintenance base funding to complete new requirement for testing the water supply to offer safe drinking water for the public and staff. This project requires baseline testing using four major tests, then subsequent testing at quarterly, annual, 3-year, and 6-year intervals.
Estimated Cost: \$40,000

34. Construct a 50-foot by 100-foot storage building to protect vehicles, heavy equipment, and other maintenance implements by 2006 (Medium Priority). Necedah NWR maintains almost 44,000 acres of habitat for a variety of species. Inclement weather shortens the life span of vehicles and equipment and is increasing maintenance costs. This building will increase the useful life of vehicles, heavy equipment, and maintenance implements.

Estimated Cost: \$60,000

35. Update the Refuge security system by 2006 (Medium Priority). The Refuge has a great deal of valuable equipment that is used for Refuge operations, research, and maintenance. There has not been any staff living on the Refuge since 1986. Adequate security for station facilities has been lacking. An updated security system will be installed in all buildings and at other sites, such as dams, where theft or vandalism have a high potential for impacting public safety. The appropriate system will be recommended after an analysis is completed by Refuge law enforcement staff and a private security contractor. Installation and maintenance of the security system will be completed by a private contractor.

Estimated Cost: \$57,000

5.6.2.6 Work Force Projects

36. Hire one additional full-time Private Lands employee by 2006 (Medium Priority). Refuge Private Lands personnel get approximately 200 requests from landowners per year for technical and restoration assistance. An average of 30 restorations are completed each year, which leaves a backlog of landowners that current staff are not able to service. Also, landowners in the Yellow River Area will require additional staff time. This staff person would assist with the current project backlog and then work primarily with landowners in the Yellow River.

Estimated Cost: \$535,000

37. Hire one additional full-time Wage Grade employee by 2007 (Medium Priority). To improve visitor services and satisfaction, it is necessary to improve and maintain current facilities at a higher standard. Facilities must also be maintained in operable condition in order to meet public expectations. This maintenance will be accomplished through the addition of one Wage Grade employee.

Estimated Cost: \$318,000

38. Remodel the Annex Building to make it suitable housing for volunteers by 2008 (High Priority). Refuge volunteers contribute invaluable time, innovation and dedication to accomplishing many facets of Refuge operations. There are often volunteers that would come great distances to volunteer, but cannot afford housing. This project would provide housing for these volunteers.

Estimated Cost: \$51,000

39. Complete a kit of volunteer recruitment and orientation tools, including a volunteer slide show, volunteer opportunities leaflet, and a list of volunteer recruitment outlets by 2006 (Medium Priority). Refuge volunteers contribute invaluable time, innovation, and dedication to accomplishing many facets of Refuge operations. Likewise, volunteering for the Refuge can provide people with unique experiences that enrich the quality of their lives. A volunteer slide show and volunteer opportunities leaflet would inform people of volunteer opportunities. A list of volunteer recruitment outlets would assist Refuge employees in reaching a diverse group of potential volunteers.

Estimated Cost: \$10,000

5.6.3 Project Schedule and Annual Funding Needs

Appendix F describes annual project funding needs for each of the projects referenced in the preceding section.

It should be noted that this CCP for the Refuge provides long-term guidance for management decisions and sets forth goals, objectives, and strategies needed to accomplish Refuge purposes and identify the Service's best estimate of future needs. Comprehensive Conservation Plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. Comprehensive Conservation Plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.

Appendices

Appendix A: Environmental Assessment	95
Appendix B: Glossary.....	193
Appendix C: Species List	203
Appendix D: Compatibility Determinations.....	213
Appendix E: Compliance Requirements	217
Appendix F: Refuge Operating Needs System (RONS) and Maintenance Management System (MMS).....	223
Appendix G: Mailing List	229
Appendix H: List of Preparers.....	237
Appendix I: Resource Conservation Priority Species	241
Appendix J: References.....	253
Appendix K: Summary and Response to Public Comments	259
Appendix L: Necedah NWR Yellow River Focus Area Land Protection Plan	283

Appendix A: Environmental Assessment

FINDING OF NO SIGNIFICANT IMPACT

Necedah National Wildlife Refuge Comprehensive Conservation Plan and Environmental Assessment

For the reasons briefly presented below and based on an evaluation of the information contained in the supporting references enumerated below, I have determined that adoption and implementation of the Comprehensive Conservation Plan (CCP) covering the Necedah National Wildlife Refuge is not a major Federal action which would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969. An Environmental Impact Statement will, accordingly, not be prepared.

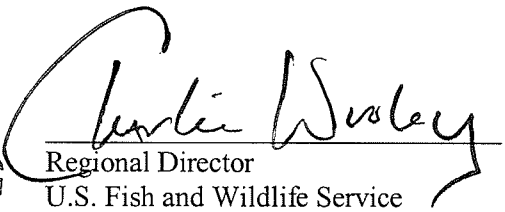
Reasons:

1. Economic impacts to the local and regional economy will be negligible compared to the overall economic base of the area. Refuge-dependent commercial (e.g., road maintenance, furbearer trapping, timber harvest), recreational (e.g., hunting, fishing, wildlife observation and photography), and management (e.g., Refuge spending) activities contribute considerably to the regional economy.
2. Acquisition and management of land in the Yellow River Focus Area by the U.S. Fish and Wildlife Service will be from willing sellers only and annual revenue sharing payments will be made to the Townships to help off-set potential impacts to the tax base. Potential tax impacts to area residents as a result of Service acquisition of land in the Yellow River Focus Area would be minimal.
3. Cultural resource inventory surveys will be conducted as necessary to insure protection of archeological, historical, and architectural resources.
4. Refuge management actions will not have any long-term adverse impacts to threatened or endangered species. Refuge management actions will improve habitat conditions for the Federally endangered Karner blue butterfly, whooping crane, and eastern timber wolf, as well as the bald eagle (federally threatened) and eastern massasauga rattlesnake (federal candidate). On-going re-introduction efforts of the Federally endangered whooping crane represent an important step toward recovery of that species (see attached Biological Opinion).
6. Increasing high quality grassland and savanna habitat on Refuge land will result in additional nesting habitat for many grassland/savanna-dependent bird species currently experiencing serious population declines. Additional emergent wetlands surrounded by grassy uplands will result in improved nesting and rearing habitat for many waterfowl species that utilize the Refuge.
7. The proposed visitor center will not result in the loss or degradation of any ecologically important or unique habitat or have any negative impacts on visitor experiences (e.g., hunters, wildlife observers).
8. The CCP provides a clear statement of direction for future management of the Refuge.

9. The CCP gives refuge neighbors, visitors and the general public an understanding of the Service's management actions on and around Complex refuges.
10. The CCP ensures that Refuge management actions and programs are consistent with the mandates of the National Wildlife Refuge System.
11. The CCP ensures that Refuge management is consistent with federal, state and county plans.
12. All issues raised were addressed.

Supporting References:

1. Necedah National Wildlife Refuge Final Comprehensive Conservation Plan and Environmental Assessment
2. Statement of Compliance
3. Environmental Action Statement
4. Biological Opinion
5. Land Protection Plan and the Director's concurrence with Boundary Expansion

ACTING

Regional Director
U.S. Fish and Wildlife Service
Region 3, Ft. Snelling, Minnesota

10/26/07
Date

ENVIRONMENTAL ASSESSMENT FOR
IMPLEMENTATION OF COMPREHENSIVE CONSERVATION PLAN
FOR NECEDAH NATIONAL WILDLIFE REFUGE

Abstract: The U.S. Fish and Wildlife Service is proposing to implement a Comprehensive Conservation Plan (CCP) for Necedah National Wildlife Refuge in 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 Refuge for the next 15 years. This management action will be achieved by implementing a detailed set of goals, objectives, and strategies described in a CCP.

Responsible Agency and Official:
Robyn Thorson, Regional Director
U.S. Fish & Wildlife Service
Bishop Henry Whipple Federal Building
1 Federal Drive
Ft. Snelling, MN 55111

Contacts for additional information about this project:

Larry Wargowsky, Refuge Manager
Necedah NWR
W7996 20th Street West
Necedah, WI 54646
608/565-2551

Thomas Larson, Chief, Division of Conservation Planning
U.S. Fish & Wildlife Service
NWRS/Conservation Planning
Bishop Henry Whipple Federal Building
1 Federal Drive
Ft. Snelling, MN 55111
612/713-5430

Environmental Assessment Necedah National Wildlife Refuge

Table of Contents

Chapter 1: Purpose and Need for Action	105
1.1 Purpose	105
1.2 Need	105
1.3 Background Information	106
1.3.1: The U.S. Fish and Wildlife Service	106
1.3.2: Mission of the U.S. Fish and Wildlife Service	106
1.3.3: Goals of the U.S. Fish and Wildlife Service	106
1.3.4: Objectives of the U.S. Fish and Wildlife Service	107
1.3.5: Functions of the U.S. Fish and Wildlife Service	107
1.4 The National Wildlife Refuge System	107
1.4.1: Mission of the National Wildlife Refuge System	108
1.4.2: Goals of the National Wildlife Refuge System	108
1.5 Necedah National Wildlife Refuge	108
1.5.1: Background	108
1.5.2: History of the Refuge	108
1.5.3: Resource Setting	108
1.5.4: Management	110
1.5.5: Refuge Purpose	110
1.5.5.1: Refuge Vision	110
1.5.5.2: Refuge Mission	110
1.5.5.3: Refuge Goals	110
1.5.5.4: Refuge Core Values and Guiding Principles	111
1.5.6: Current Issues and Needs	112
1.5.6.1: Service Trust Resources	112
1.5.6.2: Refuge Visitor Services	113
1.5.6.3: Habitat Management	114
1.5.6.4: The Yellow River Focus Area	115
1.6 Proposed Action	117
1.7 Scoping and Public Involvement	117
1.8 Decision Framework	118
Chapter 2: Description of Alternatives	119
2.1 Elements Common to All Alternatives	119
2.1.1: Archaeological and Cultural Resource Protection	119
2.1.2: Hydrology and Drainage	120
2.1.3: Landowner Rights Adjacent to Refuge Lands	120
2.1.4: Service Land Acquisition Policy	120
2.1.5: Maintenance of Roads and Existing Right-of-Ways	121
2.1.6: Environmental Justice	122
2.1.7: Timber Harvest	122
2.1.8: Fire	123
2.1.8.1: Prescribed Fire	123
2.2 Description of Alternatives	123
2.2.1: Alternative 1 (Status Quo)	123

2.2.2: Service Trust Resources	124
2.2.2.1: Listed Species	124
2.2.3: Visitor Services	126
2.2.4: Habitat Management	126
2.2.5: Yellow River Focus Area	127
2.3 Alternative 2	127
2.3.1: Service Trust Resources	127
2.3.1.1: Listed Species	127
2.3.1.2: Waterfowl and other Migratory Birds	127
2.3.1.3: Native Biological Diversity	128
2.3.2: Visitor Services	128
2.3.3: Habitat Management	128
2.3.4: The Yellow River Focus Area	129
2.4 Alternative 3 (Preferred Alternative)	129
2.4.1: Service Trust Resources	129
2.4.1.1: Listed Species	129
2.4.1.2: Waterfowl and Other Migratory Birds	129
2.4.1.3: Native Biological Diversity	130
2.4.2: Visitor Services	130
2.4.3: Habitat Management	132
2.4.4: Yellow River Focus Area	136
Chapter 3: Affected Environment	140
3.1 History of the Refuge	140
3.2 Description of the Physical Environment	141
3.2.1: Archaeological and Cultural Values	141
3.2.2: Hydrology	142
3.2.3: Physiography	143
3.2.3.1: Historic Situation	144
3.2.3.2: Current Situation	144
3.2.4: The Yellow River Focus Area	146
3.3 Geology	147
3.4 Description of the Biological Environment	147
3.4.1: Listed Species	147
3.4.2: Waterfowl and Other Migratory Birds	150
3.4.3: Native Biological Diversity	150
3.4.4: Species Level Biological Diversity	150
3.4.5: Ecosystem Level Biological Diversity	152
3.4.6: Landscape Level Biological Diversity	152
3.5 Description of the Socioeconomic Environment	152
Chapter 4: Environmental Consequences	155
4.1 General Impact Analysis	155
4.1.1: Unavoidable Adverse Impacts	155
4.1.2: Short-Term Use Versus Long-Term Productivity	155
4.1.3: Irreversible and Irretrievable Commitments of Resources	155
4.2 Cumulative Effects	156
4.2.1: Listed Species	159
4.2.1.1: Bald Eagles	159
4.2.1.2: Timber Wolves	160

4.2.1.3: Karner Blue Butterflies	161
4.2.1.4: Eastern Massasauga Rattlesnake	163
4.2.1.5: Whooping Cranes	164
4.2.2: Maintenance of Roads and Existing Right-Of-Ways	164
4.2.3: Cultural Resources	164
4.2.4: Environmental Justice	165
4.2.5: Climate Change	165
4.3 Impacts Associated with Service Trust Resources	165
4.3.1: Alternative 1 (No Action)	165
4.3.1.1: Listed Species	165
4.3.1.2: Waterfowl and Other Migratory Birds	166
4.3.1.3: Native Biological Diversity	166
4.3.2: Alternative 2	167
4.3.2.1: Listed Species	167
4.3.2.2: Waterfowl and other Migratory Birds	167
4.3.2.3: Native Biological Diversity	168
4.3.3: Alternative 3	168
4.3.3.1: Listed Species	168
4.3.3.2: Waterfowl and Other Migratory Birds	169
4.3.3.3: Native Biological Diversity	169
4.4 Impacts Associated with Visitor Services	170
4.4.1: Alternative 1	170
4.4.2: Alternative 2	170
4.4.3: Alternative 3	171
4.5 Impacts Associated with Habitat Management	172
4.5.1: Alternative 1 (No Action)	172
4.5.1.1: General Considerations	172
4.5.2: Alternative 2	173
4.5.2.1: General Considerations	173
4.5.3: Alternative 3 (Preferred Alternative)	173
4.5.3.1: General Considerations	174
4.6 Impacts Associated with the Yellow River Focus Area	174
4.6.1: Alternative 1 (No Action)	174
4.6.1.1: Habitat Considerations	174
4.6.1.2: Land Acquisition and Property Taxes	175
4.6.2: Alternative 2	175
4.6.2.1: Habitat Considerations	175
4.6.2.2: Land Acquisition and Property Taxes	176
4.6.3: Alternative 3	176
4.6.3.1: Habitat Considerations	176
4.6.3.2: Land Acquisition and Property Taxes	176
Chapter 5: List of Preparers	181
Chapter 6: Consultation and Coordination with the Public	183
Chapter 7: Glossary	188
Chapter 8: References and Selected Readings	193

Figure 1: Necedah National Wildlife Refuge Location	109
Figure 2: Yellow River Focus Area	116
Table 1: Habitat Types on the Refuge by 2019 / Alternative 1, Necedah NWR	127
Table 2: Habitat Types on the Refuge by 2017 / Alternative 2, Necedah NWR	129
Table 3: Habitat Types on the Refuge by 2019 / Alternative 3, Necedah NWR	133
Table 4: U.S. Fish & Wildlife Service Land Acquisition Tools	137
Table 5: Summary and Comparison of Alternatives, Necedah NWR	138
Table 6: Summary of Water Sources and Sinks for Necedah NWR (May 1998 - April 1999)	143
Table 7: Land Cover Types, Necedah NWR	145
Table 8: Land Cover Types Within the Watershed, Necedah NWR	145
Table 9: Land Cover Types in the Yellow River Focus Area	147
Table 10: Karner Blue Butterfly Population Levels, Necedah NWR, 1993-2000	149
Table 11: Rare Plants Found on the Refuge and Within the Yellow River Focus Area	151
Table 12: Habitat Types on the Refuge by 2015, Alternative 1, Necedah NWR	172
Table 13: Habitat Types on the Refuge by 2015, Alternative 2, Necedah NWR	173
Table 14: Habitat Types on the Refuge by 2015, Alternative 3, Necedah NWR	174
Table 15: Summary of Environmental Impacts, Necedah NWR	179
Table 16: Summary of Opportunities for Public Involvement in the CCP Process, Necedah NWR	184

Chapter 1: Purpose and Need for Action

Chapter Highlights:

- A Description of the Purpose and Need for Action
 - A Discussion of Relevant Background Information
 - A Description of the Service's Proposed Action
 - A Description of the Scoping and Public Involvement Process, including Issues
 - An Explanation of the Decision(s) to be Made
 - A Description of Applicable Federal Laws and Executive Orders
-

The purpose of this chapter is to briefly describe the underlying purpose and need to which the U.S. Fish and Wildlife Service (Service) is responding in proposing the proposed action and project alternatives.

1.1 Purpose

The purpose of this Environmental Assessment (EA) is to evaluate and publicly disclose the possible environmental consequences that implementation of the Necedah National Wildlife Refuge Comprehensive Conservation Plan (CCP), including the possible construction of a new visitor center at the Refuge and the acquisition of land from willing sellers in the Yellow River Focus Area, could have on the quality of the physical, biological, and human environment, as required by the National Environmental Policy Act of 1969.

1.2 Need

The need for a CCP for the Refuge was established by the National Wildlife Refuge System Improvement Act (Act) of 1997. The need for an EA for the CCP was established by Service policy guidance in accordance with CEQ regulations. The needs to be met by any long-range plan adopted for the Refuge were identified through internal and external scoping and the public involvement process. They are:

- Service trust resources, namely, the need to perpetuate listed species, waterfowl and other migratory birds, and native biological diversity.
- Refuge visitor services, namely, the need to provide the public quality visitor services at the Refuge, such as hunting, fishing, wildlife observation and wildlife photography, environmental education, and interpretation.

- Habitat management; namely, the need to provide quality habitat within the Refuge and the Yellow River Focus Area for the benefit of listed species, waterfowl and other migratory birds, and native biological diversity.
- The Yellow River Focus Area, namely, the need to conserve the existing quality habitat in the Yellow River Focus Area (Figure 1) for the benefit of listed species, waterfowl and other migratory birds, and native biological diversity.

1.3 Background Information

1.3.1 The U.S. Fish and Wildlife Service

The Service is the principal Federal agency responsible for conserving, protecting and enhancing fish, wildlife, and plants and their habitats for the continuing benefit of the American people. The Service manages the 93-million-acre National Wildlife Refuge System, which includes more than 520 national wildlife refuges and thousands of small wetlands and other special management areas. It also operates 66 national fish hatcheries, 64 fishery resource offices and 78 ecological services field stations. Among its key functions, the Service enforces Federal wildlife laws, protects endangered species, manages migratory birds, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, and helps foreign governments with their international conservation efforts. It also oversees a Federal Aid program that distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

The Service employs approximately 7,500 people in seven geographic regions. Its headquarters are located in Washington D.C. Necedah National Wildlife Refuge is located in the Great Lakes/Big Rivers Region of the Service, which includes the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. The Great Lakes-Big Rivers Region manages over 1.2 million acres of land and water on 46 national wildlife refuges and nine wetland management districts, including more than 240,000 acres in waterfowl production areas. The Region also manages six national fish hatcheries, nine fisheries stations, 10 ecological services field offices, and 18 law enforcement field offices.

1.3.2 Mission of the U.S. Fish and Wildlife Service

The mission of the Service is working with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

1.3.3 Goals of the U.S. Fish and Wildlife Service

- *Sustainability of Fish and Wildlife Populations:* Migratory birds, endangered fish and wildlife species, interjurisdictional fish, and marine mammals are conserved, protected, enhanced, or restored. The Service is participating in conservation of other species when its expertise, facilities, or lands can enhance state, tribal, or local efforts.
- *Habitat Conservation:* An ecologically diverse network of lands and waters, of various ownerships, is conserved to provide habitats for marine mammals and migratory, interjurisdictional, endangered, and other species associated with ecosystems conserved in cooperation with others.
- *Connecting Americans to Wildlife:* The American public understands and participates in the conservation and use of fish and wildlife resources.
- *Workforce Excellence:* The Service's workforce, scientific capability, and business practices – in cooperation with the Department of Interior's scientific expertise – fully support achievement of the Service mission.

1.3.4 Objectives of the U.S. Fish and Wildlife Service

- Assist in the development and application of an environmental stewardship ethic for our society, based on ecological principles, scientific knowledge of fish and wildlife, and a sense of moral responsibility.
- Guide the conservation, development, and management of the nation's fish and wildlife resources.
- Administer a national program to provide the public opportunities to understand, appreciate, and wisely use fish and wildlife resources.

1.3.5 Functions of the U.S. Fish and Wildlife Service

- Acquire, protect, and manage unique ecosystems necessary to sustain fish and wildlife such as migratory birds, resident species, and endangered species.
- Operate a National Fish Hatchery System in support of the restoration of depleted interjurisdictional fish stocks, the recovery of federally listed threatened and endangered species, and the fulfillment of Federal mitigation responsibilities.
- Provide protection of fish and wildlife from dislocation or destruction of their habitats, overuse, and industrial, agricultural, and domestic pollutants.
- Render financial and professional technical assistance to states through Federal Aid programs for the enhancement and restoration of fish and wildlife resources.
- Conduct programs of enforcement, management, and professional technical assistance to other agencies for the protection of endangered species.
- Promulgate and enforce regulations for the protection of migratory birds, marine mammals, fish and other non-endangered wildlife from illegal taking, transportation, or sale within the United States or from foreign countries.
- Conduct programs of planning, evaluation, and professional technical assistance to other agencies for the proper use and protection of fish and wildlife habitat that directly benefit the living natural resource and add quality to human life.
- Conduct programs of interpretation, education, and recreation to foster a stewardship ethic in the American public through quality fish and wildlife oriented experiences.
- Communicate information essential for public awareness and understanding of the importance of fish and wildlife resources and interpret fish and wildlife changes reflecting environmental degradation that ultimately will affect the welfare of human beings.

1.4 The National Wildlife Refuge System

The National Wildlife Refuge System is the world's largest and most diverse collection of lands and waters set aside specifically for wildlife. The Refuge System began in 1903 when President Theodore Roosevelt designated 3-acre Pelican Island, a pelican and heron rookery in Florida, as a national bird sanctuary.

Today, over 500 national wildlife refuges have been established from the Arctic Ocean to the South Pacific, from Maine to the Caribbean. Varying in size from half-acre parcels to thousands of square miles, they encompass more than 92 million acres of the Nation's best wildlife habitats. The vast majority of these lands are in Alaska, with the rest spread across the rest of the United States and several U.S. territories.

1.4.1 Mission of the National Wildlife Refuge System

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

1.4.2 Goals of the National Wildlife Refuge System

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

1.5 Necedah National Wildlife Refuge

1.5.1 Background

The Necedah NWR CCP represents an intensive effort by the Service to identify and evaluate strategic opportunities and issues relative to the Refuge's ability to accomplish its purpose, contribute to the mission of the Service and the National Wildlife Refuge System, and to meet other relevant mandates.

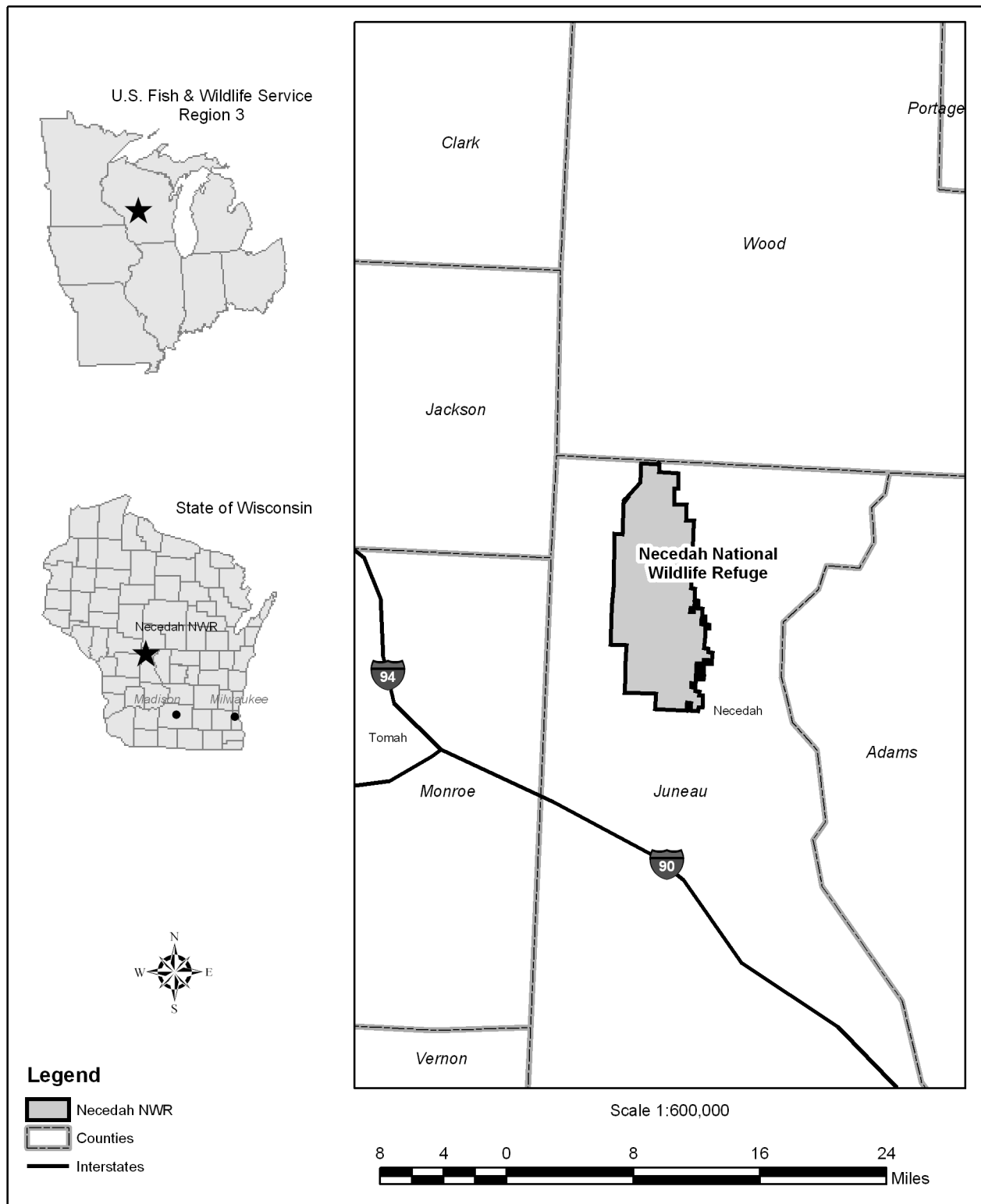
1.5.2 History of the Refuge

The history of the Refuge dates back to the early 1930s when the U.S. Government acquired 114,964 acres of land in Juneau, Wood, Monroe, and Jackson counties, Wisconsin, to assist farmers living within the area and to develop the area for wildlife. The Refuge was established in 1939 as a refuge and breeding ground for migratory birds and for use as an inviolate sanctuary for migratory birds. It is located in central Wisconsin, about 180 miles southeast of Minneapolis, Minnesota, 150 miles northwest of Milwaukee, Wisconsin, and about 4 miles west of Necedah, Wisconsin (Figure 1).

1.5.3 Resource Setting

Situated on the bed of former Glacial Lake Wisconsin and the Great Central Wisconsin Swamp, land in and around the Refuge was once a vast peat bog with some low wooded islands and savannas; the higher sand ridges were occupied by mature stands of pines and other species. Currently the Refuge consists of 43,696 acres of wetlands and open water areas, pine, oak, and aspen forests, grasslands, and rare savannas, all of which support a rich diversity of fish, wildlife, and plant populations. Over 230 different species of birds have been observed on the Refuge since its inception. The Refuge also supports several threatened, endangered, and rare species like the Karner blue butterfly, Blanding's turtle, and the eastern massasauga rattlesnake, as well as resident game species including the white-tailed deer, wild turkey, and ruffed grouse. Over 150,000 people visit the Refuge annually to hunt, fish, hike, observe and photograph wildlife, pick berries, or just relax among the trees, wetlands, and wildlife.

Figure 1: Necedah National Wildlife Refuge Location



1.5.4 Management

Management of the Refuge is carried out by a multi-disciplined team of biologists, technicians, and support staff who are recognized leaders in their fields. Conserving, restoring, and maintaining biologically diverse and productive wetlands, forest land, and open landscapes for listed species, waterfowl and other migratory birds are key indicators of management success. Management tools involve water level manipulation, prescribed burning, timber harvest, land acquisition, and public outreach and environmental education. Scientifically rigorous monitoring and research activities create the foundation from which quality management decisions are made. Cooperative working relationships with universities, other Federal agencies, the State of Wisconsin, elementary and secondary educational institutions, and non-government organizations are key assets to management success.

1.5.5 Refuge Purpose

Pursuant to the Refuge's enabling legislation, the Refuge purpose is "a refuge and breeding ground for migratory birds and other wildlife..." (Executive Order 8065, dated 1939) and "...for use as an inviolate sanctuary, or for any other purpose, for migratory birds" (Migratory Bird Conservation Act of 1929).

1.5.5.1 Refuge Vision

Necedah NWR exemplifies a diverse and productive ecological system of woodlands, savannas, and wetlands managed to perpetuate waterfowl and other migratory birds, listed species, and native biological diversity within Wisconsin's Central Sand Plain Natural Division. Refuge staff are a multi-disciplined team of biologists, technicians, and support staff who are dedicated to providing quality wildlife-dependent public use opportunities to a diverse and supportive public. The Refuge is a model in its commitment to create long-term mutually-beneficial relationships with its stakeholders, and has produced consistent growth in the public's understanding and appreciation of the Refuge, the National Wildlife Refuge System, and Service trust species.

1.5.5.2 Refuge Mission

Our mission is to provide scientific and community leadership and support in the restoration, preservation, and management of waterfowl and other migratory birds, listed species, and native biological diversity within south central Wisconsin, while providing, to the extent possible, quality wildlife-dependent recreational and educational experiences that foster an understanding and appreciation of these resources, and expands the role humankind plays in their stewardship.

1.5.5.3 Refuge Goals

- *Fish and Wildlife Management:* Fish and wildlife populations within the Refuge and the Yellow River Focus Area will be healthy, resilient, and capable of producing a variety of outdoor recreation benefits over the long-term.
- *Habitat Restoration and Management:* Diverse, productive, and self-sustaining wetlands, open landscapes, and forests within the Refuge and the Yellow River Focus Area will provide quality habitat for Service trust resources.
- *Resource Conservation:* Fish, wildlife, cultural, archaeological, water, and visitor resources on Refuge land will be conserved for the enjoyment of future generations.
- *Monitoring and Studies:* Quality scientific research and monitoring will guide Refuge management decision-making.
- *Coordination Activities:* Strong, long-term, mutually-beneficial working relationships with Refuge stakeholders will lead to healthy sustainable fish and wildlife populations within the Refuge and the Yellow River Focus Area.

- *Visitor Services:* Quality wildlife-dependent uses of the Refuge (namely, wildlife observation and wildlife photography, hunting, fishing, environmental education and interpretation) will foster public understanding and appreciation of the Refuge, the National Wildlife Refuge System, and Service trust resources, and will expand the role the public plays in their stewardship.
- *Planning and Administration:* Necedah NWR will be a safe and healthy environment for employees, volunteers and visitors and will be pro-active in addressing a wide-range of conservation opportunities and issues.
- *Work Force:* Technically skilled and diverse employees with high morale and job satisfaction will achieve high levels of stakeholder satisfaction.

1.5.5.4 Refuge Core Values and Guiding Principles

The Refuge holds the core values of quality, credibility, reliability, integrity, and responsiveness as the basis for all Refuge activities. They will be guided by these core values as well as the following guiding principles:

- *An Ecosystem Approach:* The ecosystem approach is a vision of desired future conditions developed in collaboration with a diverse group of stakeholders that integrates ecological, economic, and social factors. It is applied within a geographic framework (usually watershed) and founded primarily on ecological factors.
- *Results through Partnerships:* Partnership initiatives require extensive coordination and communication between Federal agencies; state, tribal, and local governments; and stakeholders and customers. Partnerships promote the pooling of resources and expertise to obtain results more quickly and efficiently. Results also tend to be longer lasting because consensus is built over a wide range of stakeholder interests.
- *Public Involvement:* Refuge management will include a clear, credible, and meaningful role for public input from the full spectrum of social and cultural backgrounds, and will receive full consideration in Refuge decision-making. The Refuge serves local, state, and national constituencies, therefore, public input at each of these levels will be solicited and incorporated into the Refuge's decision making process.
- *Cornerstones of Biology:* The Refuge will conserve existing, relatively intact ecosystems first; for they are the cornerstones for providing biota and other natural materials needed for future restoration.
- *Ecological Integrity:* The Refuge will restore ecological integrity, particularly the structure, composition, and natural processes of native biotic communities and physical environments.
- *Design for Self-Sustainability:* The Refuge will design for self-sustainability of natural systems. The best way to ensure long-term viability of habitat is to minimize the need for continuous maintenance.
- *Within a Watershed Context:* The Refuge will focus within the watershed and/or broader landscape level context and seek to understand its biological potential. A watershed/landscape has the capacity to become only what its physical and biological setting will support. This includes climate, geology, hydrology, and biological characteristics.
- *Address Degradation:* The Refuge will address on-going causes of habitat degradation. Conservation, restoration, and management activities will fail if the sources of degradation persist.
- *Have Clear Goals and Objectives:* The Refuge will have clear, up-to-date goals, objectives, and strategies, and will include a diverse array of expertise and interests in their development.
- *Use Passive Restoration:* The Refuge will use passive restoration and management when appropriate. Where possible, simulate natural hydrological process using low input, low

impact, and sustainable measures which capture the energies of the system to perpetuate the resources in question.

- *Use Reference Sites:* The Refuge will, whenever available, use reference sites when restoring habitat. Reference sites are areas that are comparable in structure and function to the proposed restoration before it was degraded.
- *Adaptive Management Processes:* An adaptive management approach features a structured, iterative process that recognizes that most information used in decision making is incomplete. Adaptive management guides managers in efficiently collecting and using better information, thus enabling appropriate changes in management direction.

1.5.6 Current Issues and Needs

1.5.6.1 Service Trust Resources

Numerous Service trust resources utilize the Refuge and the Yellow River Focus Area for meeting one or more of their life cycle needs, including four Federally listed threatened or endangered species. These include the Karner blue butterfly (federally listed as endangered), Eastern timber wolf (federally listed as endangered), Whooping Crane (federally listed as endangered), and Bald Eagle (federally listed as threatened). The Eastern massasauga rattlesnake, which is currently a candidate for federal listing, is found in low numbers in the Yellow River area. Several state-listed threatened or endangered species also use the Refuge, including the Blanding's turtle, and Trumpeter Swan. The Refuge also supports several rare, threatened, or endangered species of plants, including the spring beauty, oval-leaved milkweed, and wooly milkweed, and provides habitat for several important plants (e.g., wild lupine) that support rare organisms (e.g., Karner blue butterflies). Protecting endangered and threatened species and restoring them to secure status in the wild is a primary responsibility of the Service and the Refuge. Under the Endangered Species Act of 1973, as amended, the Service has primary responsibility to conserve not only jeopardized life, but also the natural resources on which life depends.

In total, more than 230 different species of birds have been observed on the Refuge since its inception. The Refuge has long been considered an important migratory stopover area for waterfowl such as Mallards, Blue-winged Teal, Ring-necks, and Wood Ducks. Other migrant bird species that utilize the Refuge during spring, summer, or fall include: Canada, Snow, and White-fronted Geese; Sandhill Cranes; Woodcock; Snipe; Great Blue Herons; swans; egrets; Dickcissels; warblers; Brown Thrashers; several different species of sparrows; meadowlarks; Sora Rails; Black-crowned Night Herons; Bobolinks; Bitterns; and Red-tailed Hawks; just to name a few. During migrations, three species of geese, 10 species of dabbling ducks, nine species of diving ducks, and Trumpeter and Tundra Swans can be found on the Refuge.

Many bird species are declining across part or all of their breeding range in the Midwest (Peterjohn et al. 1994). Breeding Bird Surveys for the Great Lakes/Big Rivers Region indicate that numerous grassland nesting, non game species in the Midwest have shown extensive declines since the mid-1960's (National Biological Survey 1995). Grassland-dependent birds have shown steeper, more consistent, and geographically more widespread declines (25-65 percent) than any other group of North American birds (Samson and Knopf 1994). Several of these declining species utilize the Refuge and the Yellow River area. These include the Bobolink, Henslow's Sparrow, Grasshopper Sparrow, Vesper Sparrow, Savannah Sparrow, Lark Sparrow, Field Sparrow, Dickcissel, Eastern Meadowlark, and American Bittern. The Grasshopper Sparrow and Dickcissel have declined over 80 percent in Wisconsin since the mid-1960s. Many others, especially those associated with rare oak savannas (e.g., Red-headed Woodpecker; Northern Flicker), have experienced similar, though less dramatic declines.

The Refuge has incomplete inventories for many of its natural, archeological, and cultural resources, including wildlife and habitat. Monitoring systems needed to protect and properly manage Refuge

resources are inadequately funded. Monitoring and evaluation systems need to be developed to measure progress toward habitat goals and objectives.

1.5.6.2 Refuge Visitor Services

The National Wildlife Refuge System Improvement Act of 1997 has ushered in a new era of public involvement on national wildlife refuges. Providing for public uses is now an essential part of Refuge missions across the country. Necedah NWR has always been a popular destination for hunting and fishing enthusiasts. However, in recent years other uses, such as wildlife observation, hiking, environmental education, and interpretation have surpassed traditional activities in terms of public interest.

The Refuge currently has two major needs relative to providing quality services to its visitors. First, the main office (which also serves as the visitor center) is ineffective as an initial visitor contact point due to its isolation, distance from a main road, and small size. The current facility has no formal education features (with the exception of a small conference room) and lacks in interpretive programming displays. In recent years, Refuge programs and activities have attracted over 150 participants at some events. The current facility accommodates a maximum of 30. Programs are held in the office space, reducing productivity of staff who are not directly involved with the event. It also compromises the overall effectiveness of the educational experience, due to the distraction of office business and the lack of student comfort.

Public use of the Refuge now exceeds over 150,000 visits annually. Three state highways border the Refuge: 21, 80 and 173. Wisconsin Department of Transportation numbers from 1995 (the latest information available) shows that over 1,500 vehicles a day use Highway 173; more than 3,200 vehicles a day travel on Highway 21; and over 1,100 use Highway 80 each day. Occupants of these vehicles are all potential visitors to the Refuge. Due to small, inconvenient facilities and poor signage, many of these potential visitors are currently being overlooked.

Further, the Refuge is now the site for an experimental Whooping Crane population, an attraction that will undoubtedly increase visitor use long-term at the Refuge. During the first year of the 10-15 year reintroduction program, the Refuge hosted an event that drew more than 600 visitors. The project frequently drew the attention of the media. This increased use of the Refuge could further disseminate key messages about the Refuge, its resources, and the National Wildlife Refuge System.

The second major need relates to the quality of the existing visitor facilities at the Refuge. There is a need to renovate existing facilities for safety and accessibility, to improve visitor information systems (signs and brochures), and to bring public facilities up to Service standards. To improve customer service, the Refuge needs to collect additional information on Refuge visitor volume, characteristics, opinions, and what their expectations are for the Refuge. Key components to customer service is having suitable facilities (addressed above) and having an eager work force that can provide quality service. Current Refuge staffing patterns do not emphasize the importance of good customer service. A strong volunteer base exists and could easily be used in the contact areas. A volunteer coordinator is vital. Seasonal public use staff could also help meet increased needs during peak times.

Other visitor services concerns learned through scoping is the Refuge are not known and understood within the local area. This was made apparent during the 3-year planning process for the Refuge CCP. Many people living near the Refuge do not distinguish the Service from the Wisconsin DNR, or understand that the Refuge is part of a national system of refuges dedicated to perpetuating our nation's fish and wildlife resources for the enjoyment of present and future generations. The Refuge needs to promote its recreation and educational opportunities, as well as raise awareness of the importance of the Refuge among the various economic and environmental interests that influence public policy and Refuge management direction.

1.5.6.3 Habitat Management

The need for additional wildlife habitat conservation, restoration and management at the Refuge has been made clear by the declining status of numerous grassland, savanna, and wetland-dependent species of birds (see “Service Trust Resources” above) and numerous studies that have demonstrated that habitat loss or degradation is a common causal factor in many of those declines.

Of the estimated 221 million acres of wetland habitat present in the lower 48 states at the time of colonial America, only 103 million acres remain (47 percent). Draining, dredging, filling, leveling, and flooding have reduced wetlands by 50 percent or more in 22 states, and 10 states have lost 70 percent or more (Dahl 1990). Prior to European settlement, Wisconsin had approximately 10 million acres of wetlands. Currently less than 47 percent remain.

In recent years, many plant and animal species associated with Midwestern grasslands have experienced serious declines, primarily due to habitat loss and alteration of natural structure and function (e.g., predation, exotic species, fire suppression, habitat fragmentation, drainage/flooding). The original tallgrass prairie, which extended from western Indiana to the eastern part of Kansas, Nebraska, and North and South Dakota and south to Oklahoma and Texas, has been virtually eliminated throughout its historic range. Recent surveys suggest that 82.6 to 99.9 percent declines in the acreage of tallgrass prairie have occurred in 12 states and one Canadian province since European settlement. The State of Wisconsin has lost over 99 percent of its original prairies. For years following the initial conversion of native Midwestern prairies, many prairie-dependent wildlife remained relatively stable through their ability to colonize agricultural grasslands. However, 20th century agricultural grassland loss has followed a similar path of decline as native prairie loss in the 19th century. In many parts of the Midwest, agricultural grasslands are at their lowest level in more than 100 years.

Similarly, oak savanna, which covered approximately 27-32 million acres of the Midwest prior to European settlement (Nuzzo 1985), has become one of the nation’s most endangered ecosystems (Noss et al. 1995). Nationwide, over 99 percent of our original savanna has been lost, and Midwestern oak savannas are among the rarest ecosystems in the Nation. Historically Wisconsin had roughly 4 million acres of savannas. Today, fewer than 60,000 acres remain, and much of what remains is highly degraded and of limited value for wildlife. Nuzzo (1985) found that by 1985 only 113 sites (2,607 acres) of quality oak savanna remained across the Midwest. Development has destroyed, fragmented, and disrupted the natural processes needed to maintain quality oak savanna ecosystems.

The wide-scale loss of oak savanna and pine barren ecosystems across 12 states and the province of Ontario, Canada, has had severe negative impacts on Karner blue butterflies (Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, 1999). As a result, the KBB was proposed for federal listing on January 21, 1992, and listed as endangered on December 14, 1992. Today scattered populations are only found in portions of New Hampshire, New York, Michigan, Wisconsin, Indiana, and Minnesota. The Refuge is home to the world’s largest remaining population of Karner blue butterflies, providing habitat for 12 population complexes. No critical habitat has been designated for this species. The long-term effect of these landscape-scale losses of important ecosystems has yet to be determined.

The long-term declines in early successional forests across the north-eastern and north-central United States has contributed to the decline of many bird species. Selective harvesting, fire suppression, urban sprawl, and cessation of agricultural abandonment contributed to the present imbalance in distribution of young forests (Oliver and Larson, 1999).

The Refuge is facing increasing threats to its ecological health due to air, water, and noise pollution, exotic species, and incompatible recreational uses. Of late, a new round of change threatens many remaining ecosystems in the Refuge area. A trend called “rurbanization” where rural areas

containing quality wildlife habitat are being converted to a more densely developed state. In recent years, the population of the area surrounding the Refuge has expanded, while the size of the undeveloped land base continues to shrink, leaving many natural areas as scattered fragments of increased importance for scientific study, education, and conservation of natural ecological processes. According to the U.S. Census, the Town of Necedah and the Town of Finley grew by 34 percent and 27 percent respectively between 1990 and 2000. As a result, many of the large natural areas around the Refuge (and in the Yellow River area) are at risk of being fragmented through housing development, driveways, etc., which diminish the value of these areas for area-sensitive wildlife like the Bobolink, Prairie Chicken, and many large mammals. Habitat size, shape, and amount and type of edge are important factors in the reproductive success of many grassland birds. It is this type of development that particularly threatens the remaining oak savanna habitat in this region. Without management, most areas will continue to degrade due to their size, isolation, absence of natural processes such as fire and hydrologic cycle maintenance, and inadequate buffers conserving them from surrounding agricultural and urban land uses. It also places greater demands on the Refuge and its partners in terms of safeguarding Refuge ecosystem structure and function for the benefit of Service trust resources.

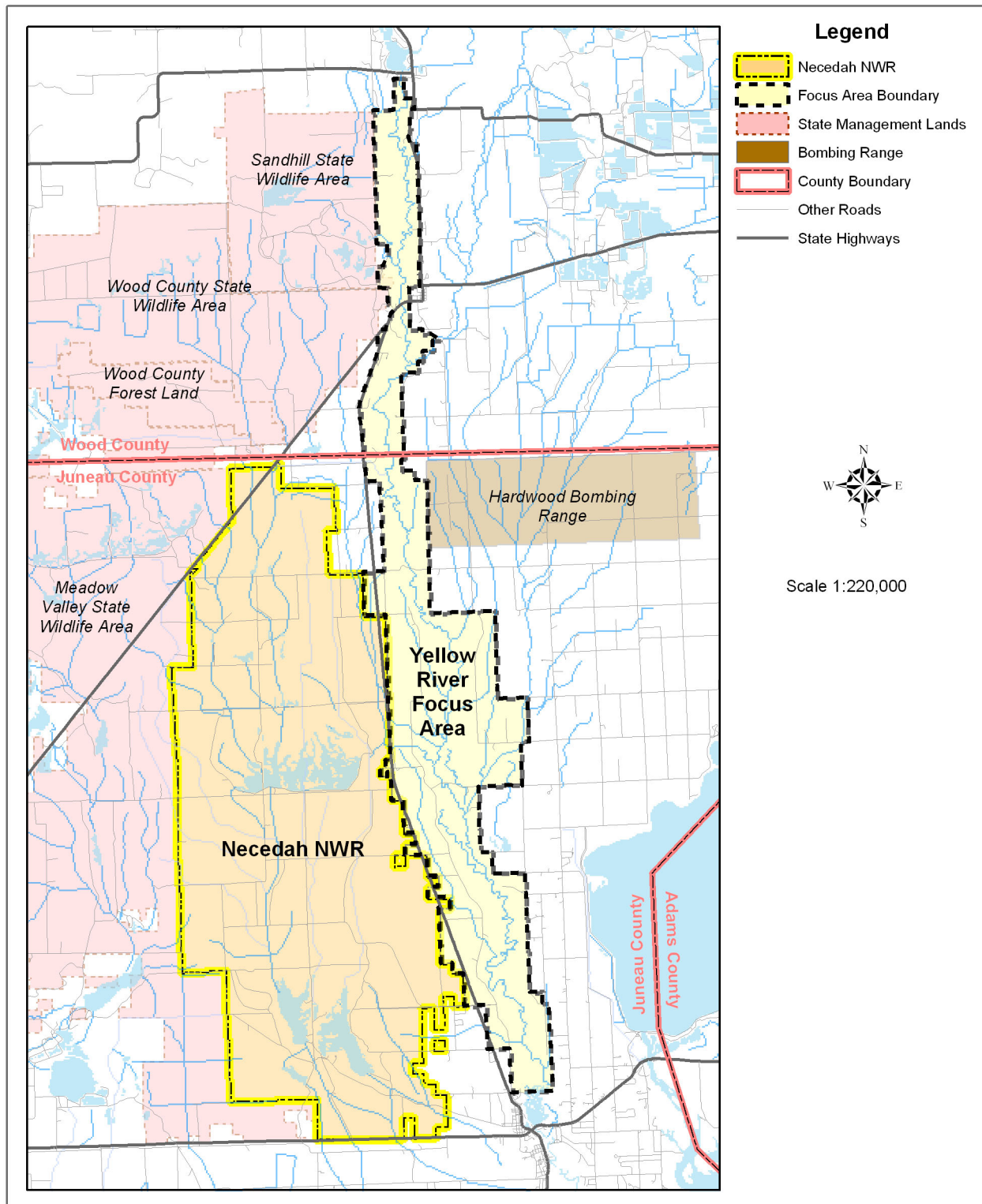
1.5.6.4 The Yellow River Focus Area

The Yellow River Area (Figure 2), which lies east of the Refuge within an area referred to as Wisconsin's Central Sand Plain Natural Division, provides a unique opportunity to conserve rare and declining bottomland forest and adjacent upland habitat for the benefit of listed species, waterfowl and other migratory birds, and native biological diversity. According to Wisconsin's Statewide Natural Area Inventory, extensive field reconnaissance by the Refuge, and other sources, the Yellow River area represents one of the few remaining quality bottomland hardwood forest ecosystems in the Midwest. Silver maple, swamp white oak, green ash, and river birch dominate the floodplain, while the lower sandy ridges, slightly higher than the flood plain, support white oak, bur oak, shagbark hickory, basswood, and white pine. The highest of these areas were once oak and pine savannas, one of North America's most endangered habitats, with only .02 percent of its pre-settlement acreage remaining. The shrub spectrum within the area varies in density from sparse to impenetrable, and includes buttonbush, dogwoods, prickly ash, winterberry, and wild grapes. The herbaceous layer of the forested areas support wood nettle, coneflowers, ferns, and many sedges. Aggressive non-native species are currently not an issue.

Many rare, uncommon, and declining species of animals have been documented in the Yellow River area in recent years. Many of them are sensitive to size, isolation, context, and quality of habitat. These include the Eastern massasauga, Blanding's turtle, Red-shouldered Hawk, Cerulean Warbler, Acadian Flycatcher, Yellow-crowned Night-heron, Prothonotary Warbler, and Louisiana Waterthrush. Several neo-tropical migrants that are suspected of or exhibiting extensive population declines that use the area include the Verry, Wood Thrush, Sedge Wren, Blue-winged Warbler, and Golden-winged Warbler. Waterfowl species include Mallard, Wood Duck, and Hooded Merganser. Bald Eagles use the area year-round and at least one active nest has been documented. Great Blue Heron rookeries are found in the Yellow River area as well as extensive Wood Duck nesting. Federally-endangered Karner blue butterflies are also found on Friendship and Plainfield soils throughout the area. These soil types offer potential for expansion of oak savanna and the restoration of essential Karner blue butterfly habitat.

While rich in biological diversity, the Yellow River area is experiencing human-induced degradation, primarily due to rural development and lack of habitat management, and would benefit from habitat conservation and management practices designed to sustain its ecological value (conservation of habitat through financial incentives to landowners, prescribed fire, mowing, wetland and upland restorations, forest management). Recreational development pressures are high in the area. An expansion of agricultural activities could directly impact Yellow River habitats, and create many indirect impacts due to fragmentation, withdrawal and discharge of surface and ground waters, and construction of needed infrastructure.

Figure 2: Yellow River Focus Area



Many Federal, state, and local conservation organizations support stewardship and conservation of the natural resources in the Yellow River area. Several property owners have indicated an interest in selling their land and/or a conservation easement on their land to the Service. Many landowners within the 21,953-acre Yellow River Focus Area have contacted the Refuge in recent years in search of technical assistance in managing their land for wildlife. In the past 2 years, 121 landowners owning 17,308 acres in the Yellow River Focus Area have received technical assistance from the Service. However, most of the area is in private ownership and unprotected from future development. However, an organized group of Yellow River property owners as well as several local units of government strongly oppose any public acquisition of land in the area (fee title and conservation easements) that would potentially restrict future cranberry bed expansion, residential development, and impact the areas tax base.

1.6 Proposed Action

The Service's proposed action in this EA is to develop and implement a Comprehensive Conservation Plan (CCP) for the Necedah NWR that best achieves the purpose of the Refuge; contributes to the mission of the National Wildlife Refuge System; is consistent with principles of sound fish and wildlife management, available science, legal mandates, and other Service policies, guidelines, and planning documents; and addresses the internal and external needs and issues identified during the scoping and public involvement process.

Future management of the Refuge aims to restore and conserve biological integrity, diversity, and environmental health of the Refuge and the Yellow River Focus Area, a 21,953-acre area located adjacent to the Refuge, for the benefit of listed species, waterfowl and other migratory birds, and native biological diversity. In addition, Refuge staff will be leaders in building mutually-beneficial relationships with the public and their conservation partners, and will facilitate, to the extent possible, quality wildlife-dependent environmental education, interpretation, and recreation experiences that further the public's understanding and appreciation for the Refuge, the National Wildlife Refuge System, and the role humankind plays in their stewardship.

1.7 Scoping and Public Involvement

Scoping is the process of identifying opportunities and issues related to a proposed action. The Service publicly announced it was preparing a CCP for the Refuge in June 1997. Since that time, information about the planning project has been provided to the public through news releases, presentations, interviews, informational letters, and one-on-one briefings. Federal, state, local, and private entities were involved in the scoping process. More than 6,000 people were sent information on the Refuge CCP (e.g., letters, newsletters, draft CCPs), including landowners in the four townships surrounding the Refuge (information was obtained from Juneau and Wood county tax records) and landowners in the Yellow River Focus Area. Others involved were Wisconsin's Congressional Delegation, the U.S. Department of Agriculture, elected officials representing Juneau and Wood counties, the Wisconsin Department of Natural Resources, local governments, representatives of national, state, and local conservation organizations, neighboring landowners, and other interested people. Public input was considered at all phases of the CCP planning process. The Service coordinated its scoping effort closely, and corresponded frequently with many of the aforementioned entities. Since June of 1997, more than 10 public meetings were held to gather public input. In addition, three draft CCPs/EAs were issued to a wide range of interests, including all of the libraries in the counties surrounding the Refuge. The first draft was released in August 1998. The second draft was released in July 2000. A third draft was released in October 2001. Comments received during the scoping and public involvement process covered a wide range of interests.

In response to the Service's proposed action to prepare and implement a CCP for the Refuge and from questions raised in conversations and correspondence with individuals and organizations within and outside the Service, the Service identified several issues that will be analyzed in this EA. They are:

- Service trust resources, namely, what effect will Refuge management actions have on listed species, waterfowl and other migratory birds, and biological diversity (internal issue)?
- Refuge visitor services, namely, what effect will Refuge management actions have on the quality of visitor services provided at the Refuge, namely hunting, fishing, wildlife observation, photography, environmental education, and interpretation (internal/external issue)?
- Habitat management; namely, what effect will Refuge habitat management actions have on the quantity and quality of habitats within the Refuge and the Refuge watershed, namely the wetlands, forests, and open landscapes (internal issue)?
- The Yellow River Focus Area, namely, how will Refuge management actions affect the habitat in the Yellow River Focus Area, and how will those management actions impact private property rights and the areas tax base (external issue)?

1.8 Decision Framework

In compliance with the National Environmental Policy Act of 1969, the Regional Director for the Great Lakes-Big Rivers Region of the Service will use this EA and attached CCP to select one of three alternative actions (Chapter 2) and will also decide whether this action will have environmental impacts requiring that an Environmental Impact Statement be developed or if a Finding of No Significant Impact can be issued.

Chapter 2: Description of Alternatives

-
- A Description of Elements Common to all Alternatives
 - A Description of Alternatives, including the No Action Alternative
 - A Summary and Comparison of Alternatives
-

The purpose of this chapter is to describe two “Action” alternatives and one “No Action” alternative for the proposed action of developing and implementing the Necedah NWR CCP. It should be noted that in describing each alternative, specific attention was paid to the needs and significant issues identified through internal and external scoping.

2.1 Elements Common to All Alternatives

The following considerations apply to all future actions, regardless of the specific goals, objectives, strategies, and projects that will be used in pursuit of the vision for the Refuge.

2.1.1 Archaeological and Cultural Resource Protection

Archaeological and cultural resources are important parts of the nation’s natural heritage. The Service is committed to protecting valuable records of human interactions with each other and the landscape. This is done in conjunction with its more widely recognized mission of protecting fish, wildlife, and plant resources.

To date, archeological investigations have only addressed 2 percent of land within the Refuge. Surveys and other sources have identified 27 prehistoric and historic sites within the Refuge. Prehistoric mounds, including effigy mounds, have been reported near the Refuge, many of them near the Yellow River.

Indian tribes may have interest in the Refuge area in terms of traditional cultural properties and sacred sites, as well as claims to human remains, funerary objects, and other cultural items. Modern tribes with possible prehistoric and historic connections to the Refuge area include the Menominee, the Winnebago or Ho-Chunk, the Potawatomi, the Sauk and Fox, the Kickapoo, the Miami, and Mascouten.

The Refuge Manager will provide a description of projects on the Refuge to the Regional Historic Preservation Officer, who will analyze the undertakings for potential effect on historic properties. The Regional Historic Preservation Officer will enter into consultation with the State Historic Preservation Officer and other parties as appropriate. No undertakings will proceed until the Section

106 process is completed. As such, the Refuge Manager will notify the Regional Historic Preservation Officer early in the planning for all projects or activities potentially affecting archaeological and cultural resources on Refuge land. By 2019, in accordance with the Archaeological Resources Protection Act, the Refuge will protect 100 percent of the known archaeological and cultural resources on the Refuge.

2.1.2 Hydrology and Drainage

It is Service policy not to impede the flow of waters from other lands, even if that flow passes through lands acquired by the Service. The Service will not cause any artificial increase of natural water levels, width, or flow of waters without ensuring that impacts would be limited to those lands in which the Service acquires an appropriate management interest. Site-level studies and detailed planning will be performed prior to the Service undertaking any management activity affecting drainage of private land. If the Service does inadvertently create a water-related problem for any private landowner (flooding, soil saturation, increase in water table height, etc.), the problem will be corrected by the Service at the Service's expense. The Refuge will continue to maintain ditches and water control structures that influence water access and use downstream. The Refuge will also continue to document water rights and use to conserve water resources for the benefit of fish, wildlife, plants and public use of Refuge water-dependent resources.

2.1.3 Landowner Rights Adjacent to Refuge Lands

Service or other agency control of access, land use practices, water management practices, hunting, fishing, and general use next to any tracts owned by the Service is limited only to those lands in which the Service or other entities have acquired that ownership interest (the Service acquires land through purchase, donation, or other means of conveyance). Any landowners adjacent to lands owned by the Service retain all the rights, privileges, and responsibilities of private land ownership.

2.1.4 Service Land Acquisition Policy

The U.S. Fish and Wildlife Service acquires lands and interests in lands consistent with legislation or other Congressional guidelines and Executive Orders, for the conservation of fish and wildlife and to provide wildlife-dependent public use for educational and recreational purposes. The Service policy is to acquire land only when other protective means, such as zoning or regulation, are not appropriate, available, or effective. When the Service acquires land, it acquires fee title (all property rights) only if lesser property interests (such as conservation easements, leases, or cooperative agreements) are not suitable to achieve resource objectives.

It is Service policy to acquire the minimum interest necessary to reach project goals and objectives. Any Service acquisition of lands, regardless of the type (easement or fee-title purchase) will be from willing sellers only. Written offers to willing sellers will be based on a professional appraisal of the property using recent sales of comparable properties in the area. Landowners will in no way be coerced into selling their land or any interest in their land. The Service recognizes that every landowner within or adjacent to an existing or proposed National Wildlife Refuge has the following rights:

- The right to retain all privileges and responsibilities of private ownership.
- The right to sell their land to anyone of their choice.
- The right not to sell their land.
- The right to receive a fair market offer for any property sought for purchase by the U.S. Fish and Wildlife Service.
- The right to control access on their land.

- The right to be heard and to provide input on management plans for neighboring Refuge lands.
- The right to be informed on a regular basis about refuge management activities.

No instances of uneconomic remnants will occur as a result of the Service's land acquisition program under any of the Action alternatives. Section 49 CFR Part 24.102 (k) prohibits the Federal Government from creating uneconomic remnants. If such a remnant were to occur, the Service would offer to purchase the remnant at market value, along with the portion of the property needed for the project. The Service would pay for necessary title evidence, mortgage prepayment penalties, mortgage releases, boundary surveys, recording fees, and similar expenses incidental to the transfer of title. It would not pay for fees charged by an attorney who was hired by the landowner.

The uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act), provides for certain relocation benefits to home owners, businesses, and farm operators who choose to sell and relocate as a result of federal land acquisition. The law provides for benefits to eligible owners and tenants in the following areas:

- Reimbursement of reasonable moving and related expenses;
- Replacement housing payments under certain conditions;
- Relocation assistance services to help locate replacement housing, farm, or business properties;
- Reimbursement of certain necessary and reasonable expenses incurred in selling real property to the government.

The Refuge Revenue Sharing Act of June 15, 1935, as amended, provides for annual payments to counties or the lowest unit of government that collects and distributes taxes based on acreage and value of National Wildlife Refuge lands located within the county. The monies for these payments come from two sources: (1) net receipts from the sale of products from National Wildlife Refuge System lands (oil and gas leases, timber sales, grazing fees, etc.) and (2) annual Congressional appropriations. Annual Congressional appropriations, as authorized by a 1978 amendment, were intended to make up the difference between the net receipts from the Refuge Revenue Sharing Fund and the total amount due to local units of government. Annual payments are calculated based on which of the following formulas as set out in the Act, provides the largest return: (1) \$.75 per acre; (2) 25 percent of the net receipts collected from refuge lands in the county; or (3) three-quarters of 1 percent of the appraised value. In Wisconsin, three-quarters of 1 percent of the appraised value always brings the greatest return to the taxing bodies. Using this method, lands are re-appraised approximately every 5 years to reflect current market values.

2.1.5 Maintenance of Roads and Existing Right-of-Ways

State, county, and townships retain maintenance obligations for roads and their rights-of-way under their jurisdiction within Refuge boundaries. Some township roads may be suited for abandonment (but not necessarily closure) and their maintenance assumed by the Service. Any such abandonments would only be with the consent of the appropriate governing body. Existing rights-of-ways and terms of other easements will continue to be honored. New rights-of-ways and easements will be considered in relation to Refuge System regulations and likely impacts of the rights-of-way or easement to Refuge resources.

The Refuge will cooperate with state, county and township officials in the maintenance of roads that cross the Refuge. Roadside mowing will be completed in accordance with State and local laws.

2.1.6 Environmental Justice

Environmental justice refers to the principle that all citizens and communities are entitled to:

- Equal protection from environmental and occupational health or safety hazards;
- Equal access to natural resources; and
- Equal participation in the environmental and natural resource policy formulation process.

On February 11, 1994, President Clinton issued Executive Order 12898: “Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations.” The purpose of this Order was to focus the attention of federal agencies on human environmental health and to address inequities that may occur in the distribution of costs/benefits, land use patterns, hazardous material transport or facility siting, allocation and consumption of resources, access to information, planning, and decision making, etc.

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. The developing environmental justice strategy of the Service extends this mission by seeking to ensure that all segments of the human population have equal access to America’s fish and wildlife resources, as well as equal access to information that will enable them to participate meaningfully in activities and policy shaping.

Within the spirit and intent of Executive Order 12898, no minority or low income populations would be impacted by any Service action under any alternative.

2.1.7 Timber Harvest

Timber harvest is an important tool used to accomplish Refuge ecological objectives. In recent years, the Refuge has conducted approximately two to four timber sales per year. Sales usually are between 40 and 400 acres. Jack pine, red pine, aspen, and Northern pin oak (Hill’s oak) are the species with the greatest quantities harvested. Under all circumstances, the following guidelines will apply:

- Timber will be cut and removed from the Refuge by private wood contractors.
- Archeological surveys will be done before any timber removal operations take place. The surveys will be funded by the timber sale and reflected in the bid price for the timber. When no other source of funding is available and it is imperative that the timber be cut, the Refuge will support the cost of the survey. Archaeological surveys are required if any part of the timber harvest operation will disrupt the soil to a depth of 6 inches or more. If haul roads and/or yarding areas are to be constructed, an archaeological survey will be required in those areas.
- Refuge roads used for haul routes by contractors will be rehabilitated by grading and 4 inches of gravel, at the completion of the logging operation.
- The method for selecting the contractor for large sales over 500 cords shall be by sealed bid.
- Whenever possible, the establishment of firebreaks will be written in as part of the timber sale.
- All timber sales are designed to accomplish specific habitat objectives. Therefore, the sale price may be significantly lower for Refuge sales than comparative sales on private or other land.
- A timber sale appraisal report will be prepared in triplicate for each sale by Refuge staff for approval by the Refuge Manager. The report will clearly indicate the cutting area, amount of timber to be harvested, and species involved. The method of harvest, harvest objectives as

related to wildlife habitat improvement, stumpage prices, scale provisions, method of payment, and other special requirements will also be included.

- Contractors are generally allowed 1 to 2 years to complete each sale. Most of the harvesting is done during the winter months when the ground is frozen to prevent damage to soil, vegetation, and archaeological resources.
- No harvesting will be allowed in areas where Northern pin oak is present during the months of April through July when trees may be infected with the oak wilt fungus.

2.1.8 Fire

2.1.8.1 Prescribed Fire

Prescribed fire has been a habitat management tool used on the Refuge since 1944. Refuge staff annually burn an average of 2,000 acres of Refuge land to enhance habitat for upland game, waterfowl, and endangered species. The periodic burning of savannas, grasslands, and sedge meadows reduces encroaching vegetation such as oak sprouts and willow. It also encourages the growth of species like blueberry, raspberry, and wild lupine (a plant necessary for the survival of the endangered Karner blue butterfly).

All prescribed burns are carried out by highly trained and qualified personnel who perform the operation under very precise plans. No burning takes place unless it meets the qualifications of the prescription for each unit. A prescription is a set of parameters that define the air temperature, fuel moisture, wind direction and velocity, soil moisture, relative humidity, and several other environmental factors under which a prescribed burn may be ignited. This insures that there is minimal chance the fire will escape the unit boundaries and that the fire will have the desired effect on the plant community.

Prescribed burns will be conducted within or near Refuge development zones, sensitive resources, and boundary area to reduce the risk from wildfire damage. To the greatest extent possible, hazard reduction prescribed fires will only be used when they complement resource management objectives.

Burn frequency will vary from every 3 to 5 years or longer on established oak savanna units dependent on management objectives, historic fire frequency, and funding. As part of the prescribed fire program, a literature search will be conducted to determine the effects of fire on various plant and animal species, and a monitoring program will be instituted to verify that objectives are being achieved.

2.2 Description of Alternatives

2.2.1 Alternative 1 (Status Quo)

Under Alternative 1, management direction at the Refuge relative to the needs and significant issues identified during the scoping and public involvement process (Chapter 1) would proceed in accordance with guidance contained in the 1979 Refuge Master Plan and subsequent step-down management plans (e.g., forest management plan, fire management plan, marsh and water management plan, public use plan, etc.).

2.2.2 Service Trust Resources

2.2.2.1 Listed Species

This alternative would include:

- Establishing and maintaining one large population of Karner blue butterflies on the Refuge as stated in the Karner Blue Butterfly Recovery Plan (in this context “large population” refers to >6,000 second flight adults consisting of 25 sub-populations and dispersed over at least 10 square miles);
- Providing technical assistance and staff support to the Whooping Crane Reintroduction program (an action that is covered by a separate EA prepared by the Service’s Green Bay Ecological Service’s Field Office);
- Protecting and maintaining resident packs of Eastern timber wolves on public lands in central Wisconsin, in accordance with the Eastern Timber Wolf Recovery Plan;
- Protecting Bald Eagles nesting on the Refuge from human disturbance; and
- Continuing international management efforts for the Eastern massasauga rattlesnake, including research, to help preclude the need for federal listing. Refuge staff currently provide landowners in the Yellow River area, Monroe County, LaCrosse, and Buffalo County with Eastern massasauga rattlesnake management support and surveys.

Specific management actions would include:

Karner Blue Butterflies

- Restrict all construction activities in Karner blue butterfly habitat. The only exception to this will be for the graveling or paving of two hiking trails (Cranberry Loop and Lupine Loop).
- All silviculture activities in occupied Karner blue butterfly habitat will be designed to avoid or minimize impacts to the butterflies. Conservation measure will be written into timber sale contracts when necessary to protect Karner blue butterfly habitat from timber operations. Slash and stumps will not be placed in occupied Karner blue butterfly habitat. Skid trails and hauling roads will be designed to avoid or minimize impacts to lupine and Karner blue butterflies.
- Refuge visitors will be advised to avoid disturbing lupine plants in occupied Karner blue butterfly areas.

Whooping Cranes

- Should an experimental population of Whooping Cranes establish themselves on or near the Refuge, manage select Refuge pools and associated habitats to support the population, as directed by the Whooping Crane Recovery Team.
- Where Whooping Cranes exhibit territorial, breeding and/or nesting behavior, maintain or adjust pool levels to create optimum conditions.
- Preclude prescribed burning in or near a unit containing an active Whooping Crane nest site.
- Prohibit human and vehicular traffic in or near Whooping Crane nest sites.
- Implement any additional Whooping Crane guidelines that may be developed for nest protection.

Eastern Timber Wolf

- All new Eastern timber wolf den and rendezvous sites verified by wildlife biologists as well as den and rendezvous sites used within the last 2 years will be protected through

implementation of the “Management Policy for Wolf Den and Rendezvous Sites” (Wydeven and Schultz 1993).

- Preclude land use activities, including timber harvest, within 100 meters of a wolf den at any time of the year.
- Restrict human activity within 100 meters of a den to those activities specifically related to wolf research and which generally are done only when wolves are not active in the area.
- Maintain volunteer tracking efforts of wolves on the Refuge.
- Continue to keep Refuge roads closed to public vehicular traffic and continue berming access roads upon completion of timber sales.
- Continue prohibiting coyote hunting and trapping year-round on the Refuge.
- Collaborate with the Wisconsin DNR on wolf trapping and radio tracking.
- Issue an annual press release prior to gun deer season advising hunters of the coyote hunting closure.

Bald Eagles

- Enforce protective buffer zones around Bald Eagle nests in accordance with the Refuge’s “Water Management Plan” and the “Northern States Bald Eagle Recovery Plan” (USFWS, 1983), including a one-half-mile no fly zone for Air National Guard aircraft.
- Restrict prescribed burning and water level drawdowns within one-quarter mile of Bald Eagle nests.
- Continue monitoring Bald Eagle nesting success on the Refuge throughout the life of the CCP.

Eastern Massasauga Rattlesnake

- If the Eastern massasauga rattlesnake is listed as federally threatened or endangered, the Refuge will cooperate and support the Federal Recovery Team.
- Should the Eastern massasauga rattlesnake occur on the Refuge, the protective measures in “The Eastern Massasauga Rattlesnake: A Handbook for Land Managers 2000” (Johnson et al. 2000) will be implemented.
- Continue to assist landowners in the Yellow River area, Monroe County, LaCrosse, and Buffalo County with Eastern massasauga rattlesnake management support and surveys, in accordance with “The Eastern Massasauga Rattlesnake: A Handbook for Land Managers 2000” (Johnson et al. 2000).

Waterfowl and Other Migratory Birds

Under this alternative the Refuge would:

- Increase the breeding pair population of savanna species of concern (e.g., Red-headed Woodpeckers, Field Sparrow, Northern Flicker) on Refuge land through additional savanna habitat management, in accordance with the North American Waterfowl Management Plan, the Karner Blue Butterfly Recovery Plan, and guidelines developed by Sample and Mossman (1997).
- Increase the breeding pair population of Black Terns on Refuge land to eight nesting pairs through additional wetland management (Region 3 priority species).
- Increase the breeding pair population of Goshawks on Refuge land (Region 3 priority species). In the past, the Refuge has supported one nesting pair of Goshawks in select red and white pine plantations.

Specific management actions are found in the “Habitat Management” section that follows.

Native Biological Diversity

Under this alternative, the Refuge would:

- Manage for increased biological diversity by restoring and managing additional savanna and wetland habitats (per guidance contained in the Refuge's Forest Management Plan and Water Management Step-down Plans).
- Continue to convert non-native habitat to native habitat on the Refuge.
- Actively control invasive and exotic species on Refuge land.
- Continue to restore wetlands, grasslands, savannas, and forest land in the Yellow River Focus Area through the Refuge's Partner's for Fish and Wildlife Program.

2.2.3 Visitor Services

Under this Alternative the Refuge would:

- Maintain its wildlife observation, photography, fishing, education, interpretation, and outreach programs at 1999 levels.
- Maintain small game and deer hunting programs at current levels, until studies are available that show the number of hunters that can safely hunt Refuge land.
- Public use initiatives would focus primarily on updating existing signs, trails, piers and parking areas (per guidance contained in the 1979 Master Plan and public use plan).
- Refuge staff would continue to conduct outreach and environmental education programs consistent with the 1979 public use plan.
- The Refuge would enlarge its headquarters building to accommodate the additional needs of visitors, Refuge staff, and local and regional educators (per guidance contained in the 1979 Refuge master plan and public use plan). Any major construction activities aimed at enlarging the existing Refuge headquarters building would be covered by future National Environmental Policy Act (NEPA) compliance at the time of construction.
- Staffing patterns for this program would remain roughly the same.

2.2.4 Habitat Management

Under this alternative, the Refuge would:

- Maintain the status quo in habitat management on the Refuge with the exception of 2,600 acres of additional savanna, which would be restored by converting an equal amount of Refuge land currently in forest cover per guidance contained in the Refuge's Forest Management Plan which currently serves as a guiding document for savanna restoration on the Refuge (Table 1).
- Restore wetlands on the Refuge and within the Refuge's Private Lands District in partnership with private landowners and other conservation organizations through the Refuge's Partners for Fish and Wildlife Program.
- Continue to provide habitat restoration and management assistance to landowners in the Yellow River Focus Area through the Refuge's Private Lands program.
- Maintain a fire management program that supports habitat objectives and reduces damage associated with wildfires throughout the life of this CCP. Contain 100 percent of wildfires occurring on the Refuge before they cross Highway 80 moving east and Highway 21 moving south.

Table 1: Habitat Types on the Refuge by 2019 / Alternative 1, Necedah NWR

Land Cover Type	2019 Acres	Compared to 2000
Open Landscapes (grasslands and savannas)	6,300	+ 2,600 acres (savanna)
Coniferous Forests	550	- 350 acres
Mixed Deciduous and Coniferous Forests	8,000	- 2,000 acres
Broad-leaf Deciduous Forests	5,350	- 250 acres
Emergent Wetlands and Wet Meadows	10,500	Status Quo
Forested Wetlands	5,700	Status Quo
Lowland Shrubs	5,500	Status Quo
Open Water Areas	1,800	Status Quo

2.2.5 Yellow River Focus Area

Under this alternative, the Refuge would:

- Intensify and concentrate the Refuge's Partner's for Fish and Wildlife private lands program in the Yellow River Focus Area, which would include developing Wildlife Management Agreements (Table 4) with landowners in the area.
- Maintain working relationships with landowners in the Yellow River Focus Area.
- Ensure landowners in the Yellow River Focus Area have viable options for restoring, enhancing, and conserving their land for the benefit of wildlife.
- Develop Memorandums of Understanding with Wood and Juneau counties to enhance communication, coordination, and collaboration in conserving Yellow River land for natural resources.
- Develop a land stewardship and natural history slide presentation for the Yellow River, to raise awareness of its unique ecological value and need for conservation (High Priority).

2.3 Alternative 2

Under Alternative 2, management direction at the Refuge relative to the needs and significant issues identified during the scoping and public involvement process would proceed in accordance with guidance contained in the Refuge's 1979 Master Plan.

2.3.1 Service Trust Resources

2.3.1.1 Listed Species

Under this Alternative the Refuge would continue protecting listed species and their habitat as described above in Alternative 1. However, under this Alternative the Refuge would not establish one large population of Karner blue butterflies on Refuge land through additional savanna habitat management.

2.3.1.2 Waterfowl and other Migratory Birds

Under this alternative the Refuge would:

- Continue its focus on providing migratory habitat for waterfowl and other migratory birds (feeding and resting) as prescribed in the 1979 Master Plan (mainly mid-migration habitat).
- Increase the breeding pair population of Black Terns on Refuge land to eight nesting pairs through additional wetland management (Region 3 priority species); and
- Increase the breeding pair population of Goshawks on Refuge land (Region 3 priority species). In the past, the Refuge has supported one nesting pair of Goshawks in select red and white pine plantations.
- Specific management actions are found in the “Habitat Management” section below.

2.3.1.3 Native Biological Diversity

Under this alternative the Refuge would:

- Continue to convert non-native habitat to native habitat on Refuge land.
- Actively control invasive and exotic species on Refuge land.

2.3.2 Visitor Services

Under this alternative the Refuge would:

- Maintain its wildlife observation, photography, fishing, education, interpretation, and outreach programs at 1999 levels. Small game and deer hunting programs would be maintained until studies are complete that identify the number of hunters that can safely hunt on the Refuge. No new trails, observation towers, fishing piers, or major facilities would be developed.
- Continue to conduct outreach and environmental education programs consistent with guidance contained in the 1979 Master Plan.
- Maintain the Refuge headquarters building as the primary visitor contact station. No additional classrooms, meeting space, or staff facilities would be developed under this Alternative.
- Maintain present staffing patterns.

2.3.3 Habitat Management

Under this alternative the Refuge would:

- Maintain the status quo in habitat restoration and management on Refuge land (Table 2). However, some small wetlands may be restored within the Refuge’s Private Lands District (Figure 12 in the CCP).
- Maintain a fire management program that supports habitat objectives and reduces damage associated with wildfires throughout the life of this CCP. Contain 100 percent of wildfires occurring on the Refuge before they cross Highway 80 moving east and Highway 21 moving south.

Table 2: Habitat Types on the Refuge by 2017 / Alternative 2, Necedah NWR

Land Cover Type	2017 Acres	Compared to 2000
Open Landscapes (grasslands, savanna, shrublands, old fields)	3,700	Status Quo
Coniferous Forests	900	Status Quo
Mixed Deciduous and Coniferous Forests	10,000	Status Quo
Broad-leaf Deciduous Forests	5,600	Status Quo
Emergent Wetlands and Wet Meadows	10,500	Status Quo
Forested Wetlands	5,700	Status Quo
Lowland Shrubs	5,500	Status Quo
Open Water Areas	1,800	Status Quo

2.3.4 The Yellow River Focus Area

Under this alternative, the Refuge would discontinue all of its efforts at conserving, restoring, and managing habitat in the Yellow River Focus Area. No easement or fee-title acquisition of land would occur under this alternative. The Refuge would not intensify and concentrate its Partners for Fish and Wildlife program in the Yellow River Focus Area. The Refuge would not develop any additional Wildlife Management Agreements with landowners in the Yellow River Focus Area.

2.4 Alternative 3 (Preferred Alternative)

Under Alternative 3, future management direction at the Refuge relative to the needs and significant issues identified during the scoping and public involvement process would be guided by the goals, objectives, strategies, and projects described in Chapter 4 of the CCP.

2.4.1 Service Trust Resources

2.4.1.1 Listed Species

This alternative would be the same as Alternative 1 regarding trust resources.

2.4.1.2 Waterfowl and Other Migratory Birds

Under this alternative, the Refuge would:

- Increase the breeding pair population of waterfowl on Refuge land to 700 pairs (e.g., Mallard, Teal, and Pintail) through additional grassland habitat management, in accordance with the North American Waterfowl Management Plan.
- Eliminate Wood Duck houses on Refuge land in favor of natural nesting cavities (the Refuge would maintain existing Wood Duck houses until they become unusable).
- Increase the breeding pair population of grassland species of concern (e.g., Dickcissel, Upland Sandpiper, Grasshopper Sparrow, Bobolink) on Refuge land through additional grassland habitat management, in accordance with the North American Waterfowl Management Plan, the Karner Blue Butterfly Recovery Plan, and guidelines developed by Sample and Mossman (1997).
- Increase the breeding pair population of savanna species of concern (e.g., Red-headed Woodpeckers, Field Sparrow, Northern Flicker) on Refuge land through additional savanna

habitat management, in accordance with the North American Waterfowl Management Plan, the Karner Blue Butterfly Recovery Plan, and guidelines developed by Sample and Mossman (1997).

- Increase the breeding pair population of Black Terns on Refuge land to eight nesting pairs through additional wetland management (Region 3 priority species); and
- Increase the breeding pair population of Goshawks on Refuge land (Region 3 priority species). In the past, the Refuge has supported one nesting pair of Goshawks in select red and white pine plantations.

Specific management actions are found in the “Habitat Management” section that follows.

2.4.1.3 Native Biological Diversity

Under this alternative, the Refuge would:

- Manage for increased biological diversity by restoring and managing additional wetland, grassland, and savanna habitats on the Refuge and within the Yellow River Focus Area, including seasonal wetlands, wet meadows, native prairies, and riparian associations (see Table 3 in the “Habitat Management” section).
- Continue to convert non-native habitat to native habitat on the Refuge.
- Actively control invasive and exotic species on Refuge land.
- Continue to restore wetlands, grasslands, savannas, and forest land in the Yellow River Focus Area through the Refuge’s Partner’s for Fish and Wildlife Program.

2.4.2 Visitor Services

Under this alternative, the Refuge would:

- Expand its wildlife observation, photography, fishing, education, interpretation, and outreach programs by roughly 10-20 percent over 1999 estimates (measured in visitor use-days).
- Small game and deer hunting programs would be maintained at current levels, until studies identify the number of hunters that can safely hunt Refuge land.
- Several notable upgrades to facilities (Figure 3) and services would occur under this alternative to provide for increased use of the Refuge (see Chapter 5 in the CCP for a complete description of projects). These would include:
 - Project 20 – developing an observation tower at Carpenter Field to enhance wildlife viewing opportunities
 - Project 21 – developing and maintaining two additional off-road parking areas on the Refuge.
 - Project 22 – developing a fishing pier at Harvey’s Pond to enhance Refuge fishing opportunities.
 - Project 23 – completing the Ellen Allan Outdoor Learning Center to facilitate on-site outdoor learning opportunities.
 - Project 25 – developing new signage that welcomes and orients visitors to the Necedah Wildlife Management Area.
 - Project 26 – developing 5 additional miles of interpretive trails on the Refuge.
 - Project 27 – designing and erecting new signs on the Refuge, including two interpretive kiosks and site interpretation signage.

- Project 29 – designing and building a new visitor center to serve as a first point of contact for Refuge visitors, office space for Refuge staff, and classrooms and meeting space for educators.

One of the proposed locations for the visitor center is an upland sight north of State Highway 21 and east of Headquarters Road (see Figure 18 in the CCP). The other site under consideration is located approximately 500 yards north-northwest of the existing office complex. This site includes the existing learning center, a converted garage. The current land cover at both sites is unrestored savanna, which would be restored in conjunction with construction of the visitor center. The restoration would benefit Service trust resources such as the Karner blue butterfly and migratory birds that use savannas and grasslands. This EA is intended to serve as the NEPA compliance document for this facility if it is constructed largely as described herein. The proposed center would have the following facilities, rooms, features:

Facility:

- The building would have a footprint of approximately 20,000 square feet, with additional square footage in the basement.
- Single story, above ground, universally accessible.
- Basement with walk-out entrance, universally accessible.
- Stone siding.
- Pond/recycling natural sewage system.
- Geothermal heating and cooling.
- Drilled well.
- Stone/tile flooring.
- Pine paneling harvested from Refuge Civilian Conservation Corps pine plantations.
- Parking area (approximately 35,000 sq. ft.) and would include space for buses, RVs, and vehicles with trailers.

Rooms:

- Reception area with desk.
- Activity area.
- Auditorium with seating for 100-150.
- Conference room which can be divided into two rooms.
- Full kitchen.
- Gift shop.
- Public restrooms (six stalls each).
- Office spaces (four)
- Staff restrooms.
- Staff break room.
- Utility room (basement).
- Storage area (basement).
- Delivery area (basement).

Outdoor Features:

- Hiking and cross-country ski trails.
- Demonstration garden with interpretive signs.

- Landscaping with native flora.
- Bird feeders.
- Outdoor theater
- Picnic area.
- Porch/deck area
- Outdoor seating
- Project 30 – constructing one additional universally accessible fishing pier, hunting blind, and hard surface trail or boardwalk.
- Project 31 – developing universally accessible versions of brochures (braille) and/or videos (close-captioned).
- Project 38 – developing housing to accommodate Refuge volunteers and other stakeholders living outside the commuting area (in this case the Refuge would remodel the Annex building to serve as volunteer housing).

2.4.3 Habitat Management

Under this alternative, the Refuge would:

- Maintain 23,500 acres of wetlands (e.g. emergent and wet meadow, forested, lowland shrub, open water) on Refuge land; maintain 12,500 acres of emergent wetland (e.g., palustrine) and wet meadow habitat (e.g., sedge meadows) on Refuge land to support nesting, resting, and feeding waterfowl (all types), associated bird species of concern (e.g., Black Terns, American Bittern, Henslow's Sparrow, Sedge Wren), and to promote native biological diversity (Table 3).
- Maintain 5,700 acres of forested wetland habitat on Refuge land to support forest-nesting waterfowl (e.g., Wood Ducks) and associated bird species of concern (e.g., American Woodcock, Veery, Northern Flicker) and to promote native biological diversity (Table 3 summarizes all of the habitat changes.)
- Maintain 3,500 acres of lowland shrub habitat on Refuge land to support associated bird species of concern (e.g. Blue-winged Warbler, Golden-winged Warbler, Willow Flycatcher) and to promote native biological diversity.
- Maintain 1,800 acres of open water habitat on Refuge land to support nesting, resting, and feeding waterfowl (all types), other associated bird species of concern (e.g., Common Loon, Black Tern) and to promote native biological diversity.
- Establish and maintain 9,800 acres of open landscape habitat on Refuge land (e.g. grasslands and savannas).
- Establish and maintain 6,200 acres of native grassland habitat on Refuge land (e.g., midgrass and tallgrass prairies characteristic of the central Wisconsin sand plain subsection) to support nesting waterfowl (e.g., Mallard, Teal, Pintail), other associated bird species of concern (e.g., Dickcissel, Upland Sandpipers, Grasshopper Sparrows, Bobolink), and to promote native biological diversity.
- Restore and maintain 3,600 acres of native savanna habitat on Refuge land (e.g., oak savanna) to support Karner blue butterflies, associated bird species of concern (e.g., Red-headed Woodpeckers, Field Sparrows, Flicker), and to promote native biological diversity.
- Maintain 10,400 acres of forest land (e.g., coniferous, mixed deciduous/coniferous, broad-leaf deciduous). Timber harvest will only occur in areas designated open landscape, except in pine plantations or for safety, operations, or fuel reduction purposes.

Table 3: Habitat Types on the Refuge by 2019 / Alternative 3, Necedah NWR

Land Cover Type	2019 Acres	Compared to 2000
Open Landscapes (grasslands and savannas)	9,800	+ 2,600 acres savanna + 3,500 acres grassland
Coniferous Forests	550	- 350 acres
Mixed Deciduous and Coniferous Forests	4,500	- 5,500 acres
Broad-leaf Deciduous Forests	5,350	- 250 acres
Emergent Wetlands and Wet Meadows	12,500	+ 2,000 acres
Forested Wetlands	5,700	Status Quo
Lowland Shrubs	3,500	- 2,000 acres
Open Water Areas	1,800	Status Quo

- Maintain 550 acres of coniferous forest habitat on Refuge land to support associated bird species of concern (e.g., Northern Goshawks,) and to promote native biological diversity.
- Maintain 4,500 acres of mixed deciduous and coniferous forest habitat on Refuge land to support associated bird species of concern (e.g., Pine Warblers, Scarlet Tanager, Whip-poor-will, Black-and-white Warbler) and to promote native biological diversity.
- Maintain 5,350 acres of broad-leaf deciduous forest habitat on Refuge land to support associated bird species of concern (e.g., Yellow-billed Cuckoo, Wood Thrush) and to promote native biological diversity.

The following action items would apply:

Emergent Wetlands/Wet Meadows

- Restore and maintain two additional palustrine emergent wetland complexes (approximately 1,000 acres each) on the Refuge by converting 2,000 acres of lowland shrubs (Low Priority).
- Manage palustrine emergent wetlands for dense annual and perennial vegetation. Burn, mow, and disk as necessary.
- By 2009, sub-divide Sprague-Mather Pool, the largest impoundment on the Refuge, into three units to enhance water management capability to provide moist soil food production and/or invertebrate availability for migrating waterfowl (High Priority).
- Beginning in 2005, provide stable water and emergent vegetation for Black Terns by leaving Pool 19 (east and west), Carter-Woggon Pool, Upper Rice Pool, and Rice Pool at “full pool” (except for maintenance purposes), in accordance with guidelines developed by Naugle et al. 2000.
- By 2005, develop internal guidelines for acceptable amounts of woody vegetation in existing Refuge pools. Control as necessary.
- By 2005, acquire and install staff water gauges in Refuge pools for accurate water level readings (High Priority).
- By 2006, install a shallow well and a solar-powered pump as a supplemental water source for the Ducks Unlimited Wetland Project (High Priority).

Forested Wetlands

- Maintain large blocks of forested wetland habitat with mature trees, sparse understory, and within one-half mile of water. Implement disturbance regimes (e.g., mechanical thinning, burning, mowing) to maintain the desired herbaceous understory (sparse), as necessary (High Priority).

Lowland Shrubs

- Establish and maintain large blocks of lowland shrub habitat with a range of young to mature shrubs and dense understory. Maintain hydrology and active wildfire suppression.

Open Water

- Maintain the current water management regime on Refuge pools, which includes leaving pools flooded at full-pool 2 out of 3 years (to setback woody vegetation).

Grasslands

- Establish and maintain a mosaic of small (40 acres to 1,000 acres) and medium-sized (1,000 to 5,000 acres) native grasslands comprised of short, medium, and tall height-density patches containing diverse structure (e.g., bare soil, stiff-stemmed forbs, sparse woody vegetation) to provide nesting, brood-rearing, and foraging habitat for grassland birds and to enhance biological diversity. The Refuge will focus on creating blocks of grassland habitat that are structurally open and free of major linear woody edges. In most cases, woody cover will represent less than 5 percent of the grasslands habitat.
- Convert 200 acres of existing non-native grasslands to native grasslands for the purpose of enhancing native biological diversity. The Refuge currently has roughly 945 acres of non-native cool season grasses.
- Implement disturbance regimes (e.g., grazing, burning, mowing) on all Refuge grasslands to establish and maintain the desired herbaceous covers (e.g., composition, height/density), as necessary (High Priority).

Savannas

- Restore and maintain an additional 640 acres of oak and pine woodlands and sedge meadow wetlands on the Refuge distributed over at least a 10 square mile area by 2015, in accordance with the Karner Blue Butterfly Recovery Plan.
- Implement disturbance regimes (e.g., mowing, burning) to establish and maintain herbaceous cover, as necessary (High Priority).
- Maintain a mature oak component in savanna restoration units to provide nesting cavities for Red-headed Woodpeckers.
- Enhance and maintain a warm-season grass component in savanna restoration units to provide nesting cover for Field Sparrows.
- By 2013, construct an additional 30 miles of firebreaks around savanna restoration units and along the Refuge's eastern boundary (an area with concentrations of hazardous fuels) to allow for periodic fire (High Priority).
- By 2007, acquire a hydro-axe to maintain open landscape habitats for Karner blue butterflies and other savanna-dependent species (High Priority). Hydro-axe operation in Karner blue butterfly management units will be conducted between August 15 and April 15, and no more than one time per year.

Coniferous Forests

- Maintain select red and white pine plantations as monotypic, even-aged stands to support nesting Goshawks, in accordance with Rosenfield et al. 1998.
- Within designated maintenance areas of the Refuge (Figure 17 in the CCP), employ approved Timber Stand Improvement techniques, such as proper thinning and harvest

schedules, to transition monocultural stands (primarily red and white pine plantations) to mixed composition, uneven-aged stands. Treat stands at least once over the life of this CCP.

- Prepare and advertise for selective timber harvest on 350 acres (over a 15-year period) of Refuge coniferous forest land, in support of the Refuge's savanna and grassland restoration efforts.

Mixed Deciduous/Coniferous Forests

- Maintain large mature stands of oak forest with a white pine component to provide nesting habitat for Scarlet Tanagers and Least Flycatchers.
- Maintain large mature stands of jack pine with an oak component for nesting Pine Warblers, Whip-poor-wills, and Black-and-white Warblers.
- Conserve 640 acres of mesic mixed oak/pine forest with interspersed sedge meadows free from active human manipulation to provide a control area (reference site) where successional changes can be monitored and compared to other managed areas. Wildfires will be suppressed in the area to protect adjacent landowners.

Broad-Leaf Deciduous Forests

- Maintain large mature stands of oak forest with a diverse, dense understory component, to provide nesting habitat for Yellow-billed Cuckoo, Chestnut-sided Warbler, and Wood Thrush.

Fire Program

- Maintain a fire management program that supports habitat objectives and reduces damage associated with wildfires throughout the life of this CCP. Contain 100 percent of wildfires occurring on the Refuge before they cross Highway 80 moving east and Highway 21 moving south.
- By 2007, acquire an additional pump engine to increase the effectiveness of both prescribed burning and fire suppression (Medium Priority).
- By 2007, construct a 40-foot by 70-foot storage building that can be heated to protect fire management vehicles from the weather (Medium Priority).
- Reduce the density of jack pine and remove slash from at least one unit with significant overmature and standing dead timber biannually with emphasis on the Refuge's eastern boundary to aid in fire control. All treated units will be within designated Maintenance Areas of the Refuge (Figure 17 in the CCP).

Pest Management

- By 2005, develop an Integrated Pest Management step-down plan that will reduce populations of exotic and invasive species from current levels, restrict the distribution of pest plants (e.g., Leafy Spurge, Spotted Knapweed, Reed Canary Grass) to their current acreage, and reduce the impact pest plant species have on rare plant communities, throughout the life of this CCP.
- Beginning in 2006, complete a rare plant inventory, and inventory every 5 years thereafter (Medium Priority).

Special Refuge Management Areas

- Restoration and management of the above mentioned habitats will be accomplished through the development of six special management areas on the Refuge. Figure 17 in the CCP represents a blueprint (long-term) for what the Refuge landscape might consist of within these special management areas. Table 6 in the CCP describes how these areas would be managed to achieve the Refuges wildlife, habitat, and people commitments.
- Similarly, Figure 17 in the CCP is a map of the Refuge's desired future habitat management condition (long-term). It combines ecological information (soils data) relative to what the Refuge can naturally support with other factors such as budgets and opportunities and

issues identified by the Refuge and its stakeholders during the CCP scoping process. This information together was used to create a blueprint of what the Refuge landscape might look like in the future. Built into the desired future condition were several key management assumptions (Chapter 3 of the CCP).

2.4.4 Yellow River Focus Area

Under Alternative 3 the Refuge would:

- Pursue long-term conservation and management of land within the Yellow River Focus Area. Over the next 15 years, roughly 3,000 acres of wetlands, uplands, and riparian areas could be conserved by the Service through technical assistance to Yellow River landowners, voluntary partnership agreements, conservation easements and fee acquisition programs (Table 4). The Service would acquire the minimum interest necessary to accomplish natural resource goals and only acquire land from willing sellers (see Table 4). Restoration and conservation would occur at a rate of approximately 250 acres/year assuming the presence of willing sellers and the availability of funds (best guess estimate). The Service would not request land acquisition money for the project until the year 2006.
- Continue developing Wildlife Management Agreements with willing landowners in the Yellow River area.
- Maintain working relationships with landowners in the Yellow River Focus Area.
- Ensure landowners in the Yellow River Focus Area have several viable options for restoring, enhancing, and conserving their land for the benefit of wildlife. As previously mentioned, the Yellow River represents one of Wisconsin's most diverse ecosystems. Therefore, landowners in the area often have several management options. The Service would work with landowners to identify management options and the suite of species that will benefit from each. Property owners with large blocks of closed canopy forest could maintain those large blocks for Cerulean Warblers, Red-shouldered Hawks, etc. The same landowner may also have sedge meadows that they wish to maintain as "open" for Sedge Wrens, Henslow's Sparrows, or Eastern massasaugas. The brush on the same meadows could maintained for Blue-winged Warblers and Golden-winged Warblers and Willow Flycatchers and Alder Flycatchers. Whichever option property owners choose, the Service would assist them in that habitat management and in process to benefit a suite of rare or imperiled species.
- Develop Memorandums of Understanding with Wood and Juneau County to enhance communication, coordination, and collaboration in conserving Yellow River land for natural resources.
- Develop a land stewardship and natural history slide presentation for the Yellow River, to raise awareness of its unique ecological value and need for conservation (High Priority).

Fee-simple acquisition involves acquisition of most or all of the rights to a persons land. There is a total transfer of property with the formal conveyance of a title to the Federal government. While fee acquisition involves most of the rights to a property, certain rights may be withheld or not purchased, such as water rights, mineral rights, and use reservations.

Conservation Easements involve the acquisition of certain rights that can be of value for the purpose of achieving fish and wildlife habitat objectives, usually by prohibiting or encouraging certain practices (right to drain a wetland or delay haying harvest). Easements become part of the title to the property and are usually permanent. If a landowner sells his or her property, the easement continues as part of the title. Based on conversations with landowners in the Yellow River Focus Area, this mechanism offers the most promise relative to landowner participation.

Table 4: U.S. Fish & Wildlife Service Land Acquisition Tools

<i>Fee Title -</i>	The acquisition of all land ownership rights
<i>Conservation Easements -</i>	The acquisition of part of the surface land ownership rights. Such easements are usually perpetual.
<i>Jurisdictional Transfer -</i>	The transfer of surface management from one Federal agency to another.
<i>Cooperative Agreement/Wildlife Management Agreement -</i>	Short term agreements with landowners to accomplish specific management objectives.
<i>Lease -</i>	Short term or long term “rental” of land for management. This usually includes periodic payments to the landowner.
<i>Donation -</i>	Gift of land or interest in land without monetary reimbursement.

Cooperative Agreements/Wildlife Management Agreements are negotiated between the Service and other government agencies, conservation groups, or individuals. An agreement usually specifies a particular management action or activity the landowner will do, or not do, on his or her property. For example, a simple agreement would be for the landowner to agree to delay hayland mowing until after a certain date to allow ground nesting birds to hatch their young. More comprehensive agreements are possible for such things as wetland or upland restoration, or public access. Agreements are strictly voluntary on the part of the landowner and are not legally binding. As long as a landowner abides by the terms of the agreement, this conservation can be effective in meeting certain objectives. Unfortunately, because these agreements are voluntary and can be modified, they do not offer the Service or the American public perpetual conservation.

Lease Agreements are short-term agreements for full or specified use of the land in return for an annual rental payment that generally includes occupancy rights. For example, the Service could lease 40 acres of grassland habitat to provide safe nesting for ground nesting birds. The landowner would not be able to hay or otherwise disturb the ground during the lease period.

Table 5: Summary and Comparison of Alternatives, Necedah NWR

ACTION	ALTERNATIVE 1 (No Action) (Guidance contained in the 1979 Master Plan and associated Step-down Management Plans)	ALTERNATIVE 2 (Guidance contained in the 1979 Master Plan)	ALTERNATIVE 3 (Preferred) (Guidance contained in the Refuge CCP)
1. Service Trust Resources			
<i>Listed Species</i>	Would continue protecting all listed species and their habitats, including restoration and management of their habitats.	Would continue protecting all listed species and their habitats. However, the Refuge would not attempt to establish one large population of Karner blue butterflies on Refuge land through additional savanna habitat management.	Would continue protecting all listed species and their habitats, including restoration and management of their habitats.
<i>Waterfowl and other Migratory Birds</i>	Would not increase waterfowl use and production. Would not increase grassland species of concern. Would increase savanna species of concern through additional savanna management.	Would not increase waterfowl use and production. Would not increase grassland species of concern. Would not increase savanna species of concern through additional savanna management.	Would increase waterfowl use and production through additional habitat management. Would increase grassland species of concern through additional grassland management. Would increase savanna species of concern through additional savanna management.
<i>Biological Diversity</i>	Would manage for increased biological diversity only through savanna restoration efforts on Refuge land and through the Private Lands Program in the Yellow River Focus Area.	Would not manage for increased biological diversity on either Refuge land or land within the Yellow River Focus Area.	Would manage for increased biological diversity on both Refuge land and within the Yellow River Focus Area through additional wetland, grassland, and savanna habitat restoration.
2. Visitor Services			
	Refuge visitor services would remain at 1999 levels. No new trails, observation towers, fishing piers, or major facilities would be developed. Headquarters building would be enlarged to accommodate staff.	Refuge visitor services would remain at 1999 levels. No new trails, observation towers, fishing piers, or major facilities would be developed. Headquarters building would remain the same and would not be enlarged.	Visitor Services would be expanded by roughly 20 percent over 1999 levels. Many upgrades to existing facilities would occur. New headquarters building/ visitor center would be constructed.

Table 5: Summary and Comparison of Alternatives, Necedah NWR (Continued)

ACTION	ALTERNATIVE 1 (No Action) (Guidance contained in the 1979 Master Plan and associated Step-down Management Plans)	ALTERNATIVE 2 (Guidance contained in the 1979 Master Plan)	ALTERNATIVE 3 (Preferred) (Guidance contained in the Refuge CCP)
3. Habitat Management			
	The Refuge would maintain the status quo in habitat management with the exception of 2,600 acres of new savanna. Forest land would be reduced by an equal amount (2,600 acres). No new grasslands or wetlands would be developed for nesting birds.	The Refuge would maintain the status quo in habitat management. No new wetlands, grasslands, or savannas would be restored and managed for nesting birds.	The Refuge would increase open landscape land on the Refuge (grasslands and savannas) by 6,100 acres. Emergent wetlands and wet meadows would increase by 2,000 acres as well. Coniferous, broad-leaf, and mixed forests would decrease by 6,100 acres. Lowland shrubs would decrease by 2,000 acres (this habitat would be converted to emergent wetland/wet meadow habitat through alteration of the hydrology).
4. Yellow River Focus Area			
5. Cultural Resources	The Refuge would continue private lands program in YRFA developing Wildlife Management Agreements with willing landowners; no easements or fee-title purchases of land.	The Refuge would discontinue private lands program in YRFA. No new Wildlife Management Agreements would be developed with willing landowners. No easement or fee-title purchases of land would occur.	The Refuge would purchase conservation easements and fee-title purchases from willing sellers. Wildlife Management Agreements would be developed with willing landowners.
5. Cultural Resources			
	By 2019, in accordance with the Archaeological Resources Protection Act, the Refuge will protect 100 percent of the known archaeological and cultural resources on the Refuge.	By 2019, in accordance with the Archaeological Resources Protection Act, the Refuge will protect 100 percent of the known archaeological and cultural resources on the Refuge.	By 2019, in accordance with the Archaeological Resources Protection Act, the Refuge will protect 100 percent of the known archaeological and cultural resources on the Refuge.
6. Fire Management			
	The Refuge will manage its fire program consistent with guidance contained in section 2.2.4.	The Refuge will manage its fire program consistent with guidance contained in section 2.3.3.	The Refuge will manage its fire program consistent with guidance contained in section 2.4.3.

Chapter 3: Affected Environment

-
- A Description of the History of the Refuge
 - A Description of the Physical Environment
 - A Description of the Biological Environment
 - A Description of the Socioeconomic Environment
-

This chapter describes physical, biological, and socioeconomic environments associated with the Refuge, the Castle Rock Watershed (Refuge Watershed), and the Yellow River Focus Area.

3.1 History of the Refuge

European settlement occurred on the Refuge during the decade of 1850 to 1860. The first of a long history of fires probably occurred during the decade of 1860 to 1870 along with increased settlement and land clearing operations. By the early 1880s lumber operations were in full swing. This was followed in 1893 by a disastrous fire which eliminated most of the remaining tamarack and spruce in the bogs. This fire also burned into the peat, probably for the first time. Following this fire the country became very prairie-like, with a few scattered oak and pine on the “islands.” The two prairie grouse, Sharp-tailed Grouse and Prairie Chickens, became abundant following this fire. Many of the former bog areas developed extensive stands of wire grass which were cut for commercial manufacture of carpets. Fires were common and widespread between 1893 and 1900.

Drainage and settlement proceeded in the decade of 1900-1910. In 1910 a fire burned large acreages of wild lands. Smartweed volunteered abundantly in crop fields and burns. By 1912 it was apparent that certain drainage ditches were inadequate, subjecting some fields to flooding. Drainage continued until about 1920, when the last drainage ditches were dug. Drainage had further reduced the tamarack and spruce areas and wire grass disappeared with elimination of surface water. It was replaced by farm weeds, goldenrod, bluejoint, woolgrass, sedges, willow, and increasing amounts of aspen and birch. Fire was common at this time. In 1920, a widespread fire covered much of the area.

Agriculture depression beginning in 1920, excessive drainage district taxes, and drought resulted in the end of the agriculture period. By 1925, abandonment was common, with only a few farms left. Most of the abandoned land was invaded by aspen, birch, woolgrass, and upland herbs.

In the fall of 1930 the most extensive and severe fire in the history of the area occurred. It burned more than 300,000 acres and consumed huge holes in the peat. Most of the sand islands were denuded of their topsoil, and it almost completely eradicated all indications of previous settlement. Following the fire, some areas came directly into aspen, while others came into agricultural weeds and smartweed.

Abandonment of most of the farms allowed for the creation of the Refuge in 1939. The events leading up to its establishment date back to the early 1930s when the U.S. Government acquired 114,964 acres of land in Juneau, Wood, Monroe, and Jackson counties, Wisconsin, using the authority of the National Industrial Recovery Act of 1933 and the Emergency Relief Appropriation Act of 1935. The purpose for these acquisitions was to assist farmers living within the area and to develop the area for wildlife.

Creation of the Refuge led to wildfire suppression and large scale wetland restoration activities by the Civilian Conservation Corps (CCC). Wetlands created by the CCC were actually not restorations as they created large, open-water impoundments where sedge meadows and tamarack bogs once occurred. Wildfire suppression activities had an equally significant effect as the areas prairie-like appearance began to disappear. Unsuppressed, succession began to create closed-canopy forests where they most likely had not occurred before. As the Refuge's savannas were lost, both Prairie Chickens and Sharp-tailed Grouse disappeared. By 1960, all of the Refuge's open-landscape savannas had been degraded. In that year, the Refuge began savanna restoration activities.

3.2 Description of the Physical Environment

3.2.1 Archaeological and Cultural Values

Archaeological records show evidence of human occupation in Juneau County since the end of the last Ice Age when Paleo Indians hunted large prehistoric animals. Every subsequent cultural period for the past 10,000 years is represented. The land now known as the Refuge was probably used by several cultures since the Ice Age. The peat-covered lowlands around the extensive marsh and shallow river environment contained a wide variety of food resources. Slightly higher ground would have been suitable for resource-extraction activities, but the people likely located their larger camps and villages on elevated land forms not found within the Refuge.

Archaeological investigations have covered 2 percent of the Refuge. The surveys and other sources have identified 27 prehistoric and historic sites. The earliest evidence of people on the Refuge has been dated to the Middle Archaic period of 5,000 to 3,000 years ago. The rest of the identified sites are camps from the Woodland period of 3,000 to 250 years ago, and farmsteads and cemeteries from the period of Western culture settlement and occupation. Prehistoric mounds, including effigy mounds, are reported near the Refuge. An inventory of Yellow River archaeological values and previous archaeological work within the Yellow River Focus Area has not been completed. As of November 1, 1998, the National Register of Historic Places contained seven properties in Juneau County and three properties in adjacent Jackson County. These properties include a bridge, houses, and prehistoric sites, including the Cranberry Creek Archaeological District 3 miles east of the Refuge.

Early 20th century fires burned across the Refuge area, destroying the peat so that now the sandy subsurface is exposed or shallowly covered with silt. The slight elevations that might have been used for resource extraction or temporary camps are virtually indistinguishable. In consultations with the Wisconsin State Historic Preservation Officer, the more efficient method of identifying archaeological sites would be to conduct a geomorphological investigation of the Refuge to determine where land forms exist that could have supported human use. The study conducted at Fort McCoy, Wisconsin, could be a useful prototype.

Indian tribes may have interest in the Refuge area in terms of traditional cultural properties and sacred sites, as well as claims to human remains, funerary objects, and other cultural items. During the early historic period in Wisconsin, Indian tribes were in a great state of flux, many tribes from the east having moved from their ancestral land and pushed the aborigines from Wisconsin to the south and west. Thus, connecting historic period tribes with their prehistoric cultural antecedents in Wisconsin is problematic. People of the Late Woodland Lakes phases may have become the

Menominee tribe. Evidence from archaeological excavations indicates that ancestors of the Winnebago had lived in eastern Wisconsin for hundreds of years; the Oneota of eastern Wisconsin may have been prehistoric Winnebago. In any event, historic records place Winnebago and Potawatomi in the area at the time of Western contact. The Refuge is within the area recognized by the Indian Claims Commission as being part of Menominee and Winnebago aboriginal territory. The Ioway spoke a Siouan language which likely links them to late prehistoric cultures of central and southern Wisconsin. To a limited extent the Illinois were indigenous tribes in southern Wisconsin, probably not as far north as the Refuge. By the 1600s, however, a variety of tribal groups were moving in and out of areas south of the Refuge and may have spent limited periods of time in areas adjacent to and within the vicinity. These tribes included the Sauk, Fox, Potawatomi, Kickapoo, Miami, and Mascouten.

3.2.2 Hydrology

Water plays an important part in the history of the Refuge. The sandy sediments and flat topography of the area are a result of Glacial Lake Wisconsin, a pre-historic lake that developed when a glacier blocked the Wisconsin River near Baraboo, Wisconsin. This extensive lake occupied large parts of Juneau and Adams counties, and parts of Wood, Portage, Waushara, Marquette, Columbia, Sauk, Richland, Vernon, Monroe and Jackson counties. Glacial Lake Wisconsin drained catastrophically about 13,000 years ago when the glaciers retreated.

The Refuge is located in the Upper Mississippi River/Tallgrass Prairie Ecosystem (Ecosystem) which is one of eight hydrologically defined ecosystems that comprise the Great Lakes-Big Rivers Region of the Service. The Ecosystem is a large and ecologically diverse area that encompasses land in the states of Wisconsin, Illinois, Indiana, Iowa, Minnesota, and Missouri. The Mississippi River bisects the Ecosystem east and west. Other major rivers include the Minnesota, Chippewa, Black, Wisconsin, Iowa, Rock, Skunk, Des Moines, and Illinois.

Located in the Castle Rock watershed (8-Digit Hydrologic Unit Code) (see Figure 5 and 6 in the CCP), the Refuge is supported by an important hydrological system comprised of natural and man-made waterways in which materials and energy are transferred. Some, such as the Yellow River and its tributaries, constitute an important ecological component to the Refuge by connecting biologically diverse food webs that provide important habitat features for wildlife. The Refuge, along with a series of other swampy basins such as Meadow Valley Flowage, Beaver Flowage, and numerous managed cranberry bogs, all contribute to the 7,800-square-mile Middle Wisconsin River Basin. The Castle Rock watershed drains 3,259 square miles, contains 27 rivers and streams, and has 3,358 total river miles.

On average, approximately 85 percent of the water entering the Refuge comes directly from precipitation, either as rain or snow (Table 6). Precipitation averages 32.6 inches annually. Streams that flow into the Refuge contribute about 13 percent of the water, while groundwater flow into the Refuge accounts for about 2 percent of the water, due largely to the interception of ground water by the extensive drainage networks surrounding the Refuge. Surface-water inflow to the Refuge includes: Remington Ditch (60 percent), Neal Lateral (15 percent), EBR-Spencer (11 percent), Meadow Valley (6 percent), and un-gauged (8 percent).

Table 6: Summary of Water Sources and Sinks for Necedah NWR (May 1998 - April 1999)¹

Water Sources	Annual Flow (acre-ft.)
Precipitation	118,700
Surface Water Inflow	19,600
Ground Water Inflow	2,300
Total Water In	140,600
Water Sinks	Annual Flow (acre-ft.)
Evapotranspiration Loss	85,400
Surface Water Outflow	51,500
Ground Water Outflow	2,700
Total Water Out	139,600
Change in Storage (water inflow - water outflow)	1,000
Percent of Water Inflow	0.7

1. U.S. Geological Survey Fact Sheet, May 2000

Of the water leaving the Refuge, about 62 percent is lost to evaporation from the pools or transpiration of water vapor back to the atmosphere from plants. Evaporation from open-water surfaces is estimated to be about 28 inches annually, as determined from a regional map of average annual lake evaporation (Kohler and others, 1959). Surface-water outflows from the Refuge, mostly through Rynearson Pools 1 (28 percent) and 2 (59 percent) and Suk-Cerney Pool (10 percent), constitute about 36 percent of the total outflows; groundwater flows out of the Refuge are about 2 percent of the total annual outflows. This small amount of groundwater outflow, along with larger surface water outflows, demonstrates the efficiency of the extensive drainage network within the Refuge boundaries. A natural topographic fall of 50 feet occurs from north to south across the Refuge, or roughly 2-3 feet per mile.

From recent groundwater modeling of the Refuge, annual recharge was estimated to be 9.5 inches. Hence, evapotranspiration was 32.6 inches (precipitation) minus 9.5 inches (groundwater recharge), or 23.1 inches. This value agrees well with the findings of Weeks and Strangland (1971), who reported evapotranspiration values for nearby agricultural areas ranging from 15 to 20 inches per year, with higher rates expected in areas containing water-tolerant vegetation. Groundwater moves through the Refuge in a northwest to southeast direction traveling toward the Yellow River and Wisconsin River. Groundwater varies from 0 to 20 feet and is typically high in iron, with a pH of approximately 6.0, which is slightly acidic. Total dissolved solids and hardness are low. Groundwater recharge occurs primarily from percolation of precipitation through the loamy sands.

Water control structures within the Refuge regulate drainage. Water contained within certain Refuge pools provide and impact water manipulation capability on other pools. Water is generally stored in Refuge pools during spring runoff and is used to refill pools that are drained and re-flooded during the course of the summer.

3.2.3 Physiography

The Refuge is located in the central plain province of Wisconsin within an area known as the Great Central Wisconsin Swamp, an extensive alluvial lake plain extending over 2,000 square miles. As stated previously, the Refuge is located in the Upper Mississippi River/Tallgrass Prairie Ecosystem (Service definition). Bailey's Ecological Unit Classification System (Keys et al., 1995) defines this ecosystem as laurentian mixed forest, eastern broadleaf forest, lower Mississippi riverine forest, and prairie parkland. The Refuge is located in the eastern broadleaf forest province within the central Wisconsin sand plain subsection.

3.2.3.1 Historic Situation

Historically, land in and around the Refuge was once a vast peat bog with some low wooded islands and savannas. The higher sand ridges were occupied by mature stands of pines and other species (see Figure 8 in the CCP). The original land surveys of the area were conducted in 1853. While conducting the surveys, the surveyors recorded the soil quality, relief, and dominant timber types of the area. At nearly every survey point on the Refuge the land was described as “surface level, wet, and mostly swampy” with fairly open stands of “small, scattered “bastard pine” (jack pine) and tamarack.” Notable exceptions to this were the sand ridges that cross the area. On these ridges the surveyors described the area as surface rolling with low ridges. The vegetation on these ridges was described as “scattered jack pine and black oak” (presumably Hill's oak). On occasion, white pine, red pine, birch, and aspen were mentioned at some survey points, but in limited numbers.

From this information it appears that the original landscape of the former lake bed of Glacial Lake Wisconsin, which the Refuge is part of, was wet and swampy and was dominated by jack pine and tamarack. This would be consistent with the name early pioneers gave to the area: “Great Central Wisconsin Swamp.” Sand ridges provided diversity to this monotypic, wet landscape. On these ridges grew scattered patches of jack pine and Hill's oak. It is difficult to say exactly what habitat types were represented on these sandy areas. Based on the number of sessile savanna species that are found in the area today, these areas were most likely dominated by savanna habitat.

3.2.3.2 Current Situation

As of 1994, the Refuge consists of roughly 43,700 acres of pine, oak, and aspen forests, grasslands and savannas, and wetlands and open water areas, all of which support a rich diversity of fish and wildlife. Table 7 is a summary of land cover types on the Refuge. Table 8 is a summary of land cover types found in the Refuge watershed (for comparison purposes).

Refuge forest communities (upland) include northern mesic forest (white and red pine, bigtooth aspen, trembling aspen, red maple) and mixed wet-mesic forest (jack pine, northern pin oak, red maple, trembling aspen, paper birch). Refuge forests provide excellent habitat for many neo-tropical migratory birds such as the Scarlet Tanager, Eastern Wood-pewee, and Ovenbird. Currently upland forests on the Refuge comprise roughly 16,500 acres.

Refuge grasslands, savannas, fallow fields, and shrublands comprise open landscapes on the Refuge. Refuge grasslands include prairies, fallow fields, and meadows. Tree cover on the grasslands ranges from little to none. Plant cover is a mixture of sedges, grasses, and forbs that attract nesting Bobolinks, Vesper Sparrows, Grasshopper Sparrows, and Upland Sandpipers. Some common grassland species on the Refuge include big bluestem, little bluestem, Kentucky bluegrass, and a wide variety of other grasses, sedges and forbs. Blackberry and spirea are scattered in grassland areas as well. Willow-dogwood communities are invading old farm fields and wet meadows in places where disturbance is rare. Refuge grasslands provide important nesting habitat for many migratory birds including ducks, geese, and Sandhill Cranes, and also serve as grazing sites for white-tailed deer.

Refuge savannas include northern pin oak, jack pine, warm season grasses, upland sedges, blueberry, goldenrod, and wild lupine. These savanna areas are also known as barrens because fire and tree diseases such as oak wilt are more common in the droughty, sandy soils. These disturbances keep the trees small and scattered. Oak savanna has been defined as having at least one tree per acre, but less than 50 percent cover. Wisconsin historically had over 4 million acres of barren habitat covering 12 percent of the state. Today less than 14 percent remains. Refuge savannas support Eastern massasauga rattlesnakes, phlox moths, Blandings turtles, Karner blue butterflies, and over 110 species of birds. Currently, open landscape lands on the Refuge comprise roughly 3,700 acres.

Refuge wetlands include forested, non-forested, and open water wetlands. The majority of these occur within pools, streams, and ditches. Wetland plant species include pondweeds, spike rushes, elodea,

Table 7: Land Cover Types, Necedah NWR¹

Land Cover Type	Acres
Open Landscapes (grasslands, savanna, shrublands, old fields)	3,700
Coniferous Forests	900
Mixed Deciduous and Coniferous Forests	10,000
Broad-leaf Deciduous Forests	5,600
Emergent Wetlands and Wet Meadows	10,500
Forested Wetlands	5,700
Lowland Shrubs	5,500
Open Water Areas	1,800
<i>Total</i>	43,700

1.Data source: WISCLAND (1994)

Table 8: Land Cover Types Within the Watershed, Necedah NWR¹

Land Cover Type	Acres
Urban Areas	26,565
Agricultural Land	510,395
Open Landscapes (grasslands, savanna, shrublands, old fields)	327,305
Coniferous Forests	118,188
Mixed Deciduous and Coniferous Forests	163,507
Broad-leaf Deciduous Forests	431,145
Emergent Wetlands and Wet Meadows	128,974
Forested Wetlands	176,491
Lowland Shrubs	108,187
Open Water Areas	79,426
<i>Total</i>	2,070,183

1.Data source: WISCLAND (1994)

coontail, milfoils, and duckweeds. Some Refuge pools are drawn down for part of the year to promote the production of high energy waterfowl foods such as millet, smartweed, chufa, beggar ticks, pigweed, sedges, and spikerush. Ditches and streams also provide additional wetland habitat, although to a lesser extent than Refuge pools.

Wet meadows and marsh edges consist of bur-reed, smartweeds, beggar's ticks, bulrushes, blue-joint grass, and reed canary grass. Open sedge meadows comprise mixed sedges with invading jack pine, willow, and hardhack. Sedge meadows on the Refuge are home to northern harriers, sedge wrens, and sora rails.

Bottomland forested areas include jack pine, silver and red maple, green ash, northern pin and swamp white oak, river birch, and trembling aspen. Tamarack was historically present in these areas. Currently non-forested, forested, and open water wetlands comprise roughly 23,500 acres.

3.2.4 The Yellow River Focus Area

The Yellow River is a 99-mile warm water stream that originates in Clark County, Wisconsin, and flows through Wood and Juneau counties before emptying into the Castle Rock Flowage. The Wisconsin Department of Natural Resources (DNR) selected the upper Yellow River as a Priority Watershed in 1990. The Refuge and the DNR proposed a collaborative effort to conserve the Yellow River in 1994, with the DNR conserving the upper Yellow River and reaches below the Necedah dam.

The Yellow River drains a portion of extinct Glacial Lake Wisconsin, which covered much of Central Wisconsin 10,000-12,000 years ago from approximately the current Black River on the west and the current channel of the Wisconsin River on the east. The Yellow River watershed is characterized by near level terrain and sandy soils, as is much of the Central Sands Ecological Landscape. This landscape historically was characterized by pine and oak barrens, wetlands, and dry to dry-mesic oak and pine forests. Currently the Yellow River is a meandering, low-gradient stream with many oxbow lakes, cut-off and running sloughs, and small ponds in the floodplain. The predominant plant community is floodplain forest (silver maple, green ash, swamp white oak, and river birch). Low sandy ridges support white oak, bur oak, shagbark hickory, black cherry, and white pine. Above all, the Yellow River boasts a rich and bountiful bottomland hardwood forest that has retained much of its wild character.

Many rare, uncommon, and declining animal species have been found in the Yellow River area in recent years. Many of these are sensitive to size, isolation, and quality of habitat. Species of Federal concern include the Eastern massasauga rattlesnake, Blanding's turtle, and Cerulean Warbler. The Red-shouldered Hawk, Acadian Flycatcher, Yellow-crowned Night Heron, Sedge Wren, Prothonotary Warbler, and Louisiana Waterthrush, each which falls within various state categories of concern, are found there also. An active Great Blue Heron rookery has been present since 1991. Other bird species present during the breeding season include several neotropical migrants which have shown significant population declines. These include the Veery, Wood Thrush, and Golden-winged Warbler. Waterfowl include the Mallard, Wood Duck, and Hooded Merganser. Woodcock, Wild Turkey, Ruffed Grouse, white-tailed deer, fox squirrel, and grey squirrel are common throughout much of the area.

Currently there are at least six Karner blue butterfly sites in the Yellow River Focus Area. Friendship and Plainfield sands soils, which support necessary habitat for the endangered Karner blue butterfly are found throughout the area. Those soil types offer potential restoration of oak savanna, habitat important to the butterfly. Table 9 is a summary of land cover types found in the Yellow River Focus Area.

Table 9: Land Cover Types in the Yellow River Focus Area¹

Land Cover Type	Acres
Open Landscapes (grasslands, savanna, shrublands, old fields)	2,593
Coniferous Forests	483
Mixed Deciduous and Coniferous Forests	1,329
Broad-leaf Deciduous Forests	3,909
Emergent Wetlands and Wet Meadows	1,847
Forested Wetlands	10,259
Lowland Shrubs	1,485
Open Water Areas	45
<i>Total</i>	21,953

1.Data Source: WISCLAND (1994)

3.3 Geology

The Refuge lies along the northeastern edge the Wisconsin Driftless Area. The topography of the Refuge is therefore not the result of glaciation, but of erosion and the inundation by Glacial Lake Wisconsin. The topography of the area is extremely flat with a few interspersed sandstone buttes and mesas which are outstanding landmarks in contrast to the general flatness of the terrain. The Refuge is underlain by a Precambrian Crystalline bedrock complex, the surface of which varies in elevation from approximately 860 Mean Sea Level at the north end of the Refuge to approximately 760 M.S.L. at the south end. The Precambrian bedrock is overlain by an estimated 30 to 100 feet stratum of late Cambrian sandstone.

Soils on and around the Refuge represent three major soil associations consistent with central Wisconsin landscapes: Aus Gres loamy sands and Morocco silt loams, Plainfield and Nekoosa loamy sands, and muck and peat soils (see Figure 10 in the CCP). The dominant soil association is the Plainfield and Nekoosa loamy sands. Newson and Dawson peat soils are found in the impoundments, along drainage ditches, and in marshes. These soils are usually inundated and consist of partially decayed organic matter and mineral soils.

3.4 Description of the Biological Environment

3.4.1 Listed Species

As stated in Chapter 2, Federally listed threatened or endangered species that use the Refuge and the adjacent Yellow River Area include the Bald Eagle, Eastern timber wolf, and Karner blue butterfly. The Yellow River Focus Area also supports the Eastern massasauga rattlesnake, which is a candidate for federal listing.

State-listed threatened or endangered species that use the Refuge include the Bald Eagle, Red-shouldered Hawk, Blanding's turtle, Eastern massasauga rattlesnake, and Trumpeter Swan. The Refuge also supports several state-listed species of plants. These include the prairie fameflower, small skullcap, oval-leaved milkweed, and wooly milkweed.

Bald Eagle

The Bald Eagle, America's national symbol, experienced a drastic decline throughout the country from the 1950s into the early 1970s. This decline was caused by the bio-accumulation of organochlorine pesticides (DDT and dieldrin) in fish and habitat destruction. The use of pesticides which contained DDT or dieldrin were banned in 1972, and shortly there after the number of successful eagle nests increased steadily. Bald Eagles were listed as an endangered species in 1976. Due to successful conservation efforts, the Bald Eagle was recently upgrade to a threatened species. One occupied eagle nest currently occurs at the Refuge.

Eastern Timber Wolf

Eastern timber wolves lived throughout Wisconsin prior to the 1830s. As settlers transformed native habitat into farmland, prey species declined and wolves began feeding on livestock. In 1865, the Wisconsin Legislature paid a \$5.00 state bounty for every wolf killed. The wolf bounty was later increased to \$20.00 for adults and \$10.00 for pups to protect the dwindling deer herd. By 1960, few wolves remained throughout the lower 48 states and were declared extirpated from the State of Wisconsin.

In 1973, the wolf was listed as a federal endangered species and as a state endangered species in the State of Wisconsin. Between 1979-1986, studies showed that four to six wolf packs (15-25 animals) roamed two areas of northern Wisconsin. Since this period, wolf packs continue to increase throughout Wisconsin. Currently there are at least 66 confirmed wolf packs (248-259 animals) in northwestern and central Wisconsin and 11 established wolf packs in the central Wisconsin forest complex (Wydeven et al. 2000). Territories of four packs, Suk Cearney, Yellow River, Dead Creek, and South Bluff, may extend onto the Refuge. The Suk Cearney pack's territory appears to be concentrated on the southern end of the Refuge. This pack has numbered as many as seven individuals at one time. Based on winter wolf track surveys, there may be two dens and/or rendezvous sites on the Refuge, although howling surveys have not detected wolf pups as of yet. For the most recent map of wolf pack distribution in Wisconsin, see the Wisconsin Department of Natural Resources website at: http://www.dnr.state.wi.us/org/land/er/publications/wolf_progress_reports/00wolfprogress/map99-00.gif.

Karner Blue Butterfly

Karner blue butterflies have undoubtedly been long time residence of the Refuge property. As previously mentioned, savanna habitat was present on Refuge land at the time of the original land surveys. Karner blue butterflies most likely occurred on these savannas. However, definitive proof is lacking. The butterflies undoubtedly benefitted from the drainage and expanded burning that occurred at the beginning of the 20th century. Presently, Karner blue butterflies are known to occur in 12 population complexes within the Refuge (see Table 10), which constitutes the world's largest remaining population of Karner blue butterflies. The butterfly was listed as an endangered species in 1993.

Eastern Massasauga Rattlesnake

Eastern massasauga rattlesnakes have already disappeared from most of Wisconsin. Once widespread and plentiful in southern and western Wisconsin, the Eastern massasauga has been reduced to just five populations in the state. One of those populations is located next to the Refuge in the Yellow River. The Yellow River was long considered Wisconsin's best massasauga population in terms of the species abundance. Evidence of this is found in bounty records indicating that bounty was paid on over 4,000 massasaugas between 1952 and 1972.

The Yellow River population produced 25 Eastern massasauga rattlesnakes in the 1990s. Nineteen of these snakes were neonates from two different clutches. Of the six adults, three were located during routine surveys and three were road-killed animals. No new snakes have been located in the Yellow River since 1995, despite intensive survey effort by the Refuge and Wisconsin Department of Natural Resources. The Eastern massasauga was listed as a state endangered species in 1975.

Table 10: Karner Blue Butterfly Population Levels, Necedah NWR, 1993-2000¹

Complex Name	Size acres	Ref. #	Year							
			1993	1994	1995	1996	1997	1998	1999	2000
South Ryneearson	19.5	1	685	682	353	1,361	1,482	155	345	719
North Ryneearson	14.3	5	211	314	838	521	179	0	0	146
Old Barrens	15.3	6	N/A	299	624	519	84	26	104	0
Goose Pool	27.4	9	160	215	501	865	282	1,249	3,861	1,952
East Sprague	27.9	10	278	536	1,263	3,896	993	669	844	955
East Ryneearson	47.4	2	359	199	105	157	131	310	115	35
Cranberry Loop	28.9	4	N/A	N/A	N/A	N/A	N/A	N/A	298	153
Research/ Natural Area	13.6	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
Clauson Burn	5.3	12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
Pool 19	35.8	11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	660
Middle Refuge	21.5	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	171

1. All population estimates are derived from Pollard-Yates surveys. The software "Distance" was then used to convert survey results to population estimates.

The Refuge is currently working with landowners on the Yellow River to conserve massasaugas through habitat improvements. Similar efforts are under way with landowners around three other massasauga populations. These populations are in LaCrosse, Monroe, and Buffalo counties. The Refuge is developing Candidate Conservation Agreements with landowners on all of these areas.

Whooping Crane

Whooping Crane chicks were introduced at the Refuge in the summer of 2001 as part of a Whooping Crane reintroduction project to establish a migratory population in the eastern U.S. to contribute toward recovery of the species. The population has been designated as a non-essential population (NEP) in a rule making action finalized on June 26, 2001. The crane chicks were rearing in a pen situation and trained to follow ultralight aircraft in migration to a selected wintering site at Chassahowitzka National Wildlife Refuge. Yearling cranes returned to the Refuge in the spring of 2002. Annual Whooping Crane introduction, rearing, and release activities are expected to continue for a period of 10 years.

Rare Plants

There may be rare species of plants that have not been identified on the Refuge, particularly those that may be living in remote locations. While several studies have been done on plant abundance and distribution, a comprehensive inventory of Refuge plants is needed. The Refuge and the Yellow River area have populations of several rare and declining plant species (or provide habitat that would support these species) that are described in Table 11.

3.4.2 Waterfowl and Other Migratory Birds

For centuries, birds have descended upon the Refuge area during their annual migrations between Central and South America and their northern U.S., Canadian, and Arctic breeding grounds. In total, more than 230 different species of birds have been observed on the Refuge since its inception. The Refuge has long been considered an important migratory stopover area for Mallards, Blue-winged Teal, Ring-necks, and Wood Ducks. Other migrant species that utilize the Refuge during spring, summer, or fall include: Canada, Snow, and White-fronted Geese; Sandhill Cranes; Woodcock; Snipe; Great Blue Herons; swans; egrets; Dickcissels; warblers; Brown Thrashers; several different species of sparrows; meadowlarks; Sora Rails; Black-crowned Night Herons; Bobolinks; bitterns; Red-headed Woodpeckers; and Red-tailed Hawks; just to name a few. During migrations, three species of geese, 10 species of dabbling ducks, nine species of diving ducks, and Trumpeter and Tundra Swans are commonly found in significant numbers on the Refuge. Waterfowl are most abundant in the fall, with fall counts of ducks averaging around 20,000. Resident bird species include Wild Turkeys, Ruffed Grouse, Sharp-tailed Grouse, Woodpeckers, and Nuthatches.

In 1999, the Great Lakes-Big Rivers Region of the Service initiated a process to identify its top species priorities in terms of those in need of the greatest conservation attention in the Region. Appendix I includes a list of regional priority species that occur on the Refuge and/or the Yellow River Focus Area. In addition, the Refuge and the adjacent Yellow River area contain habitat that supports or historically supported several species of birds on the Service's List of Migratory Nongame Birds of Management Concern. Appendix I contains those species as well.

3.4.3 Native Biological Diversity

The Keystone Center, 1991, defines biological diversity as the variety of life and its processes including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. Biological diversity can be considered at a minimum of four levels: *genetic level*, *species level*, *ecosystem level*, and *landscape level*. In order to manage the biological resources at the Refuge, it is necessary for the Refuge to work at the species, ecosystem, and landscape levels. Species are how we typically measure biological diversity and they historically represent the principal focus of wildlife managers.

3.4.4 Species Level Biological Diversity

The Refuge supports an assortment of mammals that contribute to the ecological, economic, and aesthetic value of central Wisconsin. Within the past 3 years, timber wolves are thought to have established two packs on Refuge land. Timber wolves are a top predator that play an important ecological role, as well as provide educational opportunities for Refuge visitors. Black bear and bobcat are also present in low numbers.

White-tailed deer are very abundant and can be seen on the Refuge almost anywhere, and at anytime. Cottontail rabbits; snowshoe hare; gray, red, fox and flying squirrels; woodchucks; raccoon; skunks; red and gray fox; coyotes; muskrat; mink; otter; opossum; weasels; and badger are mid-sized mammals that serve as both predators and prey in Refuge plant and animal communities. Small mammalian residents include meadow voles, white-footed and deer mice, shrews, and moles. These small animals are a primary food source for many larger animals.

Reptiles and amphibians are important Refuge residents. Snake species include hog-nosed snakes, eastern garter snakes, smooth green snakes, northern water snakes, fox snakes, and eastern massasauga rattlesnakes. Five-lined skinks are a species of lizard that call the Refuge home. Painted, softshell, and snapping turtles can be seen in wetland environments; Blanding's turtles are most frequently seen in upland savanna environments. Frog and toad species that inhabit the Refuge include leopard frogs, green frogs, wood frogs, grey tree frogs, spring peepers, and the American

Table 11: Rare Plants Found on the Refuge and Within the Yellow River Focus Area¹

Common Name	Scientific Name	State Status*	Habitat/Location
Round-stemmed false foxglove	<i>Agalinus gattingeri</i>	State threatened (Federal status assessment in progress)	Southern Juneau County in dry prairies and bedrock glades
Wooly milkweed	<i>Asclepias lanuginosa</i>	State threatened	Dry savannas (oak barrens) in Juneau County, just south of Necedah Refuge
Brittle prickly pear	<i>Opuntia fragilis</i>	State threatened	Dry, sandy habitats in neighboring Adams County; may occur in similar habitats in Juneau County
Dwarf bilberry	<i>Vaccinium cespitosum</i>	State endangered	Sandy pine and oak savanna habitats, bracken grasslands
Sand violet	<i>Viola fimbriolata</i>	State endangered	Sandy pine and oak savanna habitats
Pale false foxglove	<i>Agalinus skinneriana</i>	State endangered	Dry savannas in Adams County
Tubercled or pale green orchid	<i>Plantanthera flava</i> var. <i>herbiola</i>	State threatened	Wet prairies and sedge meadows in Juneau and Adams counties
Umbrella sedge	<i>Fuirena pumila</i>	State endangered	Coastal plain species that inhabit peat and muck flats, wet sands, and fluctuating lake shores
Bald rush	<i>Psilocarya scirpoides</i>	State threatened	Coastal plain species that inhabit peat and muck flats, wet sands, and fluctuating lake shores
Netted nut-rush	<i>Scleria reticularis</i>	State endangered	Coastal plain species requiring recently desiccated mud or sand lake beds with fluctuating water
Bog bluegrass	<i>Poa paludigena</i>	State threatened	Sedge meadows and tamarack bogs; has been documented in western Adams County.
Beak grass	<i>Diarrhena americana</i>	State endangered	Floodplain forest; may inhabit Yellow River bottoms, adjacent and east of Necedah Refuge

1. No federally-listed plants are likely to occur on the Refuge.

toad. Blue-spotted salamanders are fairly common and can be found in dark moist environments, such as under decaying logs or thick leaf litter.

Invertebrates are abundant on the Refuge and play an integral role in maintaining the ecological balance of several Refuge ecosystems. Wisconsin has approximately 20,000 species of insects – far more than any group of animals in the state. The Refuge is home to the world’s largest remaining population of the Federally listed Karner blue butterfly and also to the rare Leonard’s skipper. Other rare insects that use the Refuge include the phlox moth, frosted elfin butterfly, Persius dusky wing, ringed bog haunter dragonfly, and two species of tiger beetles.

Fish species are also important members of the Refuge biological community. They cycle nutrients in aquatic systems and serve as food sources for a variety of birds and mammals. Although many fish species are at a disadvantage due to the drainage of Refuge pools for waterbird management, many people travel to the Refuge for rewarding year-round fishing opportunities on Refuge pools and ditches. Muskellunge; northern pike; large mouth bass; yellow perch; black crappie; pumpkinseed; black, brown, and yellow bullhead are some common species sought by anglers.

3.4.5 Ecosystem Level Biological Diversity

Ecosystems are defined as the interacting parts of the physical and biological worlds (Ricklefs 1990). There are three ecosystems of primary importance with respect to the Refuge: wetlands, forests, and open landscapes. Descriptions of these ecosystems are provided in Description of the Physical Environments section “Physiography”.

3.4.6 Landscape Level Biological Diversity

Landscape is defined as a number of interacting stands or ecosystems repeated in similar form over a kilometer wide area (Forman and Godron 1986). For convenience, we can think of it as a regional view of biological diversity. Until recently, there has been very little work, particularly in the Midwest, to protect biological diversity at the landscape scale.

In order for the Refuge to exist as part of a functioning landscape, the Refuge will have to:

- Conserve and restore ecosystems historically occurring in the landscape across a portion of the Refuge area.
- Arrange protected areas so that the arrangement of ecosystems mimics the natural organization.
- Work cooperatively with a broad array of partners to manage public and privately owned land in order to mimic natural processes, e.g., fire, flooding, succession, and providing connectivity to the matrix in which the Refuge occurs.

The Refuge is promoting biological diversity at the species, ecosystem, and landscape level by using different management regimes. For example, locally some savannas are burned often while others haven't been burned in 8 years. Some savannas are mowed while others have never been mowed. The Refuge is contributing to Regional biological diversity by restoring and maintaining rare habitats including sedge meadows and savannas. Nationally, the Refuge is contributing to biological diversity by providing habitat for endangered species.

3.5 Description of the Socioeconomic Environment

In 1998, the Refuge contracted with Industrial Economics Inc. to complete an economic impact assessment to estimate the regional economic and national social welfare benefits of the Refuge. However, some of the data used to generate the economic report is associated with significant uncertainty, as well as dated. As a result, the estimates in the report should be interpreted with uncertainty in mind. Some of the values used to generate that report have been updated to reflect more current figures. Also, it should be noted that the report was not commissioned to support any of the action items contained in the CCP. It was prepared to facilitate a better understanding of the economic contribution national wildlife refuges in general have on local and regional economies.

Within the four-county region surrounding the Refuge (Wood, Juneau, Adams, and Monroe counties), agricultural activities constitute an important component of the economy. This sector includes both dairy farms and farms that grow row crops (e.g., sweet corn, potatoes, snap peas). Cranberry

production is also important. It is considered a premium crop in that it commands a high price in the market. Cranberry beds, while representing a small percentage of the total land area, are scattered throughout the region. The total acreage of cranberry beds currently in Juneau and Wood counties alone is estimated to be 4,500. Because the region has large tracts of both private and public forest land, the timber industry is important to the economy as well. Wood County is the most populous and strongest economically of the four.

These four counties offer a variety of recreational activities on both public and private land. Along with the Refuge, there are several other public recreation areas. These include Sandhill Wildlife Area, Wood County Wildlife Area, and Meadow Valley Wildlife Area. Other recreational and camping areas nearby include Buckhorn State Park, Castle Rock, and Petenwell County Parks, which are adjacent to the Refuge. These offer substitute sites and opportunities to the Refuge for hunting, fishing, wildlife viewing, photography, and other recreational activities.

Commercial activities on the Refuge include timber harvesting and trapping for pelts. Several of the surrounding towns maintain roadways that pass through the Refuge. Funding for road maintenance on Federal property helps supplement the tax base used to fund road projects. The Refuge's annual budget (> \$1 million dollars in 2001) supports employee salaries, operation and maintenance, education, and improvement projects such as bridges, dams, and roads.

Commercial and Refuge management economic activities on the Refuge include:

- The annual budget for staff salaries, maintenance, operations, small capital purchases and educational programs exceeded \$1,000,000 in 2001.
- Each year, sections of the Refuge are selected for timber harvesting to maintain quality habitat for plants and animals. In 1996-97, 3,237 cords of wood were harvested worth \$155,758.
- Trapping is an important management tool used to reduce or prevent damage to Refuge roads, dikes, and water control structures. Trapping may also reduce predation on nesting birds. Trapping is also a recreational opportunity afforded by the Refuge. Trapped species include mink, beaver, muskrat, and raccoon. The annual average value of pelts taken between 1980 and 1995 was \$6,858.
- In addition to maintenance of land by the Refuge, certain roads within the boundary of the Refuge are maintained by the surrounding townships of Necedah, Finley, Cutler, Remington, and Kingston. These townships spend, on average, approximately \$96,000 annually for road maintenance, with a large part of this cost for snow removal.

Conclusions drawn from Refuge-dependent commercial and Refuge management economic activities include:

- Refuge spending contributes over \$1 million and roughly 18 jobs to the regional economy.
- Refuge road maintenance and timber harvesting produce similar effects on the regional economy, accounting for approximately \$150,000 each year.
- Furbearer trapping plays a minor role in the overall regional economy, accounting for only \$7,000 of regional output and less than one job.
- Refuge fire support to the Necedah Fire Department accounted for \$9,500 in 2001 through Wildland Urban Interface Funding.

The Refuge also has an indirect economic impact on the local economy through recreational activities it supports. Among these are hunting, fishing, wildlife observation and photography, berry picking, and cross-country skiing. Although the Refuge charges no entrance fee, individuals who visit the Refuge and participate in these activities often purchase a variety of goods and services in the

communities surrounding the Refuge (e.g., food, lodging, fuel, equipment). In 2000, Juneau County contributed \$84 million to Wisconsin's tourism industry (Wisconsin Department of Tourism).

Some of the more popular recreational activities on the Refuge are:

- Hunting for both large (white-tailed deer) and small game species (grey, red, and fox squirrel; rabbit; snowshoe hare; ruffed grouse; waterfowl; wild turkey; and raccoon). In 1996, an estimated 10,000 trips were made to the Refuge for the purpose of hunting.
- Fishing on Refuge waters, primarily for northern pike, bullheads, crappie, yellow perch, and sunfish. In 1996, approximately 7,000 trips were made to the Refuge for the purpose of fishing.
- Wildlife viewing accounted for over 106,000 trips to the Refuge in 1996.
- Blueberry, raspberry, and blackberry picking are popular during summer months.

Conclusions drawn from Refuge-dependent recreational activities include:

- Wildlife viewing has the greatest effect on the regional economy, accounting for between \$1.9 million and \$2.3 million of regional output and between 48 and 67 jobs.
- Recreational hunting has the second greatest effect on the regional economy, accounting for \$250,000 and 6.8 jobs.
- Fishing produces the third greatest regional economic effects, accounting for \$220,000 of regional output and 5.9 jobs.

Chapter 4: Environmental Consequences

-
- General impact analysis
 - A description of impacts associated with Service trust resources
 - A description of impacts associated with visitor services
 - A description of impacts associated with habitat management
 - A description of impacts associated with the Yellow River Focus Area
 - A summary of table of environmental impacts
-

This chapter evaluates three alternatives on the basis of environmental consequences or impacts relative to the issues identified in Chapter 1. The chapter is organized by issue. Environmental impacts are summarized in Table 15 on page 179

4.1 General Impact Analysis

4.1.1 Unavoidable Adverse Impacts

Under Alternative 1 and Alternative 3, the potential development of access roads, dikes, control structures, visitor parking areas, and reclamation of former building sites could lead to local and short-term negative impacts to plants, soil, and some wildlife species. Increased use of the Refuge may result in increased littering, noise, and vehicle traffic.

4.1.2 Short-Term Use Versus Long-Term Productivity

The local, short-term uses of the environment under Alternatives 1 and Alternative 3 include habitat restoration and enhancement activities for the benefit of Service trust resources. Alternatives 1 and 3 could also include the development of additional public use facilities to further the public's understanding and appreciation of the natural world. The resulting long-term effect of these alternatives includes increased protection of threatened and endangered species, increased waterfowl and songbird production, and long-term recovery of a myriad of species dependent on quality wetland and grassland habitats. In addition, local and regional people will gain long-term opportunities for wildlife-dependent recreation and education.

4.1.3 Irreversible and Irretrievable Commitments of Resources

Funding and personnel commitments by the Service or other organizations under Alternatives 1 and 3 would be unavailable for other programs. Fee-title acquisition of lands by the Service would make them "public lands" and preclude other use of these lands in accordance with individual desires. Traditional land uses may change since uses on Service lands must be shown to be compatible with the

purposes for which the land is acquired. Any lands purchased will lose their potential for future development by the private sector as long as they remain in public ownership. Structural improvements that are purchased with any land may be declared surplus to government needs and sold and/or demolished on site. Land that a new visitor center would be built on would no longer be available for hunting purposes or provide habitat for wildlife and plants.

4.2 Cumulative Effects

Cumulative effects (or impacts) are those effects on the environment resulting from incremental consequences of the alternatives when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes these actions. However, accurately summarizing cumulative effects is difficult in that while one action increases or improves a resource in an area, other unrelated actions may decrease or degrade that resource in another area.

Over many years the cumulative effects of wetland drainage, conversion of native prairies into crop land, and the clearing of bottomland forests and savannas have been severe on listed species, waterfowl and other migratory birds, and native biological diversity, both at the local, state, and national levels.

The State of Wisconsin has lost over 53 percent of its original wetlands and 99 percent of its original prairies and oak savannas. Prior to European settlement, Wisconsin is estimated to have had approximately 10 million acres of wetlands and 4 million acres of savannas. Today less than 5 million acres of wetlands remain. Savannas have been reduced to less than 60,000 acres statewide. At the national level, of the estimated 221 million acres of wetland habitat present in the lower 48 states at the time of colonial America, only 103 million acres remain (47 percent). Draining, dredging, filling, leveling, and flooding have reduced wetlands to the point where 22 states have lost 50 percent or more of their original wetlands, and 10 states have lost 70 percent or more (Dahl, 1990). The consequences of this intensive conversion of wetlands, prairies, and oak savannas have been significant declines in migratory birds populations, water quality degradation in lakes, rivers, and the Gulf of Mexico, and probable increased flood frequency and intensity along mainstem rivers and their major tributaries.

The wide-scale loss of oak savanna and pine barren ecosystems across twelve states and the province of Ontario, Canada, has had a severe negative impact on the Karner blue butterfly. Over the past century, the number of Karner blue butterflies have declined by at least 99 percent. Over 90 percent of that decline has occurred in the last 15 years. Loss of habitat resulted in a rapid decline in Karner population numbers, and extirpation of large populations across its range. Today scattered populations are only found in portions of New Hampshire, New York, Michigan, Wisconsin, Indiana, and Minnesota. As a result, the Karner blue butterfly was proposed for federal listing on January 21, 1992, and listed as endangered on December 14, 1992. Presently the Refuge is home to the world's largest remaining population of the Federally listed Karner blue butterfly, supporting 12 population complexes.

The long-term declines in early successional forests across the north-eastern and north-central United States has contributed to the decline of many bird species as well. Selective harvesting, fire suppression, urban sprawl, and cessation of agricultural abandonment contributed to the present imbalance in distribution of young forests (Oliver and Larson, 1999).

The continent's only migratory population of Whooping Cranes winters at Aransas National Wildlife Refuge on the Texas Gulf Coast and is vulnerable to a catastrophic event such as a major hurricane. In the summer of 2001, a population was introduced on the Refuge as part of an effort to establish a migratory population in the eastern U.S. and to contribute toward recovery of the species.

The original tallgrass prairie, which extended from western Indiana to the eastern part of Kansas, Nebraska, and North and South Dakota and south to Oklahoma and Texas, has been virtually eliminated throughout its historic range. Recent surveys suggest that 82.6 to 99.9 percent declines in the acreage of tallgrass prairie have occurred in 12 states and one Canadian province since European settlement. Loss and fragmentation of prairie landscapes combined with changes in natural processes (e.g., fire suppression) have had negative consequences for many grassland plants and associated animals

For years following the initial conversion of native Midwestern prairies, many prairie-dependent wildlife species remained relatively stable through their ability to colonize agricultural grasslands. However, 20th century agricultural grassland loss has followed a similar path of decline as native prairie loss in the 19th century. In many parts of the Midwest, agricultural grassland are at their lowest level in more than 100 years

Consequently, grassland-dependent birds have shown steeper, more consistent, and geographically more widespread declines (25-65 percent) than any other group of North American birds (Samson and Knopf 1994). Other grassland associated mammals, insects, and microorganisms are threatened with a similar fate. Currently there are 55 grassland species in the U.S. considered threatened or endangered (Samson and Knopf 1994). Species using the Refuge that are experiencing serious declines include the Bobolink, Henslow's Sparrow, Grasshopper Sparrow, Vesper Sparrow, Savannah Sparrow, Lark Sparrow, Field Sparrow, Dickcissel, Eastern Meadowlark, and American Bittern (National Biological Survey 1995). The Grasshopper Sparrow and Dickcissel have declined over 80 percent in Wisconsin since the mid-1960s.

Alternatives 1 and 3 could reverse many of the above mentioned population declines (at least locally) for many bird species and Karner blue butterflies by restoring and managing additional savanna habitat. Under the preferred alternative (Alternative 3), the Refuge would be restoring approximately 3,000 additional acres of savanna habitat, bringing its total savanna habitat to approximately 3,500 acres. The 3,500 acres will be distributed between 35 sub-sites that are distributed over approximately 15 square miles. Through these efforts the Refuge aims to insure a minimum Karner population of 6,000 to 7,000 second flight adults and constitute a major step toward the recovery of that species. Restoration and preservation of additional savanna on the Refuge would also help reverse the long-term decline in early successional forests across the region.

Alternative 3 would also result in the restoration and management of an additional 3,500 acres of grasslands on the Refuge for nesting waterfowl and other migratory birds, thus contributing to the recovery of many grassland-dependent species of regional concern. Alternative 2 would allow past trends to continue; and conditions at the local level for Karner blue butterflies, savanna and grassland-dependent birds, and native biological diversity would worsen.

All of the alternatives described in this EA would contribute to the recovery of Bald Eagle, Whooping Crane, and gray wolf. Efforts to establish a migratory population of Whooping Cranes on or near the Refuge would not only restore the Whooping Crane to part of its historic range, but also provide a geographically distinct migratory population, leading toward the long-term recovery of that species.

All of the alternatives described in Chapter 2 offer opportunities for additional actions relating to the conservation, restoration, and management of habitat for the benefit of Service trust resources independent of Service operations. These other actions, if initiated by other Federal agencies, the state, local communities, non-governmental organizations or private individuals, could be coordinated with the Service through cooperative agreements, mutual aid agreements, matching challenge grants, etc. or through technical assistance between cooperators. Typical cumulative actions that could be taken by these other entities include the acquisition of land in fee title, acquisition of conservation easements or access rights-of-way, protection of water quality, cleanup of contaminants, implementation of various agricultural management practices and techniques, management of private lands for wildlife and timber stand improvement through county and state programs, protection of

endangered species through the Endangered Species Act and state laws and regulations, management of resource uses by the states and non-governmental organizations, management of non-game species by the state, predator and damage control by U.S. Department of Agriculture's Animal and Plant Health Inspection Service and the state, implementation of grants through the Endangered Species Act, Federal Clean Water Act, Federal Reclamation Act and to the state through the Federal Aid in Fish and Wildlife Restoration Program and to private landowners through the Service's Partners for Wildlife program, to name a few. These cooperative actions are all possible, and the chances for initiating any of these cooperative actions by others may increase by the mere presence of the Refuge and Refuge staff in the area.

In the final analysis, the integrity of the natural resource values encompassed within the state and country (all inclusive) will depend on actions taken by others. Refuge land, even with the acquisition of additional land in the Yellow River Focus Area, would exist only as a small portion of the total acreage within the state and nation.

Cumulative effects on property taxes paid to the local taxing bodies (townships, county, school districts) by the Service and others would likely be neutral, since the taxing bodies have discretion in adjusting their revenue stream in order to account for their expenses. While the Service does not pay taxes, it does make an annual Refuge Revenue Sharing payment (see Chapter 2 "Elements Common to all Alternatives") to the townships where Service-owned land is present. Since these payments are based on land value, an acre of land valued at \$1,000.00 would generate a \$7.50 payment each year, or \$7,500.00 per million of land value (at full entitlement). In Juneau County, Refuge Revenue Sharing payments at full entitlement are roughly 32 percent of what taxes would be if lands had remained in private ownership (based on personnel communication with Juneau County, Wisconsin). Alternative 3 below provides additional analysis/clarification of Refuge Revenue Sharing.

Further, the presence of a national wildlife refuge is often considered an asset to an area contributing to the quality of life. Not only does it offer public recreation potential and greatly enhance the educational opportunities of the local schools, it serves as an attraction for people looking to relocate from urban areas. Therefore it can be expected that as more people relocate to the two counties (due in part to the presence of the Refuge), taxable real estate such as new homes, cabins, and other land improvements will increase, thereby increasing the local private property tax base.

As natural habitats in the area are destroyed and fragmented into smaller parcels by new development activities, acquisition and management of land in the Yellow River Focus Area will represent a compensating factor to make up for the loss. Long-term environmental benefits would be gained from habitat conservation and enhancement resulting from Service activities in this area. Biodiversity, including numbers and variety of non-game species, would be enhanced. Threatened and endangered species would benefit from specific management actions and monitoring programs. As more of the area becomes conserved and managed, the more important and recognized it will become for natural resource values and as a special place for people to find enjoyment and educational benefits.

The trend in demand for wildlife-dependent recreation (e.g., wildlife observation) is expected to continue into the foreseeable future, due in part to the increasing population of retirement-age Americans. As the number of visitors to the Refuge area increases, private enterprises would be likely to develop support facilities and services such as campgrounds, motels, restaurants, sporting goods stores, etc. to meet the increased demand. Increased visits to the Refuge could result in additional on-site facilities such as a visitor center, parking areas, trails, observation towers, etc. These new facilities both on- and off-site could reduce available habitat and create localized damage to vegetation, soil compaction and erosion, while increasing the chance of wildlife disturbance and disturbance to other visitors. These potential negative effects could be minimized through careful planning and management. Popular activities on site specific areas could be controlled to reduce impacts through proper design, site selection and construction technique or by restructuring participation through

registration and fee systems. Although control of development would be exercised on Refuge land, off-site development would be controlled by other state and Federal regulations such as the Clean Water Act.

Restoration of the relatively small amount of crop land found in the Yellow River Focus Area to wildlife habitat would have minimal effects on total county employment, population, and the unemployment rate. Willing seller landowners would be appropriately compensated, while their employees, suppliers and brokers could experience some income reduction. Cumulative loss of crop land in the two-county area (due to such things as road construction, commercial and residential development, and other factors) would not jeopardize the agriculture infrastructure in the area.

4.2.1 Listed Species

Federally listed threatened or endangered species that use the Refuge include the Bald Eagle, Eastern timber wolf, and Karner blue butterfly. The Yellow River Focus Area supports a small population of Eastern massasauga rattlesnakes, which is a candidate for federal listing. The Refuge is currently a re-introduction site for an experimental population of Whooping Cranes. Under all alternatives, the Service is required by law to accommodate the needs of threatened and endangered species. Thus the following section would apply to all alternatives.

4.2.1.1 Bald Eagles

One occupied Bald Eagle nest currently occurs at the Refuge. However, numerous migrating Bald Eagles utilize Refuge habitats for resting and feeding.

Potential Impacts to Bald Eagles

Water Level Management: Current management practices on dozens of water impoundments on the Refuge provide Bald Eagles with a constant, year-round food source. Eagles feed primarily on fish but are known to prey on muskrats, waterfowl, American coots, and even white-tailed deer fawns. The Refuge manages most of its large water impoundments for moist soil plant production and to lower rough fish populations. This is accomplished by draining these pools every third year. During undrained years, water on these pools is held as high as possible. The Refuge staggers management of these pools so the northern and southern end of the Refuge have at least one large drained pool per year. Management of this type is conducted to provide food for waterfowl migrating south during the fall. As a consequence, fish populations are reduced, which reduces the areas appeal for nesting Bald Eagles. However, these management practices simultaneously make the large water impoundments attractive for migrating Bald Eagles during the fall.

Aircraft Activity: Currently eagles on the Refuge face sporadic flights of both fixed and rotary-wing military aircraft. These aircraft are usually participating in training at Hardwood Bombing Range or Fort McCoy. Eagles don't currently nest in close proximity to any proposed Whooping Crane release sites. If eagles nest by one of these sites and Whooping Cranes are reintroduced, they would be exposed to daily ultra-light aircraft activity during Whooping Crane fledging.

Refuge Staff Activities: Refuge staff sometimes need to approach the eagle nest to perform other activities such as wildfire suppression, water level management, or other endangered species surveys. Too much activity around the nest could cause desertion.

Prescribed Burn Activities: At this time the Refuge's only active eagle nest is located in a prescribed burn unit. Prescribed burning during nesting could cause nest desertion.

Water Level Management Next to an Active Nest: The Refuge's only active eagle nest is located near a large water impoundment. Drainage of this pool could result in take by causing nest desertion or making food for the eaglets more difficult to obtain.

Access by the Public: The Refuge's only active eagle nest is located near a hiking trail in an area open to blueberry picking. Activity near the nest by the public could result in its abandonment.

Measures to Reduce Impacts on Bald Eagles

In regard to all forms of disturbance, with the exception of overhead flights by the Air National Guard and ultra-light aircraft activity associated with Whooping Crane releases, the "Bald Eagle Management Guidelines" (USFWS undated) will be incorporated on the Refuge.

In regard to overhead flights by the Air National Guard (ANG), locations of active nests will be provided to the ANG. As in the past, the ANG will provide these locations to their pilots and a half mile no-fly zone will be established around and above each active nest. If a pair of eagles should nest near a Whooping Crane release site, ultra-light aircraft activity will continue. However, the pilots will be notified of the eagle nest and required to maintain a half-mile flight distance from the nest.

While active, no prescribed burns or water level draw-downs will occur within one-quarter mile of the nest. "Active nests" will include all site used within the two previous years. As eagles nest in oaks on the Refuge, their nest trees are unaffected by prescribed fires. As the conservation measures outlined above meet or exceed those outlined in the Bald Eagle Management Guidelines, all of these disturbances will have no effect on Bald Eagles.

Monitoring Bald Eagles

Bald Eagle nests will be observed to document activity. Once a nest is deemed active, personnel will periodically observe the nest to determine if it was successful and how many young fledged.

4.2.1.2 Timber Wolves

Potential Impacts on Timber Wolves

Land Conversion: Early successional forests provide the maximum prey base for Eastern timber wolves (USFWS 1992). Converting forested land to grassland could therefore reduce the prey available for wolves.

Public Access: Currently turkey hunters have nearly total access to all of the Refuge. Since wolf pups are born between early and mid-April, excessive activity around a den site could cause abandonment. As pups grow, the den site is abandoned and a rendezvous site is used (WIWP 1999). During this time (July 1st), almost the entire Refuge is open to berry pickers. Again, excessive disturbance around a rendezvous site could lead to abandonment.

Prescribed Burning: The Refuge has the ability to prescribe burn several thousand acres in a day. Prescribed burns of this size can overcome wildlife. Therefore, burning around den or rendezvous sites could result in wolf pup mortality.

Refuge Activities: Throughout the year, staff from the Refuge visit most of the property while conducting various activities. Excessive disturbance around a den or rendezvous site could lead to abandonment.

Hunting: The greatest perceived threat to wolves in Wisconsin is the 9-day gun deer season. During the gun deer season, all of the 600,000 hunters who possess a small game license are eligible to shoot coyotes while deer hunting in most of the state. The Refuge is an exception. However, most gun deer hunters on the Refuge are not from the area and may not know that coyote hunting is prohibited on the Refuge. Therefore, opening up nearly 100 percent of the Refuge to gun deer hunting has resulted in wolf mortality in the past and may continue to do so.

Measures to Reduce Impacts on Timber Wolves

Human-caused mortality is a major factor in many wolf populations. Hunters and residents within occupied wolf range have greater potential to directly impact wolf populations than the general public

(Tucker and Pletscher 1989). Reduction of these contacts has been achieved on most of the Refuge by gating-off interior roads. The policy of maintaining gates on interior roads and berming access roads upon completion of timber sales will be continued.

Coyote hunting and trapping on the Refuge are prohibited and will remain closed year-round. In an effort to inform hunters about this closure, the Refuge will issue press releases yearly prior to the gun deer season. The Refuge will also post signs reminding hunters of the closure. The closure has been posted in the Federal Register and is printed in all of the Refuge's hunting pamphlets, which are available in leaflet boxes throughout the property.

Possibly the most critical portion of timber wolf habitat are den and rendezvous sites (Wydeven and Schultz 1993). Wolf packs usually use one or two dens per year with movement to a new den site associated with disturbance. After the denning period, the alpha female moves the litter to a home site(s) or activity site(s) called a 'rendezvous site.' The potential for wolf populations to increase and expand is directly related to pup survival. Therefore, all actively used wolf home sites (den and rendezvous sites) verified by a wildlife biologist and used within the last 2 years will be protected. Active den and rendezvous sites will be protected by following guidelines established in the Wisconsin Wolf Management Plan (1999), which requires all disturbances within 100 meters of a den or rendezvous site be eliminated. The only exceptions to this will be activities associated with proposed Whooping Crane releases and for safety reasons such as dam operations on large water impoundments and wildfire suppression. The Refuge will meet or exceed guidelines established in Wisconsin Wolf Management Plan, and there will be no effect on wolves.

Monitoring Timber Wolves

Personnel will continue to track wolf distribution and will conduct winter tracking surveys. Personnel will conduct howling surveys in late May or early June to monitor pack production and aerial monitoring of radio collared wolves to determine pack territory and obtain dispersing information.

4.2.1.3 Karner Blue Butterflies

Potential Impacts on Karner Blue Butterflies

Wildfire Suppression: Wildfire is one of the driving forces in savanna creation and maintenance. Both the Wisconsin Department of Natural Resources and U.S. Fish and Wildlife Service aggressively control all wildfires on the project lands for financial and legal reasons. Wildfire suppression is mandatory for these reasons, but has a very negative effect on Karner blue butterfly habitat. In an effort to mitigate the effects of wildfire suppression, the Refuge will conduct prescribed burns. As the purpose of these burns will be to mimic the effects of wildfires, some units will be burned in consecutive years if succession is threatening a Karner blue butterfly population.

Prescribed Fire: Prescribed fire is currently used on the project lands to maintain KBB habitat. Surveys on the Refuge show a strong positive correlation between the frequency of prescribed burning and Karner blue butterfly densities. The Refuge tested the effects of burning on Karner blue butterfly habitat with a study design that incorporated both replicates and control sites (King in litt b). No other research of this quality exists. This work concluded that wild lupine as well as nectar sources (Karner blue butterfly habitat) were unaffected by the treatments. Again, the effects of burning of KBB populations was tested with a study design that incorporated both replicates and controls. Again, prescribed burning had no short (1 year) or long-term (2 or 3 years) detectable effect on KBB populations (King in litt b). Although all evidence indicates that Karner blue butterflies survive fire as adults and eggs (King in litt a; King in litt b), it is conceivable that individual butterflies could be lost during prescribed burning operations.

Mowing: Similar to prescribed burning, controlled and replicated experiments have demonstrated that mowing has no detectable effect on butterfly habitat or populations (King in litt b). However, it is conceivable that an individual butterflies could be killed by mowing.

Refuge Activities: Silviculture practices are the only other Refuge activities that have the potential to impact Karner blue butterflies. Land conversion through tree plantings is often cited as negatively affecting butterfly population, however the Refuge doesn't plant trees. Timber sales aimed at controlling disease and pest outbreaks like oak wilt, jack pine budworm, and two-lined chestnut borer for silvicultural purposes have a negative impact on Karner blue butterflies because these are natural processes that help to create and maintain butterfly habitat.

Foot Travel: Foot travel through Karner blue butterfly habitat on existing trails could have negative impacts on butterflies if eggs or larvae are stepped on. Maintenance of existing trails is accomplished by annual mowing, which could conceivably result in the loss of an individual butterfly, although this would be very unlikely. Establishment of more trails on the Refuge could result in the take of butterflies if wild lupine plants are destroyed.

White-tailed Deer: White-tailed deer browse on savanna plants, including wild lupine, has been high on the Refuge. The Refuge surveyed the number of browsed and unbrowsed lupine flower stems on one Karner blue butterfly site in the spring of 1994 and found that 85 percent of all wild lupine stems were browsed.

Succession: If unchecked, succession will destroy butterfly habitat and eliminate populations. Currently three Karner blue butterfly populations are located on unmanaged tracts of land and face certain extirpation unless some form of disturbance or disturbances are returned to the landscape.

Measures to Reduce Impacts on Karner Blue Butterflies

The effects of each potential impact of land management activities on Karner blue butterfly population on the project lands will not be monitored. Instead, the effects of all potential impacts will be mitigated by restoring and maintaining enough habitat to restore one large Karner blue butterfly population on the Refuge. The Refuge will be restoring approximately 3,000 additional acres of savanna, which will bring its total savanna habitat to approximately 3,500 acres. The 3,500 acres will be distributed between 35 sub-sites that will be distributed over approximately 15 square miles. Enough savanna habitat will be restored and managed on the Refuge to insure a minimum population of 6,000 to 7,000 second flight adults.

In regard to all outlined activities that have the potential to effect existing Karner blue butterfly populations, the Refuge will incorporate the terms set forth in the Biological Opinion prepared for the Refuge CCP. Specifically, the Refuge will incorporate the following conservation measures:

Foot travel: The public will be encouraged to restrict foot travel to existing trails through occupied Karner blue butterfly habitat. Blueberry pickers will be allowed to travel throughout occupied butterfly habitat as the blueberries they seek are also distributed throughout the savannas. The Refuge staff will keep foot travel activities to a minimum while on occupied Karner blue butterfly habitat. Netting, handling, and marking butterflies will also be kept to minimum.

Untreated Land: The Refuge will leave at least one untreated Karner blue butterfly site on the southern end (south of Hanson Road) of the Refuge in any given year. Likewise, one untreated Karner blue butterfly unit will be left on the north end of the Refuge in any given year. All other units can be treated (mowed or burned) in a given year. Recently published Karner blue butterfly dispersal research on the Refuge (King 1998) demonstrates that leaving one untreated unit on the southern portion of the Refuge and one on the north will provide "refugia" for the entire Refuge. The dispersal ability of the Karner blue butterfly makes the refugia approach work for the Refuge. Within the open landscapes of the Refuge, 10 percent of all Karner blue butterflies with multiple captures were shown to travel at least 1.4 miles during the second flight of 1995. One individual, a female, traveled at least 4.1 miles during the same flight (King 1998).

As previously stated, research on the Refuge has shown that butterfly populations are unaffected by burning or mowing. Therefore, even if we conservatively assume that mowing or burning result in take of some individual Karner blue butterfly eggs or larvae, research on the Refuge has demonstrated that this take has no effect at the population level. In that respect, leaving refugias on the Refuge will be a back-up plan should the effects of burning or mowing differ dramatically from the past. The Refuge will take the same approach when mitigating the effects of succession. If succession is threatening a population, that unit will be burned or mowed repeatedly, in consecutive years, until the threat of succession is removed. As burning and mowing have no effect on Karner blue butterfly populations (King in litt a, King in litt b) these conservation measures will pose no threat to butterfly populations even if we conservatively assume that some individual Karner blue butterflies could be affected. In fact, most of the Refuge's best Karner blue butterfly sites, in regard to density, have a history of being burned in two or more consecutive years.

Mowing: For Karner blue butterfly areas that are mowed, including trails, blade height will be at least 8 inches from the ground. Mowing will not occur between April 15 and August 15 when butterfly larvae may be present.

By implementing the conservation measures listed above, Necedah NWR will be effectively eliminating all Karner blue butterfly take. In the cases of burning and mowing, the Refuge will be conservatively assuming take of individual butterfly eggs or larvae can occur, although there is no support for this in peer reviewed literature. However, the potential effects of that take will not be mitigated as, if they occur, they have been shown to have absolutely no effect on Karner blue butterfly populations (King in litt a).

Monitoring Karner Blue Butterflies

The Refuge will monitor all Karner blue butterfly populations on the Refuge with Pollard-Yates type surveys during only the butterflies' second flight each year. Surveys will be conducted only on the dedicated savanna sites and only during the second flight. The surveys will be done on each site three times during the second flight. Spacing of 7 days will be used between subsequent surveys on each site. Spacing of 7 days will be used between counts because mark-release-recapture research at the Refuge has shown that the risk of counting the same butterfly on subsequent surveys is reduced to 5 percent with this spacing (King 1998). Assuming that each Karner blue butterfly counted is a separate individual is useful because a sum of all the counts on a unit as opposed to a mean can be used. The number of butterflies annually counted on the units will then be used to show trends on the Refuge, which will be used to demonstrate that the Refuge is still meeting the criteria for a large population.

4.2.1.4 Eastern Massasauga Rattlesnake

Potential Impacts on the Eastern Massasauga Rattlesnakes

Wetland Drainage: Eastern massasauga rattlesnakes hibernate below the water-line. They therefore require high, stable water levels in the winter. Drainage of a wetland could eliminate an area as suitable habitat for hibernating Eastern massasauga Rattlesnakes.

Prescribed Burning: Eastern massasauga rattlesnakes have been burned during prescribed burn operations on other National Wildlife Refuges. Burning after snakes emerge from hibernation can result in mortality.

Mowing: Mowing while Eastern massasauga rattlesnakes are active can result in mortality. This mortality can be hard on populations as gravid females often seek-out areas that are both dry and warm. Mowing these areas at the wrong time can eliminate gravid females as well as her young.

Succession: Massasauga require open landscapes. In closed canopy forests they lose basking opportunities, which are particularly critical for gravid females. As trees grow-up, they also provide perches for raptors that have been shown to substantially affect massasauga populations. Succession has degraded habitat both on the Refuge and the Yellow River area.

Measures to Reduce Impacts on Eastern Massasauga Rattlesnakes

The Refuge will not be conducting any massasauga-related activities on the Refuge proper. In regard to the Wildlife Management Agreements with landowners, the Refuge will incorporate methodology outlined in “*The Eastern Massasauga Rattlesnake: A Handbook for Land Managers: 2000*” (Johnson et al. 2000). By following this handbook, the Refuge will be eliminating all take of Eastern massasauga rattlesnakes.

Monitoring Eastern Massasauga Rattlesnakes

The Refuge will conduct massasauga surveys for all the Candidate Conservation Agreements it is working on. The Refuge will survey Eastern massasauga rattlesnakes with the methodology set forth in the “Recommended Standard Survey Protocol for the Eastern Massasauga, *Sistrurus catenatus catenatus*” (Capser et al. 2001).

4.2.1.5 Whooping Cranes

Whooping Crane chicks were introduced at the Refuge in the summer of 2001 as part of a Whooping Crane reintroduction project to establish a migratory population in the eastern U.S. to contribute toward recovery of the species. The population has been designated as a non-essential population (NEP) in a rule making action finalized on June 26, 2001. The crane chicks are being reared in a pen situation and trained to follow ultra light aircraft in migration to a selected wintering site at Chassahowitzka National Wildlife Refuge. Annual Whooping Crane introduction, rearing, and release activities are expected to continue for a period of 10 years.

The introduction project itself is covered by a separate EA and separate Biological Opinion prepared by the Service’s Green Bay Ecological Service’s Field Office.

4.2.2 Maintenance of Roads and Existing Right-Of-Ways

State, county, and townships retain maintenance obligations for roads and their rights-of-way under their jurisdiction within Refuge boundaries. Some township roads may be suited for abandonment (but not necessarily closure) and their maintenance assumed by the Service. Any such abandonments would only be with the consent of the appropriate governing body. Existing rights-of-ways and terms of other easements will continue to be honored. New rights-of-ways and easements will be considered in relation to Refuge System regulations and likely impacts of the rights-of-way or easement to Refuge resources.

The Refuge would cooperate with state, county and township officials in the maintenance of roads that cross the Refuge. Roadside mowing would be completed in accordance with State and local laws.

4.2.3 Cultural Resources

Under all alternatives, the Service will take into consideration impacts on historic properties and other cultural resources from Refuge undertakings (e.g., activities, projects, and uses). Nevertheless, some loss could still occur. Any development (e.g., dikes, roads, buildings, etc.) would only be carried out after a thorough review or survey of possible cultural resources likely to be disturbed, and plans for avoidance or minimizing impacts are in place. The Service will inform state Historic Preservation Officers of any acquisition of lands and structures. Structures considered to meet the criteria for the National Register will be maintained until the Service’s Regional Historic Preservation Officer can complete an evaluation and appropriate mitigation is accomplished. Buildings and other structures will be maintained until the Service can consider how the historic property can be retained and used for Refuge purposes.

A description of undertakings for all Refuge lands would be provided by the Refuge Manager to the Regional Historic Preservation Officer who will analyze the undertaking for potential effects on historic properties. The Refuge Manager will inform the Regional Historic Preservation Officer of

each undertaking during early planning. The Regional Historic Preservation Officer will enter into consultation with state Historic Preservation Officers and other parties as appropriate. No undertakings will proceed until the Section 106 process is complete. Also, the Refuge Manager will, with the assistance of the Service's Regional Historic Preservation Officer, develop a program for conducting Section 110 inventory surveys, and will attempt to obtain funding for those surveys. The Refuge Manager will similarly involve the Regional Historic Preservation in other cultural resources issues on the Refuge.

4.2.4 Environmental Justice

Within the spirit and intent of Executive Order 12898, no minority or low income populations would be impacted by any Service action under any alternative.

4.2.5 Climate Change

The increase of carbon 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 A...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

The land is a tremendous force in carbon sequestration. Terrestrial biomes of all sorts are effective both in preventing carbon emission and acting as a biological "scrubber" of atmospheric carbon monoxide. 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. Conserving natural habitat for wildlife is the heart of any long range plan for national wildlife refuges. The actions proposed in this CCP would conserve or restore land and water, and would enhance carbon sequestration. This will contribute positively toward efforts to mitigate human-induced global climate changes.

4.3 Impacts Associated with Service Trust Resources

4.3.1 Alternative 1 (No Action)

Under Alternative 1, the Refuge would continue to operate under the 1979 Master Plan and subsequent step-down management plans (maintains the status quo in management). The Refuge's Forest Management and Fire Management plans articulate future open landscape developments, which would benefit some Service trust resources (see Habitat Management section below). However, Alternative 1 does not provide the Refuge a future vision, prioritize management activities Refuge-wide, or hold the Refuge accountable for management results through a monitoring and evaluation program. With less coordination among the conservation organizations, this alternative would probably result in less efficient conservation efforts of Service trust resources on the Refuge and within the Yellow River Focus Area. In the meantime, opportunities to work at the landscape scale for the benefit of Service trust resource in the Yellow River Focus Area would rapidly disappear.

4.3.1.1 Listed Species

Alternative 1 would have a positive impact on threatened and endangered species that utilize Refuge open landscape lands. Protection of federally-listed species on the Refuge would continue under existing laws and regulations. This alternative might not, however, focus Service restoration and habitat management activities to benefit both federally and state-listed species.

Since the Refuge's Forest Management Plan and Fire Management Plan articulate restoration and conservation of additional open landscape habitats on the Refuge, local populations of Karner blue butterflies would likely increase over the long-term. However, management actions aimed at restoring and maintaining open landscape habitat (mowing, burning, hydro-axing) could impact individual Karner blue butterflies and Eastern massasauga rattlesnakes (see section 1.5 above). However, over the long-term, these populations would benefit from the net gain in savanna habitat that would be restored and conserved.

Nesting Bald Eagles on the Refuge would be afforded protection from human disturbance consistent with the Service's Bald Eagle Management Guidelines (USFWS undated).

Refuge habitat would be managed to support Whooping Cranes and Eastern timber wolves, which would benefit their populations over the long-term. A separate EA has been prepared to evaluate the re-introduction of an experimental population of Whooping Cranes on the Refuge. The "General Impact Analysis" section above provides additional detail relative to potential impacts to listed species, including Eastern timber wolves.

4.3.1.2 Waterfowl and Other Migratory Birds

Under this alternative, the Refuge would not produce any major change in waterfowl production or use at the Refuge, since there would not be an appreciable increase in nesting, resting, or feeding habitats (grasslands and wetlands) in the immediate area, or the quality of existing Refuge habitats would not improve appreciably (see "Habitat Management" section below). In the long-term, local waterfowl populations could decline as existing wetland habitats degrade and other natural and anthropogenic forces take their toll.

Alternative 1 would benefit savanna species of concern (Red-headed Woodpeckers, Bobolinks, etc.) through additional savanna habitat management on the Refuge. However, other species on the Refuge, such as those associated with mature closed-canopy upland forests (Scarlet Tanagers, Wood Thrushes, Eastern Wood Peewees) would probably experience local declines as those forests are converted to open landscape lands. However, the landscape surrounding the Refuge provides an abundance of mature closed-canopy forest habitat (see Table 7 in Chapter 3) and those bird species would be expected to relocate into those adjacent habitats. Further, conversion of closed-canopy forests to savanna landscapes would occur gradually over an extended period of time (>15 years).

Grassland bird species of concern would probably continue to decline on the Refuge as the Refuge would not make restoration and conservation of additional grasslands a priority under this alternative.

Many bird species considered priority conservation species by the Service and the state, and which are found in the forested wetlands and associated habitats in the Yellow River Focus Area (Cerulean Warbler, Red-shouldered Hawk, Acadian Flycatcher, Yellow-crowned Night Heron, Sedge Wren, Prothonotary Warbler, Louisiana Waterthrush) would not be afforded any habitat conservation under this alternative. As the area develops and degrades due to lack of habitat management actions, many of these species would likely decline.

4.3.1.3 Native Biological Diversity

Under Alternative 1, we anticipate increased biological diversity on the Refuge from additional savanna restoration and management efforts per guidance contained in the Refuge's Forest Management Plan and Fire Management Plan. This would include increased numbers of many game species also, including Turkey and Sharp-tail Grouse, as well as small mammals, invertebrates, reptiles, and amphibians. However, since the Refuge would not take an active role in restoring and conserving habitats in the Yellow River Focus Area aside from its private lands effort, we anticipate that the quantity and quality of wetlands, bottomland forests, and open landscapes in the area would

continue to decline due to lack of habitat management and development, as well as wildlife species richness and abundance.

4.3.2 Alternative 2

Under Alternative 2 management actions relative to the significant issues identified during scoping would follow guidance contained in the 1979 Refuge Master Plan.

Significant changes have occurred in the art and science of natural resource management since the writing of the 1979 Master Plan. The Service's "ecosystem approach" is an example of the implementation of a new management paradigm, as is the development of regional resource conservation priority species (see CCP chapter 2). Waterfowl, migratory birds, and listed species would not benefit from this new knowledge if the Refuge continued to be guided by an outdated plan and information. Also, the status of Service trust resources has changed since the writing of the 1979 Master Plan due to successful conservation strategies (e.g., the recovery of the Bald Eagle), and unsuccessful conservation strategies (e.g., the declining status of many grassland-dependent bird populations across the region). The 1979 Master Plan does not take into account these or many other changes, and would not enable the Refuge to adequately address Service trust resource needs. In addition, with less coordination among the Service and the conservation community, this alternative would result in less efficient conservation efforts of Service trust resources. In the meantime, like Alternative 1, opportunities to work at the landscape scale in the Yellow River Focus Area for the benefit of Service trust resources would rapidly disappear as development and other anthropogenic forces take their toll.

4.3.2.1 Listed Species

Alternative 2 would have little or no direct impact on threatened and endangered species that utilize the Refuge, with the exception of Karner blue butterflies. Protection of federally-listed species on the Refuge would continue under existing laws and regulations. This alternative might not, however, focus Service restoration and habitat management activities to benefit both Federally and state-listed species. Since no major effort would be made to restore and conserve additional open landscape habitats on the Refuge or Yellow River Focus Area, local populations of Karner blue butterflies would likely remain the same.

Under certain circumstances, management action aimed at restoring and maintaining habitats for listed species, such as mowing, burning, and hydro-axing, may have short-term adverse effects on some listed species the Refuge is trying to benefit (Karner blue butterflies and Eastern massasauga rattlesnakes) (see section 1.5 above).

Eastern massasauga rattlesnakes would likely decline over the long-term as development encroaches the Yellow River Area.

Nesting Bald Eagles on the Refuge would still be afforded protection from human disturbance consistent with the Service's Bald Eagle Management Guidelines (USFWS undated).

The Refuge would manage habitat to support Whooping Cranes and Eastern timber wolves, which would benefit their populations over the long-term (a separate EA and separate Biological Opinion was prepared by the Service's Green Bay Ecological Service's Field Office to cover re-introduction and management of Whooping Cranes).

4.3.2.2 Waterfowl and other Migratory Birds

Alternative 2, like Alternative 1, would result in no direct change in waterfowl production or use at the Refuge since there would not be an appreciable increase in nesting, resting, or feeding habitats (see "Habitat Management" section below) within the Refuge or the Yellow River Focus Area, or the quality of existing Refuge and Yellow River Focus Area habitats would not improve appreciably. In the

long-term, local waterfowl populations could decline as existing wetland habitats degrade and other natural and anthropogenic forces take their toll.

Similarly, Alternative 2 would result in no direct change in migratory bird production or use at the Refuge since there would not be an appreciable increase in nesting, resting, or feeding habitats within the Refuge, nor would the quality of existing habitats improve appreciably. In the long-term, local wetland and grassland-dependent migratory bird populations would likely decline as existing habitats degrade and predation, artificially heightened by fragmented landscapes, continues to take its toll on nesting females and their young.

Many bird species considered priority conservation species by the Service and the state, and which are found in the forested wetlands and associated habitats in the Yellow River Focus Area (Cerulean Warbler, Red-shouldered Hawk, Acadian Flycatcher, Yellow-crowned Night Heron, Sedge Wren, Prothonotary Warbler, Louisiana Waterthrush) would not be afforded any habitat restoration or conservation under this alternative. As the area develops and degrades due to lack of habitat management and conservation, many of these species would likely decline.

4.3.2.3 Native Biological Diversity

Under Alternative 2, no effort would be made to manage for increased biological diversity on either Refuge land or land within the Yellow River Focus Area by the Refuge (i.e. no new wetlands, savannas, or grasslands restored). Over the long-term, species richness and abundance on both the Refuge and within the Yellow River Focus Area would be expected to decline. No additional open landscape land (grasslands/savannas) would be developed on the Refuge or within the Yellow River Focus Area. No new wetlands would be restored and managed on the Refuge. Some small increases of wetland habitat could occur in the Yellow River Focus Area through other non-Service programs.

4.3.3 Alternative 3

Alternative 3 would have the greatest positive impact on Service trust resources.

4.3.3.1 Listed Species

Alternative 3 would have the greatest benefit to listed species by restoring, conserving, and managing additional wetland and open landscape habitats on the Refuge and within the Yellow River Focus Area (see “Habitat Management” section below).

Under certain circumstances, management action aimed at restoring and maintaining habitats for listed species, such as mowing, burning, and hydro-axing, may have short-term adverse effects on some listed species the Refuge is trying to benefit (Karner blue butterflies and Eastern massasauga rattlesnakes).

Through additional savanna habitat management, local populations of Karner blue butterflies would likely increase over the long-term.

Local populations of massasauga rattlesnakes would likely increase as additional habitat is restored and conserved in the Yellow River Area.

Nesting Bald Eagles on the Refuge would still be afforded protection from human disturbance consistent with the Service’s Bald Eagle Management Guidelines.

Refuge habitat would be managed to support Whooping Cranes and Eastern timber wolves, which would benefit their populations over the long-term (a separate environmental assessment (EA) was prepared by the Service’s Green Bay Ecological Service’s Field Office to cover re-introduction and management of Whooping Cranes).

4.3.3.2 Waterfowl and Other Migratory Birds

Alternative 3 would increase waterfowl production (primarily Mallards, Teal, and Pintails) and use at the Refuge by increasing the quantity and quality of nesting, resting, and feeding habitats available to local and migratory populations (see “Habitat Management” section below and attached CCP). As more grasslands are established, nesting success would increase as birds disperse their nests over a larger area, thus creating a larger area that predators must search. Additional resting and feeding habitats (wetlands) would also disperse staging birds over a larger area and decrease the chance of catastrophic accident or disease, such as avian botulism. Additional feeding habitats on the Refuge would help ensure that migrating ducks arrive on their northern breeding grounds in better reproductive condition.

Alternative 3 would benefit other migratory bird species also by providing additional nesting, resting, and feeding habitats (wetlands, grasslands, and savannas). Several species of special management concern would benefit directly. These include the American Bittern, Upland Sandpiper, Least Bittern, Black Tern, Red-shouldered Hawk, Northern Harrier, Dickcissel, Short-eared Owl, Sedge Wren, Loggerhead Shrike, Grasshopper Sparrow, Vesper Sparrow, Savannah Sparrow, Field Sparrow, Bobolink, and Eastern Meadowlark.

However, other species on the Refuge, such as those associated with mature closed-canopy upland forests (Scarlet Tanagers, Wood Thrushes, Eastern Wood Peewees) could experience declines on the Refuge as those forests are converted to open landscape lands. However, the landscape surrounding the Refuge provides an abundance of mature closed-canopy forest habitat (see Table 7 in Chapter 3) and those bird species could relocate into those adjacent habitats. Further, conversion of forest land to open landscape habitat would occur over an extended period of time (>15 years).

Restoration, conservation, and management of riparian areas, wetlands, wet prairies, sedge meadows, and associated grasslands on the Refuge and in the Yellow River Focus Area would create and conserve habitats essential for many nesting and migrating songbirds, and should contribute to the long-term recovery of some neotropical migrant populations (Cerulean Warbler, Red-shouldered Hawk, Acadian Flycatcher, Yellow-crowned Night Heron, Sedge Wren, Prothonotary Warbler, Louisiana Waterthrush).

4.3.3.3 Native Biological Diversity

Alternative 3 would increase and conserve biological diversity by restoring and conserving additional diverse habitats on the Refuge and within the Yellow River Focus Area, including seasonal wetlands, wet meadows, native prairies, and riparian associations. Once restored, these areas could create a number of interconnected habitat niches for indigenous and migrant wildlife that currently do not exist at the Refuge, thus increasing the overall biological diversity of the Refuge and surrounding area. This would include increased numbers of many game species also, including Turkey and Sharp-tail Grouse. In particular, this alternative would focus the restoration of large, native grassland blocks, and the management of the surrounding landscape that will establish a favorable landscape for the management of area-sensitive grassland birds. Moreover, Alternative 3 would attempt to restore the links (i.e. suitable matrix) between the historic wetlands, prairies, and oak savanna ecosystems found on the Refuge, which would also contribute to enhanced biological diversity.

Since this alternative emphasizes the greatest habitat conservation, restoration and enhancement, it would also result in the greatest benefit to resident wildlife, such as those species that help sustain natural biological systems that support Service trust resources like muskrat, raccoon, mink, weasel, reptiles, river otter, amphibians and reptiles. In addition, as water quality improves from habitat treatments in the Yellow River Watershed, important resident game fish populations would be expected to increase in proportion to the amount of quality habitat made available on the Refuge, thus increasing the food supply for many fish-eating wildlife.

4.4 Impacts Associated with Visitor Services

4.4.1 Alternative 1

Under Alternative 1, the 1979 Master Plan and associated step-down plans (e.g., public use, sign, law enforcement plan, etc.) would be used to guide visitor services on the Refuge. Visitation at the Refuge would continue to increase due to recent Refuge developments (Whooping Crane project, savanna restorations) while the quality of visits would probably decline due to lack of adequate infrastructure.

Increased visitation could generate the development of additional on-site facilities, such as improvements to visitor facilities, parking areas, trails, observation towers, etc. These new facilities and infrastructure could reduce available habitat and create localized damage to vegetation, soil compaction and erosion, while increasing the chance of wildlife disturbance and disturbance to other visitors. These potential negative effects would be minimized through careful planning and management. Popular activities on site-specific areas could be controlled to reduce impacts through proper design, site selection and construction technique.

One feature of this alternative would include expanding the current Refuge headquarters building (per guidance contained in the 1979 Master Plan and public use plan), which would help accommodate large groups of visitors that have been drawn to the Refuge by the Whooping Crane and savanna restoration projects. It would not however provide for the larger-scale visitation and use changes (more people coming to the Refuge, and the trend in more people coming to see wildlife rather than harvest related reasons) that Refuge staff and stakeholders feel are necessary for accomplishing the Refuge's mission, as well as accommodating the desires of local towns, townships, and counties in making the Refuge a regional attraction for outdoor enthusiasts. The land area that would be used for the current headquarters expansion is not an area currently used by large numbers of refuge visitors (e.g., hunters, bird watchers, anglers). There are no federally-listed species or Region 3 conservation priority species located in the area. There are no sensitive habitats located in the area. There are no known cultural or archaeological resources located in the area. Thus, adverse impacts to current Refuge uses (such as hunting) and habitat and other resources would be minimal.

Relative to staffing patterns, the Refuge currently supports two part-time Park Ranger positions devoted to visitor services. In the past this has been insufficient to handle the number of requests for Refuge programs. With the popularity of the Refuge's savanna restoration and the Whooping Crane project growing each day, staff shortages will continue to get worse. Alternative 1 would provide no new staff for the visitor services program. Volunteers would be emphasized to help with the additional workload associated with the Whooping Crane project. If this effort fails, some staff and resources may need to be redirected from current activities.

4.4.2 Alternative 2

Refuge visitation has increased yearly since the development of the 1979 Master Plan. Again, the reasons that people come to the Refuge have also changed. Uses like wildlife observation and relaxation are surpassing hunting and fishing as the most common reasons for visitors to come to the Refuge and Refuge area. The Refuge also has additional attractions, such as examples of globally rare savannas, the federally listed Karner blue butterfly and, potentially, the Whooping Crane, one of the rarest birds in the world.

Under Alternative 2, the Refuge's visitor services program would remain roughly status quo. No additional emphasis would be placed on providing quality wildlife-dependent public uses of the Refuge. Visitation would probably continue to increase due to recent Refuge developments (Whooping Crane project, savanna restoration). The Refuge would not attempt to either enlarge the existing Refuge headquarters building (per guidance contained in the Master Plan) or build a new visitor

center (Alternative 3). Without additional infrastructure, the quality of Refuge visits would probably decline.

Relative to staffing patterns, the Refuge currently supports two part-time Park Ranger positions devoted to visitor services. In the past this has been insufficient to handle the number of requests for Refuge programs. With the popularity of the Refuge's savanna restoration and the Whooping Crane project growing each day, staff shortages will continue to get worse. Like alternative 1, Alternative 2 would provide no new staff for the visitor services program. Volunteers would be emphasized to help with the additional workload associated with the Whooping Crane project. If this effort fails, some staff and resources may need to be redirected from current activities.

4.4.3 Alternative 3

Under Alternative 3, the Refuge has outlined its goals for public education and recreation and specific objectives, strategies, and projects that would support the Refuge in meeting those goals (see attached CCP). The CCP incorporates visitor services with other Refuge work, such as Service trust resource management, into one cohesive management planning effort. While Alternative 2 would allow for updated step-down plans, it does not provide for strategic implementation of all Refuge programs to achieve the Refuge's purpose and vision.

Alternative 3 also recognizes substantial changes in visitor numbers and use patterns brought on by demographic shifts (more people are using refuges for wildlife viewing and relaxation, fewer users are hunting and fishing) and new initiatives and projects such as savanna restoration and the reintroduction of whooping cranes on the Refuge. These new initiatives and projects could reduce available habitat and create localized damage to vegetation, soil compaction and erosion, while increasing the chance of wildlife disturbance and disturbance to other visitors. However, these potential negative effects would be short-term and be minimized through careful planning and management. Popular activities on site specific areas could be controlled to reduce impacts through proper design, site selection and construction techniques.

One of the projects called for under this alternative is the construction of a new visitor center. There are two areas under consideration for locating the visitor center (Figure 18 in the CCP). The site near Highway 21 is not currently used by large numbers of refuge visitors (e.g., hunters, bird watchers, anglers). The second site is in the vicinity of the current learning center. There are no federally-listed species or Region 3 priority species located in either proposed area. There are no sensitive habitats located in the areas. There are no known cultural or archaeological resources located in the areas. Thus, adverse impacts to current Refuge uses (such as hunting) and habitat and other resources would be minimal.

There are several notable positive impacts associated with a new visitor center at the Refuge. Having a facility located on state highway 21 will increase the Refuge's profile in the local community, and for users of one of Wisconsin's most traveled east-west travel corridors. The current main office is 3 miles north of State Highway 21. The Highway 21 site would have greater accessibility than the current Refuge main office. However, the second site under consideration, near the existing learning center, would be only about 500 yards from the existing office complex. The expanded facilities and proximity to wetlands and other diverse habitats would provide environmental education and interpretive opportunities not available at the Highway 21 site. Either visitor center site would also allow the Refuge to be more effective at transmitting Service messages to a broader group of stakeholders, through quality education and interpretation programs.

Several factors have been considered to minimize the impact of the facility and parking area on the environment. The visitor center would be constructed to blend in with the surrounding landscape (low profile and natural siding materials). Sewage treatment and heating and cooling systems have been chosen to minimize environmental impacts. Parking lot lights would be light-sensing to save

electricity. Native vegetation would be used for all landscaping to provide habitat for Service trust species, minimize runoff from the parking area, and to serve as an interpretive tool for visitors. Finally, recreational and interpretive opportunities at either proposed site would give the Service the largest increase in public exposure with the least impact on Service trust resources by concentrating the increased visitation on the periphery of the Refuge or in areas already disturbed. The Refuge would work with the Wisconsin Department of Transportation to provide for a safe entrance and exit from State Highway 21 to the visitor center due to increased visitation regardless of which site is chosen.

Relative to staffing patterns, the Refuge currently supports two part-time Park Ranger positions devoted to visitor services. In the past this has been insufficient to handle the number of requests for Refuge programs. With the popularity of the Refuge's savanna restoration and the Whooping Crane project growing each day, staff shortages will continue to get worse. Alternative 3 calls for three full-time Park Rangers, one whose position would be dedicated solely to law enforcement. These positions, along with increased funding and the help of Refuge volunteers, would be adequate to meet the Refuge's visitor service responsibilities. The Refuge anticipates increased funding as a result of the Whooping Crane project, and has already requested additional funding for staff and equipment. If these efforts fail, some staff and resources may need to be redirected from current activities.

4.5 Impacts Associated with Habitat Management

4.5.1 Alternative 1 (No Action)

Table 12 details the types and amounts of habitats the Refuge would manage by 2015 under Alternative 1, based on guidance contained in the 1979 Master Plan and subsequent step-down plans. No additional habitat management would occur in the Yellow River Focus Area aside from some private lands activities associated with the Refuge's Partners for Wildlife private lands program.

4.5.1.1 General Considerations

No forest land considered "old growth" would be adversely impacted by the Refuge's open landscape restoration efforts. No "critical habitat" would be adversely impacted by this alternative. This alternative would not lead to increased runoff or erosion, nor would it contribute to increased sedimentation in Refuge pools or waterways. Existing forest habitats would not be unduly fragmented by timber harvest activities.

Table 12: Habitat Types on the Refuge by 2015, Alternative 1, Necedah NWR

Land Cover Type	Acres	Acre Gain/Loss Compared to 2000
Open Landscapes (grasslands, savanna, shrublands, old fields)	6,300	+ 2,600 (savanna)
Coniferous Forests	550	- 350
Mixed Deciduous and Coniferous Forests	8,000	- 2,000
Broad-leaf Deciduous Forests	5,350	- 250
Emergent Wetlands and Wet Meadows	10,500	Status Quo
Forested Wetlands	5,700	Status Quo
Lowland Shrubs	5,500	Status Quo
Open Water Areas	1,800	Status Quo

The use of prescribed fire as a habitat management tool would be governed by the guidelines and provisions contained in the Refuge's prescribed burn plan. Impacts associated with the use of fire as a management tool on the Refuge are common to all alternatives and are discussed in the "General Impact Analysis" section found above and the Refuges Fire Management Plan.

Specific impacts to Service trust resources (including native biological diversity), visitor services, and the Yellow River Focus Area due to habitat management activities associated with Alternative 1 are discussed in those sections.

4.5.2 Alternative 2

Under Alternative 2, through guidance contained in the 1979 Master Plan, the Refuge would manage the habitat types and amounts described in Table 13 by 2015. The Refuge's savanna restoration program, which began in the early 1990s, would be discontinued. Habitats would be maintained in proportion to what is there presently. Timber harvest as a tool in habitat restoration and establishment (savanna and grasslands) would cease. The Service would not pursue additional habitat management in the Yellow River Focus Area.

Table 13: Habitat Types on the Refuge by 2015, Alternative 2, Necedah NWR

Land Cover Type	2015 Acres	Acre Gain/Loss Compared to 2000
Open Landscapes (grasslands, savanna, shrublands, old fields)	3,700	Status Quo
Coniferous Forests	900	Status Quo
Mixed Deciduous and Coniferous Forests	10,000	Status Quo
Broad-leaf Deciduous Forests	5,600	Status Quo
Emergent Wetlands and Wet Meadows	10,500	Status Quo
Forested Wetlands	5,700	Status Quo
Lowland Shrubs	5,500	Status Quo
Open Water Areas	1,800	Status Quo

4.5.2.1 General Considerations

No forest land considered "old growth" would be adversely impacted by the Refuge's open landscape restoration efforts. No "critical habitat" would be adversely impacted by this alternative. This alternative would not lead to increased runoff or erosion, nor would it contribute to increased sedimentation in Refuge pools or waterways. Existing forest habitats would not be unduly fragmented by timber harvest activities.

The use of prescribed fire as a habitat management tool would be governed by the guidelines and provisions contained in the Refuge's prescribed burn plan. Impacts associated with the use of fire as a management tool on the Refuge are common to all alternatives and are discussed in the "General Impact Analysis" section found above and the Refuges Fire Management Plan.

Specific impacts to Service trust resources (including native biological diversity), visitor services, and the Yellow River Focus Area due to habitat management activities for Alternative 2 are discussed in those sections.

4.5.3 Alternative 3 (Preferred Alternative)

Table 14 describes the types and amounts of habitats the Refuge would manage under Alternative 3 by 2015, based on guidance contained in the Refuge CCP.

Table 14: Habitat Types on the Refuge by 2015, Alternative 3, Necedah NWR

Land Cover Type	Acres	Acre Gain/Loss Compared to 2000
Open Landscapes (grasslands and savannas)	9,800	+ 2,600 acres savanna + 3,500 acres grassland
Coniferous Forests	550	- 350 acres
Mixed Deciduous and Coniferous Forests	4,500	- 5,500 acres
Broad-leaf Deciduous Forests	5,350	- 250 acres
Emergent Wetlands and Wet Meadows	12,500	+ 2,000 acres
Forested Wetlands	5,700	Status Quo
Lowland Shrubs	3,500	- 2,000 acres
Open Water Areas	1,800	Status Quo

4.5.3.1 General Considerations

No forest land considered “old growth” would be adversely impacted by the Refuges open landscape restoration efforts. No “critical habitat” would be adversely impacted by this alternative. This alternative would not lead to increased runoff or erosion, nor would it contribute to increased sedimentation in Refuge pools or waterways. Existing forest habitats would not be unduly fragmented by timber harvest activities.

The use of prescribed fire as a habitat management tool would be governed by the guidelines and provisions contained in the Refuge’s prescribed burn plan. Impacts associated with the use of fire as a management tool on the Refuge are common to all alternatives and are discussed in the “General Impact Analysis” section found above and the Refuges Fire Management Plan.

Specific impacts to Service trust resources (including native biological diversity), visitor services, and the Yellow River Focus Area due to habitat management activities for Alternative 3 are discussed in those sections.

4.6 Impacts Associated with the Yellow River Focus Area

4.6.1 Alternative 1 (No Action)

Under Alternative 1, the Refuge would only intensify and concentrate its private lands program in the Yellow River Focus Area. The Service would not seek to acquire any realty interests by fee-title or conservation easements in land and water in the Yellow River Focus Area. The Service would continue to develop Wildlife Management Agreements with landowners in the area.

At the time of printing the draft CCP, of the 230 landowners in the Yellow River Focus Area, 121 had signed up with the Service for technical assistance. Of those, 16 landowners owning 1,233 acres have signed Wildlife Management Agreements. Restoration work accomplished as of mid 2002 includes: three sedge meadow restorations (62 acres), three wetland restorations (33 acres), one bottomland hardwood restoration (54 acres) and six savanna/prairie restorations (135 acres). All work was performed by landowners and Refuge Private Lands personnel. These efforts, however, offer very little long-term conservation of habitats, as most are short-term in nature.

4.6.1.1 Habitat Considerations

Under this alternative, we would expect small increases in wetland and upland habitats to be restored in the Yellow River Focus Area through existing USDA, county, and the Service’s Partners for Wildlife

private lands program. Currently these programs offer restoration to small tracts of habitat scattered throughout large geographic areas (as opposed to larger single blocks). Similar increases in habitat could be realized through the Refuge's Partner for Wildlife program.

However, many of the existing wetland and upland habitats in the area could be impacted by the lack of a central management plan for the area, which may lead to increased residential development in undesirable locations or proportions, unmonitored water quality changes, declines in quality recreational and aesthetic experiences, and declines in the overall value of the Yellow River to local communities. Waterfowl, sandhill crane, other waterbirds, songbirds, fish, and many resident wildlife species would likely decrease over time as habitat degradation occurred. Unique plant communities could be degraded or lost due to conversion of additional wetlands to agricultural lands, namely cranberry production. Archeological resources would be offered little protection and subject to loss. Public use opportunities would be limited to private landowners, others with permission from landowners, and the general public on the public lands in the area.

Many areas of bottomland forest not considered wetlands under the Swampbuster provisions of the Food Security Act could eventually be cleared and put into other uses not beneficial to wildlife. The many water quality and wildlife habitat benefits associated with these areas would be lost. Although many current landowners in the area demonstrate a laudable conservation ethic, lack of a Service presence could result in timber harvest decisions on un-managed woodlands that are based primarily on maximizing short-term income. Continued high-grading of timber could further reduce tree species diversity, and the heavy mast component (oaks) of the forest community could be reduced, thus reducing food for waterfowl. Emergent, scrub-shrub and open water wetlands would continue to receive limited conservation afforded by present regulatory processes.

4.6.1.2 Land Acquisition and Property Taxes

Under Alternative 1 the Refuge would only intensify and concentrate its private lands program in the Yellow River Focus Area. The Service would not acquire any realty interests (e.g., fee-title or conservation easements) in land and water in the Yellow River Focus Area. No land would be removed from the tax rolls. No Refuge Revenue Sharing Payments would be made to the affected townships, since no additional land would be removed from the tax rolls.

4.6.2 Alternative 2

Alternative 2 would not provide staff and funding to provide a leadership role in facilitating pro-active conservation approaches in the area. This would mean the Service would not intensify and concentrate its private lands efforts in the area or seek to acquire realty interests in lands and waters. All efforts aimed at developing Wildlife Management Agreements with landowners in the Yellow River Focus Area would cease. Efforts at conserving the habitat work accomplished to-date through the Refuge's Partners for Wildlife program would be abandoned.

4.6.2.1 Habitat Considerations

Like Alternative 1, small increases in wetland and upland habitats would be restored in the Yellow River Focus Area through existing USDA and county programs. Again, most of these programs restore small tracts of habitat scattered throughout large geographic areas (as opposed to larger single blocks). While important habitat for migratory birds and other diverse wildlife would be restored, there is no provision for the conservation of a large, regionally important landscape such as the Yellow River Focus Area.

Again, many of the existing wetland and upland habitats in the area could be impacted by the lack of a central management plan for the area, which may lead to increased residential development in undesirable locations or proportions, unmonitored water quality changes, declines in quality recreational and aesthetic experiences, and declines in the overall value of the Yellow River to local communities. Waterfowl, Sandhill Crane, other waterbirds, songbirds, fish, and many resident wildlife

species would likely decrease over time as habitat degradation occurred. Unique plant communities could be degraded or lost due to conversion of additional wetlands to agricultural lands, namely cranberry production. Archeological resources would be offered little protection and subject to loss. Public use opportunities would be limited to private landowners, others with permission from landowners, and the general public on the public lands in the area.

Like Alternative 1, many areas of bottomland forest not considered wetlands under the Swampbuster provisions of the Food Security Act could eventually be cleared and put into other uses not beneficial to wildlife. The many water quality and wildlife habitat benefits associated with these areas would be lost. Timber harvest decisions on un-managed woodlands could likely be based primarily on maximizing short-term income (again, given current landowners' conservation ethic, this is possible but not necessarily certain). Continued high-grading of timber could further reduce tree species diversity, and the heavy mast component (oaks) of the forest community could be reduced, thus reducing food for waterfowl. Emergent, scrub-shrub and open water wetlands would continue to receive limited conservation afforded by present regulatory processes.

4.6.2.2 Land Acquisition and Property Taxes

Under Alternative 2, the Service would not seek to acquire any realty interests (fee-title or conservation easements) in land and water in the Yellow River Focus Area. No land would be removed from the tax rolls. Therefore, no Refuge Revenue Sharing Payments would be made to the affected townships.

4.6.3 Alternative 3

Implementation of the CPP would provide the Refuge with additional tools to restore and conserve the Yellow River Focus Area in a way that supports Service trust resources and the diverse group of stakeholders owning land in the area (willing sellers only). The Refuge would continue to employ a private lands biologist devoted to working in the Yellow River Focus Area. A staff person dedicated to the Yellow River Focus Area conservation effort would provide the attention and continuity necessary to maintain stakeholder trust and allow for wetland and prairie restorations to continue in other areas of the 12-county Private Lands District.

4.6.3.1 Habitat Considerations

Like Alternatives 1 and 2, small increases in wetland and upland habitats would be restored in the Yellow River Focus Area through existing USDA and county programs. Again, most of these programs restore small tracts of habitat scattered throughout large geographic areas (as opposed to larger single blocks). Under Alternative 3, like Alternative 1, Refuge private lands staff will continue providing landowners technical and funding assistance to manage fish, wildlife, and plants on their land and seek to augment other non-Service conservation efforts.

As of September 2000, of the 230 landowners in the Yellow River Focus Area, 121 had signed up with the Service for technical assistance. Of those, 16 landowners owning 1,233 acres have signed Wildlife Management Agreements. Restoration work accomplished to date includes: three sedge meadow restorations (62 acres), three wetland restorations (33 acres), one bottomland hardwood restoration (54 acres) and six savanna/prairie restorations (135 acres). All work was performed by landowners and Refuge Private Lands personnel. Refuge private lands staff will continue providing landowners technical and funding assistance to manage fish, wildlife, and plants on their land, and seek to augment these other non-Service conservation efforts. In addition, under this alternative the Service would seek to conserve these and other areas by offering to purchase a realty interest in properties with high natural resource values (willing seller only).

4.6.3.2 Land Acquisition and Property Taxes

Alternative 3 would expand the Refuges private lands conservation effort by offering conservation easements and fee title purchases to willing landowners, further conserving the restoration work done

through the Refuge's Wildlife Management Agreements and other non-Service programs. While the Yellow River Focus Area program emphasizes conservation of quality wildlife habitat in private ownership, land acquisition by the Service could involve approximately 3,750 acres (250 acres/year) over the next 15 years (based on a future funding scenario and the presence of willing sellers). In reality, this figure could be more or less given the uncertainty of future funding scenarios and the presence of willing participants. All lands acquired by the Service would be administered and managed by the National Wildlife Refuge System, Necedah National Wildlife Refuge. Tracts in which less than fee-title agreements are negotiated would remain in private ownership. All restoration and conservation would be carried out on a tract-by-tract basis as participants and fiscal resources become available over a 15-year time period. Funding for land acquisition would be from the Migratory Bird Conservation Fund (proceeds from the sale of Federal duck stamps) using the authority of the Migratory Bird Conservation Act and the Land and Water Conservation Fund using the authority of the Fish and Wildlife Act of 1956. Participation with the Service in any aspect of the Yellow River Focus Area is voluntary, and all land acquisition would be from willing sellers only.

The Refuge Revenue Sharing Act of June 15, 1935, as amended, provides for annual payments to counties or the lowest unit of government that collects and distributes taxes based on acreage and value of National Wildlife Refuge lands located within the county. The monies for these payments come from two sources: (1) net receipts from the sale of products from National Wildlife Refuge System lands (oil and gas leases, timber sales, grazing fees, etc.) and (2) annual Congressional appropriations. Annual Congressional appropriations, as authorized by a 1978 amendment, were intended to make up the difference between the net receipts from the Refuge Revenue Sharing Fund and the total amount due to local units of government.

Payments to the counties are calculated based on whichever of the following formulas as set out in the Act provides the largest return: (1) \$.75 per acre; (2) 25 percent of the net receipts collected from refuge lands in the county; or (3) three-quarters of 1 percent of the appraised value. In the state of Wisconsin, three-quarters of 1 percent of the appraised value always brings the greatest return to the taxing bodies. Using this method, lands are re-appraised every 5 years to reflect current market values.

According to the Refuge Revenue Sharing Act, which authorizes the Service to make these payments:

“Each county which receives payments....shall distribute, under guidelines established by the Secretary, such payments on a proportional basis to those units of local government (including, but not limited to, school districts and the county itself in appropriate cases) which have incurred the loss or reduction in real property tax revenues by reason of existence of such area.”

In essence, the Act directs the counties or lowest unit of government that collects and distributes taxes to distribute Refuge Revenue Sharing payments in the same proportion as it would for tax monies received.

Evaluating the environmental consequences for Alternative 3 is complicated by the Service's willing-seller-only acquisition policy. Because the Service would be buying land from willing sellers only (easements and fee-title acquisitions), and nearly all of the land in the Yellow River Focus Area is in private ownership, there is no reliable way to predict when or where particular land parcels might be purchased. However, in the spring of 2001 Refuge staff and regional office personnel held a public meeting at the Town of Necedah town hall to discuss the Yellow River Focus Area project. The following analysis of potential tax implications to the Town of Necedah was prepared for that meeting using the following assumptions.

Town of Necedah

<i>Total Assessments</i>	\$82,170,792
<i>Tax Rate</i>	\$23.50 per \$1,000 assessed value
<i>Total Revenue Received</i>	\$1,931,013

The assessment makes the following three assumptions:

- The U.S. Fish and Wildlife Service acquires 250 acres of land in fee-title in the Town of Necedah.
- The value of the land is \$1,000 per acre (estimated).
- The total valuation of the land is \$250,000 (250 acres X \$1,000 per acre).

Based on the above assumptions, the total amount of lost property tax revenue as a result of the Service's hypothetical purchase of 250 acres would equal \$5,875 per year ($\$250,000 / \$1,000 \times \$23.50$). After the land was acquired, the Service would make a Refuge Revenue Sharing payment to the Town of Necedah. The Service's Refuge Revenue Sharing payment (at 100 percent) would be \$1,875 per year ($\$250,000 \times .0075$).

The Service's Refuge Revenue Sharing payment to the Town of Necedah at 53 percent of entitlement would be \$993.75 per year.

The difference between the taxes on the 250 acres used in this example (had they remained in private ownership) and the Service's Refuge Revenue Sharing payment would be \$5,875 (taxes) - \$993 (revenue sharing payment) = \$4,882 per year.

The amount of revenue lost as a percentage of total revenue received by the Town of Necedah ($\$4,882 / \$1,931,013$) would equal .25 percent (one-quarter of 1 percent).

Since roughly 60 percent of the tax revenue received by the Town goes to the school district, and the state makes up any shortfall in school funding due to public land ownership, the actual loss would be \$1,952 ($.4 \times \$4,882$) (the state would pay the other \$2,929 to the school district).

The amount of tax revenue lost after the state payment to the school district (expressed as a fraction of total tax revenues) would be .10 or one-tenth of 1 percent ($\$1,952 / \$1,931,013$).

Lastly, for comparison purposes and using the above analysis, if someone is currently paying roughly \$1,000 in property taxes for living in the Town of Necedah, they could expect their taxes to increase by roughly \$1.00 as a result of Service fee-title acquisition of land in the Yellow River Focus Area (for every 250 acres valued at \$1,000 per acre).

Since the draft CCP was written, the Wisconsin Department of Revenue prepared an analysis of the potential tax impacts on local taxes due to hypothetical Service fee acquisition in the Yellow River Focus Area. The analysis considered the impact on the municipal, school district, and county taxes due to the hypothetical purchases of lands of varying acreages by the Service in eight different taxing authorities in Wood and Juneau counties. The Department of Revenue assumed that the Service revenue sharing payment would equate to .75 percent of the fair market value and that the Service would pay 51 percent of the full Refuge Revenue Sharing entitlement. The calculated tax impact ranged from a decrease of \$.09 to an increase of \$.17 in taxes for an average residential parcel.

Table 15: Summary of Environmental Impacts, Necedah NWR

ISSUE	ALTERNATIVE 1 (Guidance contained in the 1979 Master Plan and associated Step-down Management Plans)	ALTERNATIVE 2 (Guidance contained in the 1979 Master Plan)	ALTERNATIVE 3 (Guidance contained in the Refuge CCP)
1. Service Trust Resources			
<i>Listed Species</i>	Populations of listed species on the Refuge would likely remain the same or increase slightly. Eastern massasauga rattlesnakes in the Yellow River Focus Area (YRFA) may decline as development encroaches the area.	Populations of listed species on the Refuge would likely remain the same or increase slightly. Eastern massasauga rattlesnakes in the YRFA may decline as development encroaches the area.	Populations of all listed species on the Refuge and in the YRFA would likely increase. This alternative would have the greatest contribution to listed species.
<i>Waterfowl and other Migratory Birds</i>	Would not increase waterfowl use and production. Would not increase grassland species of concern. Would increase savanna species of concern through additional savanna management.	Would not increase waterfowl use and production. Would not increase grassland species of concern. Would not increase savanna species of concern through additional savanna management. Local populations in the YRFA would likely decline.	Would increase waterfowl use and production at the Refuge through additional habitat management. Would increase grassland species of concern through additional grassland management. Would increase savanna species of concern through additional savanna management.
<i>Biological Diversity</i>	Would increase native biological diversity on Refuge land through savanna restoration efforts and in the YRFA through the Refuge's Private Lands Program.	Would not increase native biological diversity on either Refuge land or land within the Yellow River Focus Area.	Would increase native biological diversity on both Refuge land and land within the YRFA.
2. Visitor Services			
	The quality of Refuge visits would likely decline as visitation increases due to recent developments (e.g., Whooping Crane introduction).	The quality of Refuge visits would likely decline as visitation increases due to recent developments (e.g., Whooping Crane introduction).	Many upgrades to existing facilities would occur. The quality of Refuge visits would improve most.
3. Habitat Management			
	Would restore native savanna and contribute to the recovery of early successional forests.	Could lead to further degradation of forest land (over mature closed-canopy forests).	Would restore native savanna and contribute to the recovery of early successional forests. Would establish native prairies and contribute to the recovery of those ecosystems as well.
<i>Fire Management</i>	Would be safely done	Would be safely done.	Would be safely done.

Table 15: Summary of Environmental Impacts, Necedah NWR (Continued)

ISSUE	ALTERNATIVE 1 (Guidance contained in the 1979 Master Plan and associated Step-down Management Plans)	ALTERNATIVE 2 (Guidance contained in the 1979 Master Plan)	ALTERNATIVE 3 (Guidance contained in the Refuge CCP)
Yellow River Focus Area			
	No impact to private property rights. No impact to taxes. Most likely would lead to further degradation of the natural resources.	No impact to private property rights. No impact to taxes. Most likely would lead to further degradation of the natural resources.	No impact to private property rights. Could result in reduced tax revenues as land is purchased in fee-title. Would conserve existing and restorable natural resources in the area.

Chapter 5: List of Preparers

<i>Gabe DeAlessio</i>	Biologist/GIS, Division of Conservation Planning, Great Lakes/Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for GIS mapping.
<i>Jeff Gosse</i>	Regional National Environmental Policy Act Coordinator, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for environmental assessment review and editing and NEPA compliance.
<i>Jane Hodgins</i>	Technical Writer/Editor, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for CCP/environmental assessment review and editing.
<i>Sean Killen</i>	Cartographer, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for GIS development and maps.
<i>Richard King</i>	Biologist, Necedah National Wildlife Refuge, Necedah, Wisconsin. Responsible for CCP/environmental assessment preparation and review.
<i>Jane Lardy Nelson</i>	Editorial Assistant, Division of Conservation Planning, Great Lakes/Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for production assistance and review.
<i>Thomas Larson</i>	Chief, Division of Conservation Planning, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for CCP/environmental assessment review.
<i>Thomas Magnuson</i>	Fish and Wildlife Biologist, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for project coordination and CCP/environmental assessment preparation and review and editing.
<i>Mary Mitchell</i>	Regional GIS Coordinator, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for GIS development.
<i>Rebecca Power</i>	Park Ranger, Necedah National Wildlife Refuge, Necedah, Wisconsin. Responsible for public involvement, CCP/environmental assessment preparation and review and editing.

Claudia Wondra

Former Editorial Assistant, Ascertainment and Planning, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota.
Responsible for CCP/environmental assessment review and editing.

Larry Wargowsky

Refuge Manager, Necedah National Wildlife Refuge, Necedah, Wisconsin. Responsible for CCP/environmental assessment review and editing.

Chapter 6: Consultation and Coordination with the Public

The Service used a highly participatory planning process to develop the Necedah National Wildlife Refuge CCP and associated EA. Throughout the planning process, the Service initiated outreach to diverse stakeholders, including representatives from other Federal and state agencies, county and township governments, local drainage districts, special interest groups such as birders, hunters, and anglers, industry and non-profit organizations, landowners living adjacent to the Refuge and within the Yellow River Area, Refuge visitors, and Service employees.

Information about the CCP was provided to stakeholders and the general public through news releases, presentations, interviews, informational letters, newsletters, public meetings, briefings, and the Internet. Questionnaires, focus groups, public meetings, and one-on-one discussions were used to gather input from Refuge visitors, neighbors, and other stakeholders. A geographic information system was developed to aid in the analysis and transfer of information.

The following table (Table 16) is a summary of opportunities afforded the public in the Refuge's Comprehensive Conservation Planning (CCP) process. This summary covers the majority of formal outreach efforts by the Service and the Refuge. A number of informal outreach efforts, particularly in the Juneau County and Wood County area, occurred throughout the CCP process and are not documented here. These efforts include contacts with Refuge visitors (approximately 5,000 Refuge hunters responded to a questionnaire), informing local service organizations and county boards at regularly scheduled meetings, and informing/updating other agencies at meetings scheduled for purposes other than to discuss the Refuge CCP.

Table 16: Summary of Opportunities for Public Involvement in the CCP Process, Necedah NWR

Date	Action or Event	Message
January 1997	Juneau/Adams County interagency meeting	Informed local, state, and federal resource management personnel about the upcoming Refuge planning process
February 1997	Refuge staff met with representatives of the Wisconsin Bowhunters Association, the Wisconsin Muzzleloaders Association, and the Wisconsin Traditional Archers Association, at their request	Discussed the future of special hunts and game management on the Refuge
March 1997	Press release	Happy birthday Necedah Refuge and call for input into CCP
March 1997	Letter to the editor - Juneau County Star Times	Refuge asks for help planning the future of the Refuge
April 1997	Press release	Publicizing National Wildlife Week and opportunities to comment on the CCP
April 1997	National Wildlife Week Open House	Request public input into Refuge and Yellow River planning efforts
April 1997	Press release	Publicize International Migratory Bird Day events and requesting input into the Refuge CCP
May 1997	Refuge staff meet with local drainage district personnel at Refuge	Scoping of issues/opportunity for input into CCP
May 1997	International Migratory Bird Day Open House	Request public input into the Refuge CCP and Yellow River planning efforts
June 1997	Mailing to property owners within a 4-township area, plus over 90 groups with an interest in conservation issues (to approx. 4,200 people and groups)	The Refuge wants your input on the future of Refuge management.
June 1997	Refuge public scoping meetings/open houses (2)	CCP and CCP process. Public input is important
June 1997	Press coverage - Juneau County Star Times	Refuge seeks citizen input
July 1997	Interview - Tomah Tribune	CCP process
July 1997	Interview - WKTY AM 580 (La Crosse)	CCP process
October 1997	Press release	National Wildlife Refuge Week Open House and CCP input opportunity
October 1997	National Wildlife Refuge Week Open House	Request public input into Refuge and Yellow River planning efforts

Table 16: Summary of Opportunities for Public Involvement in the CCP Process, Necedah NWR (Continued)

Date	Action or Event	Message
January 1998	Juneau/Adams County interagency meeting	Informed local, state, and federal resource management personnel about the ongoing Refuge CCP planning process
June 1998	Central Wisconsin Basin Partnership (CWBP) meeting	First proposal to adopt the Yellow River as a CWBP project; the Yellow River project was subsequently adopted, and the project was discussed quarterly at meetings thereafter
September 1998	Release of the first draft CCP with cover letter requesting and outlining ways to comment	
September 1998	Press coverage - Tomah Monitor-Herald	Waterfowl hunters criticize Refuge conservation plan and deadline for written comments
September 1998	Letter to the editor - Tomah Monitor-Herald	Response to Tomah Monitor-Herald press coverage
January 1999	Juneau/Adams County interagency meeting	Informed local, state, and federal resource management personnel about the ongoing Refuge planning process
April 1999	Newsletter to 800+ Refuge mailing list	Informed public of CCP availability - postage-paid request for a copy of the CCP was included
April 1999	National Wildlife Week Open House	Yellow River slide show about area and project
July 1999	Newsletter to 800+ Refuge mailing list and at local outlets such as libraries and local businesses	CCP update
August 1999	Contact letter to Yellow River landowners	Informing landowners about the Yellow River Focus Area project and resource management services offered by the Refuge
October 1999	Press release and newsletter to 800+ refuge mailing list and at local outlets such as libraries and local businesses	Requesting historic pictures of the Yellow River area for the Yellow River Focus Area project
December 1999	Press coverage - Juneau County Star Times	Yellow River Focus Area project creates new partnerships
January 2000	Newsletter to 800+ Refuge mailing list and at local outlets such as libraries and local businesses	CCP update
March 2000	Newsletter to 800+ Refuge mailing list and at local outlets such as libraries and local businesses	Advertising Yellow River landowner meetings

Table 16: Summary of Opportunities for Public Involvement in the CCP Process, Necedah NWR (Continued)

Date	Action or Event	Message
March 2000	Refuge-hosted Yellow River landowner forum	Discussion about landowner's perspective on the issues and information needs in the Yellow River
March 2000	Letter to Yellow River landowners	Summarizing results of first landowner forum and written assurance that participation with the Service in the Yellow River is voluntary and that the Service will not use eminent domain
April 2000	Refuge-hosted Yellow River landowner forum	Tally of responses collected at last meeting, plus "experts" that could address landowners's questions from last meeting
July 2000	Release of revised CCP draft	
August 2000	Mailing to property owners within a 4-township area, plus over 90 groups with an interest in conservation issues (to approx. 4,200 people and groups)	The Refuge wants your input on the final draft CCP and what comes after the plan's approval
August 2000	Press release	Refuge invites comments on revised plan
September 2000	Press release	Draft plan release and publicizing two public meetings
September 2000	Two public meetings	Inviting public comments and answering questions about the draft CCP
February 2001	Press release	Midwest private landowners to receive grants for conservation actions (Yellow River landowners were recipients of these grants)
March 2001	Juneau/Adams County interagency meeting	Informed local, state, and federal resource management personnel about the ongoing Refuge planning process
March 2001	Letter to the editor - Juneau County Star Times	Necedah NWR staff explain Town of Necedah referendum regarding the Yellow River Focus Area
March 2001	Press coverage - Juneau County Star Times	Yellow River referendum to go before Town of Necedah voters; two informational meetings scheduled at the Necedah Town Hall
March 2001	Four public meetings on Yellow River Focus Area; two hosted by the Town of Necedah, two hosted by the Refuge	Discussion and questions about the Yellow River Focus Area

Table 16: Summary of Opportunities for Public Involvement in the CCP Process, Necedah NWR (Continued)

Date	Action or Event	Message
April 2001	Two public meetings - Armenia Town Hall and Finley Town Hall	Discussion and questions about the Yellow River Focus Area
June 2001	Letter to Yellow River landowners	Reiterating the scope of the Yellow River Focus Area project and written assurance that participation in the project is voluntary and that the Service will not use eminent domain
August 2001	Booth at Ducks Unlimited Great Outdoors Festival in Oshkosh	Refuge staff explained CCP and YRFA as well as distributed fact sheets and brochures.
August 2001	Meeting with Wood County Conservation Staff	Discussion of various natural resource management efforts in Wood County including the YRFA
September 2001	Booth at Necedah Whooping Crane Festival	Refuge staff explained CCP and Yellow River FA and handed out fact sheets and brochure.
October 2001	Central Wisconsin Basin Partnership Meeting	Discussion of YRFA with partners and the Wisconsin Cranberry Growers Association.
November 2001	Adams County Holiday Fair	Refuge staff explained CCP and Yellow River FA and handed out fact sheets and brochure and mentioned new comment period.
November 2001	Juneau County Board Meeting	Reminded Board of new comment period.
November 2001	Dexter Town Hall Meeting	Discussed the Refuge and the YRFA project
December 2001	Wisconsin Land and Water Conservation Association Conference	Provided an overview of the CCP
December 2001	Juneau County - Land, Forestry, Parks & Zoning Committee	Discussed potential land acquisition and conservation easements in the YRFA
December 2001	Service staff meet with Town Chairman	Discussed Refuge CCP and Revenue Sharing Payments
December 2001	Service staff meet with State Representative Albers, Lippert, and Schultz	Discussed CCP and the YRFA project

Chapter 7: Glossary

<i>Alluvial</i>	Of and/or relating to river and stream deposits
<i>Amphibian</i>	A class of carnivorous, ectotherms (body temperature regulated by outside heat sources) whose living members have a moist, glandular skin that is permeable to water and gases. Most amphibians have a well-defined aquatic, larval stage in their life cycle and then undergo metamorphosis into adults. Depending on the species, adults may occupy aquatic or terrestrial habitats. Frogs, toads, and salamanders are examples.
<i>Biological Diversity</i>	The variety of life forms and processes, including the complete natural complex of species, communities, genes, and ecological functions.
<i>Biological Integrity</i>	Biotic composition, structure, and functioning at genetic, organism, and community levels consistent with natural conditions, including the natural biological processes that shape genomes, organisms, and communities.
<i>Biomass</i>	The weight of all life in a specified unit of environment or an expression of the total mass or weight of a given population, both plant and animal.
<i>Bloom</i>	A readily visible concentrated growth or aggregation of plankton (plant and animal).
<i>Community</i>	All the groups of organisms living together in the same area, usually interacting or depending on each other for existence.
<i>Cumulative Effects</i>	Those effects on the environment that result from the incremental effect of the action when added to the past, present, and reasonable foreseeable future actions regardless of what agency (Federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.
<i>Dissolved Oxygen</i>	Amount of oxygen dissolved in water.
<i>Drainage Basin</i>	An area mostly bound by ridges or other similar topographic features, encompassing part, most, or all of a watershed.

<i>Ecology</i>	The study of the relations between organisms and the totality of the biological and physical factors affecting them or influenced by them.
<i>Ecological Integrity</i>	The integration of biological integrity, natural biological diversity, and environmental health; the replication of natural conditions.
<i>Ecosystem</i>	An ecological system; the interaction of living organisms and the nonliving environment producing an exchange of materials between the living and nonliving.
<i>Ecosystem Approach</i>	A strategy or plan to manage ecosystems to provide for all associated organisms, as opposed to a strategy or plan for managing individual or clusters of species.
<i>Ecosystem Management</i>	Management of an ecosystem that includes all ecological, social, and economic components which make up the whole of the system.
<i>Effects</i>	Effects, impacts, and consequences, as used in the environmental assessment, are synonymous. Effects may be direct, indirect, or cumulative.
<i>Endangered Species</i>	Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register.
<i>Environmental Analysis</i>	An analysis of alternative actions and their predictable short-term and long-term environmental effects, incorporating physical, biological, economic, and social considerations.
<i>Environmental Assessment</i>	A systematic analysis of site-specific or programmatic activities used to determine whether such activities have a significant effect on the quality of the physical, biological, and human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary.
<i>Environmental Health</i>	Abiotic composition, structure, and functioning of the environment consistent with natural conditions, including the natural abiotic processes that shape the environment.
<i>Eutrophication</i>	The intentional or unintentional enrichment of water.
<i>Fauna</i>	All the animals of a particular region or a particular era.
<i>Flora</i>	All the plants of a particular region or a particular era.
<i>Food Chain</i>	The dependence of organisms upon others in a series of food. The chain begins with plants or scavenging organisms and ends with the largest carnivores.
<i>Goals</i>	Broad statements of direction; end results or positions to be achieved.

<i>Hardness</i>	A measurement of the content of dissolved calcium and magnesium in water.
<i>Hydrology</i>	The science of water in the hydrological cycle, the sun-driven movement of water between aquatic and terrestrial environments and the atmosphere, including evapo-transpiration, condensation, precipitation, and runoff.
<i>Impoundment</i>	A natural or artificial body of water that is held back by a dam.
<i>Interdisciplinary Team</i>	A group of individuals with varying areas of expertise assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately analyze the problem and propose action.
<i>Invertebrate</i>	An animal without a backbone or internal bony skeleton. Insects, crustaceans, worms, corals, and molluscs are examples.
<i>Mesic</i>	Describing an environment having moderate rainfall and moderately moist, well-drained soils. Mesic plants are those that require moisture.
<i>Monitoring</i>	A process of collecting information to evaluate if an objective and/or anticipated or assumed results of a management plan are being realized (effectiveness monitoring) or if implementation is proceeding as planned (implementation monitoring).
<i>National Environmental Policy Act</i>	An Act passed by the U.S. Congress in 1969 to declare a national policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, and establishes a Council on Environmental Quality.
<i>Natural Conditions</i>	Conditions thought to exist from the end of the Medieval Warm Period to the advent of the industrial era (app. 950AD to 1800AD), based upon scientific study and sound professional judgement.
<i>Objectives</i>	Intermediate-term targets necessary for the satisfaction of Refuge goals; quantifiable measures that serve as indicators against which attainment, or progress toward attainment, of goals can be measured.
<i>pH</i>	A measure of the relative concentration of hydrogen ions in a solution; indicating the acidity or alkalinity of the solution. A pH value of 7 indicates a neutral solution; values that are greater than 7 are basic, and those below 7 are acidic. Vinegar has a pH of 3; ocean water has a pH of approximately 8.
<i>Reptile</i>	A class of vertebrates whose skin is dry, lacking in glands, and covered with scales. Claws are present and skull, limb bones, vertebrae, muscles, and so forth are stronger and more advanced

than those of amphibians. Egg fertilization is internal, there is no larval stage, and eggs have a protective, hard shell.

<i>Riparian Area</i>	A geographic area containing an aquatic ecosystem and the adjacent upland areas that directly affects it. This includes floodplain, and associated woodland, rangeland, or other related upland areas. Pertaining to the banks of streams, lakes, wetlands, or tidewater.
<i>Riparian Zones</i>	Terrestrial areas where the vegetation complex and micro-climate conditions are products of the combined presence and influence of perennial and/or intermittent water; associated high water tables, and soils that exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.
<i>Savanna</i>	A community that was historically bordered by the prairies of the west and the deciduous forests of the east. It is a community type that falls in the middle of a continuum from prairie to forest. Savannas characteristically have less than 50 percent tree crown cover.
<i>Sedge</i>	A grass-like plant, usually having a three-sided stem and clearly three-ranked leaves. The pistil, a female flower part, is surrounded by a sac-like or flask-shaped structure called the <i>perygium</i> .
<i>Sedimentation</i>	The settling-out or deposition of suspended materials.
<i>Sensitive Species</i>	Those plant or animal species for which population viability is a concern as evidenced by a significant current or potential downward trend in population numbers, distribution, density, or habitat capability.
<i>Species Richness</i>	The number of different species in a given area.
<i>Stakeholder</i>	Any group or individual who is affected by or who can affect the future of the Refuge.
<i>Step-Down Management Plans</i>	Tactical plans that describe in detail specific strategies and implementation schedules for management functions (e.g., habitat management, public use, fire, safety, etc.).
<i>Strategic Framework</i>	A pattern of purposes, policies, programs, actions, decisions, or resource allocations that describe what the Refuge is, what it does, and why it does it.
<i>Strategies</i>	Step-down approaches that could be used to meet Refuge goals and objectives; provide direction for defining and coordinating operational tasks to effectively perform the Refuge's purpose.
<i>Succession</i>	A gradual change from one community to another and characterized by a progressive change in species structure, an increase in biomass

and organic matter accumulation, and a gradual balance between community production and community respiration.

Threatened Species

Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register.

Total Dissolved Solids

A measure of the total quantity of dissolved substances contained in water or effluent, including organic matter, minerals, and other inorganic substances.

Viable Population

A viable population is one which has such numbers and distribution of reproductive individuals as to provide a high likelihood that a species will continue to exist and be well-distributed throughout its range.

Warm Season Grasses

A grass that grows most during the warmest seasons of the year.

Watershed

The drainage basin contributing water, organic matter, dissolved nutrients, and sediments to a water body.

Watershed Analysis

A systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis is a stratum of ecosystem management planning applied to watersheds.

Watershed Restoration

Actions taken to improve the current conditions of a watershed to restore degraded habitat, and to provide long-term protection to natural resources, including riparian, terrestrial, and aquatic resources.

Watershed Treatments

Specific actions or tools to satisfy the goals and objectives of a watershed project. These may include establishing permanent vegetation on sensitive areas within the watershed (riparian buffers, stream bank stabilization, erosion-prone areas); establishing permanent wildlife habitat for dependent species (warm/cool season grasses, wetlands, sediment retention, erosion, or water control structure basins, field/farmstead windbreaks, shelter rows, and winter food plots); and encouraging Best Management Practices (BMP's) on agricultural lands (strip-cropping systems, terraces, diversions, contour farming, cropland protective cover, conservation tillage, feedlot and manure management).

Chapter 8: References and Selected Readings

Dahl, T.E. 1990. Wetlands losses in the United States 1780's to 1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 21pp.

Forman, R. and M. Godron. 1986. Landscape ecology. J. Wiley and Sons, New York, 619pp.

Keys, Jr., J., et al. 1995. Ecological units of the eastern United States - first approximation (map and booklet of map tables), Atlanta, Ga.: U.S. Department of Agriculture, Forest Service.

Keystone Center. 1991. Final consensus report of the Keystone policy dialogue on biological diversity on Federal lands. The Keystone Center, Keystone, Colorado, 96 pp.

Kohler, M.A., T.J. Nordenson, and D.R. Baker, 1959. Evaporation maps for the United States: US Weather Bureau Tech. Paper 37.

Malloy, Sarah J., Robert E. Unsworth, and Edward A. Blomdahl, March 1998. "Economic Assessment for the Necedah National Wildlife Refuge Comprehensive Conservation Plan." Industrial Economics, Inc.

Naugle, D. F., K. F. Higgins, M. E. Estey, R. R. Johnson and S. M. Nusser 2000. Local and landscape-level factors influencing black tern habitat suitability. *Journal of Wildlife Management* 64: 253-260.

Necedah National Wildlife Refuge. 1994. Forest Management Plan. Unpublished.

Necedah National Wildlife Refuge. 1994. Oak Barrens Restoration Plan. Unpublished.

Necedah National Wildlife Refuge. 1979. Refuge Master Plan. Unpublished.

Necedah National Wildlife Refuge. 1998. Economic Impact Assessment for the Necedah National Wildlife Refuge Comprehensive Conservation Plan. Unpublished.

Noss, R.F. and L. D. Harris. 1986. Nodes, Networks, and MUMs: preserving diversity at all scales. *Environmental Management* 10(3): 299-309.

Nuzzo, V.A. 1986. Extent and status of mid-west oak savanna: pre-settlement and 1985. *Natural Areas Journal* 6(2): 6-36.

Oliver, C.D., and B.C. Larson. 1996. Forest stand dynamics. John Wiley and Sons, New York, New York.

Peterjohn, B.G., J.R. Saur, and W.A. Link. 1994. The 1992 and 1993 summary of the North American Breeding Bird Survey. Bird Populations 2: 46-61

Rosenfield, R. N., J. Bielefeldt, D. R. Trexel, and T. Doolittle. 1998. Breeding distribution and nest-site habitat of northern goshawks in Wisconsin. Journal of Raptor Research 32: 189-194.

Sample, D.W., and M. J. Mossman. 1997. Managing Habitat for Grassland Birds: A Guide for Wisconsin. Wisconsin DNR Publication. 154 pp.

Samson, F.B., and F.L. Knopf. 1994. Prairie conservation in North America. BioScience 44:418-421.

Tucker, P. and D. H. Pletscher, 1989. Attitudes of hunters and residents towards wolves in northwestern Montana. Wildl. Soc. Bull. 17(4):509-514.

U.S. Department of State, U.S. Climate Action Report 2002, Washington D.C., May 2002.

U.S. Fish and Wildlife Service. 1992. Recovery Plan for the Eastern Timber Wolf. Twin Cities, Minnesota. 73pp.

U.S. Fish and Wildlife Service. 2001. Karner Blue Butterfly (*Lycaeides melissa samuelis*) Technical/Agency Draft Recovery Plan. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota.

U.S. Geological Survey Fact Sheet. FS-068-00. May 2000.

Wisconsin Department of Natural Resources. 1999. Wisconsin Wolf Management Plan. Madison, Wisconsin.

Wisconsin Department of Revenue. 2001. An Assessment of Potential Tax Impacts Due to Service Fee Acquisition of Land in the Yellow River Focus Area. Unpublished.

Wydeven, A. P. and R. N. Schultz, 1993 and Addendum, 1995. Management policy for wolf den and rendezvous sites background information. Unpubl. Report Wis. DNR.

Appendix B: Glossary

Glossary

<i>Alluvial</i>	Of and/or relating to river and stream deposits
<i>Amphibian</i>	A class of carnivorous, ectotherms (body temperature regulated by outside heat sources) whose living members have a moist, glandular skin that is permeable to water and gases. Most amphibians have a well-defined aquatic, larval stage in their life cycle and then undergo metamorphosis into adults. Depending on the species, adults may occupy aquatic or terrestrial habitats. Frogs, toads, and salamanders are examples.
<i>Biological Diversity</i>	The variety of life forms and processes, including the complete natural complex of species, communities, genes, and ecological functions.
<i>Biological Integrity</i>	Biotic composition, structure, and functioning at genetic, organism, and community levels consistent with natural conditions, including the natural biological processes that shape genomes, organisms, and communities.
<i>Community</i>	All the groups of organisms living together in the same area, usually interacting or depending on each other for existence.
<i>Cumulative Effects</i>	Those effects on the environment that result from the incremental effect of the action when added to the past, present, and reasonable foreseeable future actions regardless of what agency (Federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.
<i>Drainage Basin</i>	An area mostly bound by ridges or other similar topographic features, encompassing part, most, or all of a watershed.
<i>Ecology</i>	The study of the relations between organisms and the totality of the biological and physical factors affecting them or influenced by them.
<i>Ecological Integrity</i>	The integration of biological integrity, natural biological diversity, and environmental health; the replication of natural conditions.
<i>Ecosystem</i>	An ecological system; the interaction of living organisms and the nonliving environment producing an exchange of materials between the living and nonliving.
<i>Ecosystem Approach</i>	A strategy or plan to manage ecosystems to provide for all associated organisms, as opposed to a strategy or plan for managing individual or clusters of species.
<i>Ecosystem Management</i>	Management of an ecosystem that includes all ecological, social, and economic components which make up the whole of the system.

<i>Effects</i>	Effects, impacts, and consequences, as used in the environmental assessment, are synonymous. Effects may be direct, indirect, or cumulative.
<i>Endangered Species</i>	Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register.
<i>Environmental Analysis</i>	An analysis of alternative actions and their predictable short-term and long-term environmental effects, incorporating physical, biological, economic, and social considerations.
<i>Environmental Assessment</i>	A systematic analysis of site-specific or programmatic activities used to determine whether such activities have a significant effect on the quality of the physical, biological, and human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary.
<i>Environmental Health</i>	Abiotic composition, structure, and functioning of the environment consistent with natural conditions, including the natural abiotic processes that shape the environment.
<i>Eutrophication</i>	The intentional or unintentional enrichment of water.
<i>Fauna</i>	All the animals of a particular region or a particular era.
<i>Flora</i>	All the plants of a particular region or a particular era.
<i>Food Chain</i>	The dependence of organisms upon others in a series of food. The chain begins with plants or scavenging organisms and ends with the largest carnivores.
<i>Goals</i>	Broad statements of direction; end results or positions to be achieved.
<i>Hydrology</i>	The science of water in the hydrological cycle, the sun-driven movement of water between aquatic and terrestrial environments and the atmosphere, including evapo-transpiration, condensation, precipitation, and runoff.
<i>Impoundment</i>	A natural or artificial body of water that is held back by a dam.
<i>Interdisciplinary Team</i>	A group of individuals with varying areas of expertise assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately analyze the problem and propose action.
<i>Invertebrate</i>	An animal without a backbone or internal bony skeleton. Insects, crustaceans, worms, corals, and molluscs are examples.

<i>Mesic</i>	Describing an environment having moderate rainfall and moderately moist, well-drained soils. Mesic plants are those that require moisture.
<i>Monitoring</i>	A process of collecting information to evaluate if an objective and/or anticipated or assumed results of a management plan are being realized (effectiveness monitoring) or if implementation is proceeding as planned (implementation monitoring).
<i>National Environmental Policy Act</i>	An Act passed by the U.S. Congress in 1969 to declare a national policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, and establishes a Council on Environmental Quality.
<i>Natural Conditions</i>	Conditions thought to exist from the end of the Medieval Warm Period to the advent of the industrial era (app. 950AD to 1800AD), based upon scientific study and sound professional judgement.
<i>Objectives</i>	Intermediate-term targets necessary for the satisfaction of Refuge goals; quantifiable measures that serve as indicators against which attainment, or progress toward attainment, of goals can be measured.
<i>pH</i>	A measure of the relative concentration of hydrogen ions in a solution; indicating the acidity or alkalinity of the solution. A pH value of 7 indicates a neutral solution; values that are greater than 7 are basic, and those below 7 are acidic. Vinegar has a pH of 3; ocean water has a pH of approximately 8.
<i>Reptile</i>	A class of vertebrates whose skin is dry, lacking in glands, and covered with scales. Claws are present and skull, limb bones, vertebrae, muscles, and so forth are stronger and more advanced than those of amphibians. Egg fertilization is internal, there is no larval stage, and eggs have a protective, hard shell.
<i>Riparian Area</i>	A geographic area containing an aquatic ecosystem and the adjacent upland areas that directly affects it. This includes floodplain, and associated woodland, rangeland, or other related upland areas. Pertaining to the banks of streams, lakes, wetlands, or tidewater.
<i>Riparian Zones</i>	Terrestrial areas where the vegetation complex and micro-climate conditions are products of the combined presence and influence of perennial and/or intermittent water; associated high water tables, and soils that exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.
<i>Savanna</i>	A community that was historically bordered by the prairies of the west and the deciduous forests of the east. It is a community type

that falls in the middle of a continuum from prairie to forest. Savannas characteristically have less than 50 percent tree crown cover.

<i>Sedge</i>	A grass-like plant, usually having a three-sided stem and clearly three-ranked leaves. The pistil, a female flower part, is surrounded by a sac-like or flask-shaped structure called the <i>perygium</i> .
<i>Sedimentation</i>	The settling-out or deposition of suspended materials.
<i>Sensitive Species</i>	Those plant or animal species for which population viability is a concern as evidenced by a significant current or potential downward trend in population numbers, distribution, density, or habitat capability.
<i>Species Richness</i>	The number of different species in a given area.
<i>Stakeholder</i>	Any group or individual who is affected by or who can affect the future of the Refuge.
<i>Step-Down Management Plans</i>	Tactical plans that describe in detail specific strategies and implementation schedules for management functions (e.g., habitat management, public use, fire, safety, etc).
<i>Strategic Framework</i>	A pattern of purposes, policies, programs, actions, decisions, or resource allocations that describe what the Refuge is, what it does, and why it does it.
<i>Strategies</i>	Step-down approaches that could be used to meet Refuge goals and objectives; provide direction for defining and coordinating operational tasks to effectively perform the Refuge's purpose.
<i>Succession</i>	A gradual change from one community to another and characterized by a progressive change in species structure, an increase in biomass and organic matter accumulation, and a gradual balance between community production and community respiration.
<i>Threatened Species</i>	Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register.
<i>Viable Population</i>	A viable population is one which has such numbers and distribution of reproductive individuals as to provide a high likelihood that a species will continue to exist and be well-distributed throughout its range.
<i>Warm Season Grasses</i>	A grass that grows most during the warmest seasons of the year.
<i>Watershed</i>	The drainage basin contributing water, organic matter, dissolved nutrients, and sediments to a water body.

<i>Watershed Analysis</i>	A systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis is a stratum of ecosystem management planning applied to watersheds.
<i>Watershed Restoration</i>	Actions taken to improve the current conditions of a watershed to restore degraded habitat, and to provide long-term protection to natural resources, including riparian, terrestrial, and aquatic resources.
<i>Watershed Treatments</i>	Specific actions or tools to satisfy the goals and objectives of a watershed project. These may include establishing permanent vegetation on sensitive areas within the watershed (riparian buffers, stream bank stabilization, erosion-prone areas); establishing permanent wildlife habitat for dependent species (warm/cool season grasses, wetlands, sediment retention, erosion, or water control structure basins, field/farmstead windbreaks, shelter rows, and winter food plots); and encouraging Best Management Practices (BMP's) on agricultural lands (strip-cropping systems, terraces, diversions, contour farming, cropland protective cover, conservation tillage, feedlot and manure management).

Appendix C: Species List

Species List

Bird List, Necedah NWR

Common loon	Pied-billed grebe	Double-crested cormorant
American bittern	Green heron	Least Bittern
Great blue heron	Great egret	Black-crowned night-heron
Tundra swan	Trumpeter swan	Greater white-fronted goose
Snow goose	Canada goose	Wood duck
Green-winged teal	American black duck	Mallard
Northern pintail	Blue-winged teal	Northern shoveler
Gadwall	American wigeon	Canvasback
Redhead	Ring-necked duck	Lesser scaup
Greater scaup	Common goldeneye	Bufflehead
Hooded merganser	Red-breasted merganser	Common merganser
Ruddy duck	Turkey vulture	Osprey
Northern harrier	Sharp-shinned hawk	Cooper's hawk
Northern goshawk	Red-shouldered hawk	Broad-winged hawk
Red-tailed hawk	Rough-legged hawk	Golden eagle
Bald eagle	American kestrel	Merlin
Perigrine falcon	Ring-necked pheasant	Ruffed grouse
Northern bobwhite	Wild turkey	King rail
Virginia rail	Sora	American coot
Sandhill crane	Whooping crane	Black-bellied plover
Lesser golden plover	Semipalmated plover	Killdeer
Greater yellowlegs	Lesser yellowlegs	Solitary sandpiper
Spotted sandpiper	Semipalmated sandpiper	Least sandpiper
Baird's sandpiper	Pectoral sandpiper	Western sandpiper
Dunlin	Stilt sandpiper	Short-billed dowitcher
Long-billed dowitcher	Common snipe	American woodcock
Wilson's phalarope	Bonaparte's gull	Ring-billed gull
Herring gull	Caspian tern	Common tern
Forster's tern	Black tern	Rock dove

Bird List, Necedah NWR (Continued)

Mourning dove	Black-billed cuckoo	Yellow-billed cuckoo
Eastern screech owl	Great horned owl	Snowy owl
Barred owl	Great gray owl	Long-eared owl
Short-eared owl	Northern saw-whet owl	Common nighthawk
Whip-poor-will	Chimney swift	Ruby-throated hummingbird
Belted kingfisher	Red-headed woodpecker	Red-bellied woodpecker
Yellow-bellied sapsucker	Downy woodpecker	Hairy woodpecker
Northern flicker	Pileated woodpecker	Olive-sided flycatcher
Eastern wood-pewee	Alder flycatcher	Willow flycatcher
Least flycatcher	Eastern phoebe	Great crested flycatcher
Eastern kingbird	Horned lark	Purple martin
Tree swallow	Northern rough-winged swallow	Bank swallow
Cliff swallow	Barn swallow	Blue jay
American crow	Common raven	Black-capped chickadee
Tufted titmouse	Red-breasted nuthatch	White-breasted nuthatch
Brown creeper	House wren	Winter wren
Sedge wren	Marsh wren	Golden-crowned kinglet
Ruby-crowned kinglet	Blue-gray gnatcatcher	Eastern bluebird
Veery	Swainson's thrush	Wood thrush
American robin	Gray catbird	Brown thrasher
Bohemian waxwing	Cedar waxwing	Northern shrike
European starling	Solitary vireo	Yellow-throated vireo
Warbling vireo	Red-eyed vireo	Blue-winged warbler
Golden-winged warbler	Tennessee warbler	Nashville warbler
Yellow warbler	Chestnut-sided warbler	Yellow-rumped warbler
Black-throated blue warbler	Blackburnian warbler	Pine warbler
Palm warbler	American redstart	Ovenbird
Common yellowthroat	Scarlet tanager	Northern cardinal
Rose-breasted grosbeak	Indigo bunting	Dickcissel
Eastern towhee	American tree sparrow	Chipping sparrow
Clay-colored sparrow	Field sparrow	Vesper sparrow

Bird List, Necedah NWR (Continued)

Henslow's sparrow	Savannah sparrow	Fox sparrow
Song sparrow	Swamp sparrow	White-throated sparrow
White-crowned sparrow	Dark-eyed junco	Snow bunting
Bobolink	Red-winged blackbird	Eastern meadowlark
Western meadowlark	Rusty blackbird	Brewer's blackbird
Common grackle	Brown-headed cowbird	Northern oriole
Purple finch	American goldfinch	House sparrow

Plant List, Necedah NWR

Scientific Name	Common Name
<i>Acer rubrum</i>	red maple
<i>Achillea millefolium</i>	common yarrow
<i>Amelanchier sp.</i>	serviceberry
<i>Andropogon gerardii</i>	big bluestem
<i>Antennaria neglecta</i>	field-pussytoes
<i>Apocynum androsaemifolium</i>	spreading dogbane
<i>Arabis lyrata</i>	sand cress
<i>Arctostaphylos uva-ursi</i>	bearberry
<i>Aronia melanocarpa</i>	black chokeberry
<i>Aster macrophyllus</i>	big-leaved aster
<i>Baptisia lactea</i>	milky white indigo
<i>Betula papyrifera</i>	white birch
<i>Botrychium dissectum</i>	lace-frond grape-fern
<i>Calamagrostis canadensis</i>	bluejoint
<i>Calystegia spithamea</i>	low bindweed
<i>Carex pensylvanica</i>	Pennsylvania sedge
<i>Carex sp.</i>	sedge
<i>Celastrus scandens</i>	American bittersweet
<i>Chimaphila umbellata</i>	prince's pine
<i>Comandra umbellata</i>	bastard toad-flax
<i>Comptonia peregrina</i>	sweet fern

Plant List, Necedah NWR (Continued)

Scientific Name	Common Name
<i>Conyza canadensis</i>	horseweed
<i>Coreopsis palmata</i>	finger-tickseed
<i>Cornus sp.</i>	dogwood
<i>Corylus cornuta</i>	beaked hazel-nut
<i>Crepis sp.</i>	hawk's beard
<i>Cyperus sp.</i>	flatsedge
<i>Danthonia spicata</i>	poverty-oatgrass
<i>Epigaea repens</i>	trailing arbutus
<i>Erigeron annuus</i>	annual fleabane
<i>Euphorbia corollata</i>	flowering spurge
<i>Fragaria virginiana</i>	thick-leaved wild strawberry
<i>Fraxinus pennsylvanica</i>	green ash
<i>Galium boreale</i>	northern bedstraw
<i>Gaultheria procumbens</i>	wintergreen
<i>Gaylussacia baccata</i>	black huckleberry
<i>Gnaphalium obtusifolium</i>	fragrant cudweed
<i>Helianthemum canadense</i>	frostweed
<i>Helianthus divaricatus</i> <i>divaricate</i>	sunflower
<i>Hieracium aurantiacum</i>	orange-red king-devil
<i>Hieracium caespitosum</i>	yellow king-devil
<i>Hieracium floribundum</i>	glaucous hawkweed
<i>Hieracium kalmii</i>	Canada hawkweed
<i>Ilex verticillata</i>	winterberry
<i>Koeleria pyramidata</i>	junegrass
<i>Krigia biflora</i>	orange dwarf dandelion
<i>Lactuca Canadensis</i>	Canada wildlettuce
<i>Lespedeza capitata</i>	bush-clover
<i>Liatris aspera</i>	lacerate blazing star
<i>Lilium philadelphicum</i>	wood-lily
<i>Lonicera dioica</i>	wild honeysuckle
<i>Lupinus perennis</i>	sundial-lupine

Plant List, Necedah NWR (Continued)

Scientific Name	Common Name
<i>Lycopodium lucidulum</i>	shining clubmoss
<i>Lycopodium sp.</i>	clubmoss
<i>Lysimachia ciliata</i>	fringed loosestrife
<i>Lysimachia lanceolata</i>	lance-leaved loosestrife
<i>Lysimachia quadrifolia</i>	whorled loosestrife
<i>Maianthemum canadense</i>	Canada mayflower
<i>Melampyrum lineare</i>	cow-wheat
<i>Panicum sp.</i>	panic-grass
<i>Pedicularis canadensis</i>	forest-lousewort
<i>Phlox glaberrima</i>	smooth phlox
<i>Physalis virginiana</i>	Virginia ground-cherry
<i>Pinus banksiana</i>	jack-pine
<i>Pinus resinosa</i>	red pine
<i>Pinus strobus</i>	white pine
<i>Poa compressa</i>	Canada bluegrass
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Polygala polygama</i>	bitter milkwort
<i>Polygonatum biflorum</i>	Solomon's seal
<i>Populus grandidentata</i>	big-toothed aspen
<i>Populus tremuloides</i>	quaking aspen
<i>Potentilla norvegica</i>	strawberry-weed
<i>Potentilla simplex</i>	old-field five-fingers
<i>Prunus serotina</i>	wild black cherry
<i>Prunus virginiana</i>	choke-cherry
<i>Pteridium aquilinum</i>	bracken fern
<i>Pyrola secunda</i>	one-sided shinleaf
<i>Pyrus ioensis</i>	prairie crab-apple
<i>Quercus alba</i>	white oak
<i>Quercus ellipsoidalis</i>	northern pin oak
<i>Quercus rubra</i>	northern red oak
<i>Quercus velutina</i>	black oak
<i>Rosa carolina</i>	pasture-rose

Plant List, Necedah NWR (Continued)

Scientific Name	Common Name
<i>Rubus hispidus</i>	swamp-dewberry
<i>Rubus allegheniensis</i>	common blackberry
<i>Rubus flagellaris</i>	northern dewberry
<i>Rubus idaeus</i>	red raspberry
<i>Rubus occidentalis</i>	black raspberry
<i>Rubus sp.</i>	bramble
<i>Rudbeckia hirta</i>	black-eyed Susan
<i>Rumex acetosella</i>	red sorrel
<i>Salix sp.</i>	willow
<i>Schizachyrium scoparium</i>	little bluestem
<i>Smilacina racemosa</i>	false spikenard
<i>Smilacina stellata</i>	no common name
<i>Solidago juncea</i>	early goldenrod
<i>Solidago nemoralis</i>	gray goldenrod
<i>Sorghastrum nutans</i>	indian grass
<i>Spartina pectinata</i>	prairie cord-grass
<i>Spiraea alba</i>	meadowsweet
<i>Streptopus roseus</i>	twisted stalk
<i>Taraxacum officinale</i>	common dandelion
<i>Toxicodendron radicans</i>	common poison-ivy
<i>Trientalis borealis</i>	starflower
<i>Uvularia grandiflora</i>	bellwort
<i>Vaccinium angustifolium</i>	common lowbush-blueberry
<i>Vaccinium myrtilloides</i>	velvetleaf-blueberry
<i>Vaccinium pallidum</i>	hillside-blueberry
<i>Verbascum thapsus</i>	common mullein
<i>Viola pedata</i>	bird's-foot violet
<i>Viola sagittata</i>	arrowhead-violet

Mammal List

Virginia Opossum
Big brown bat
Little brown bat
Coyote
Red fox
Gray fox
Gray wolf
Black bear
Common raccoon
Northern river otter
American Mink
American badger
Long-tailed weasel
Least weasel
Fisher
Ermine
Striped skunk
Bobcat
Southern flying squirrel
Northern flying squirrel
Eastern gray squirrel
Eastern fox squirrel
Thirteen-lined ground squirrel
Red squirrel
Chipmunk
Woodchuck
Muskrat
White-footed Mouse
Deer Mouse
Meadow Vole
Meadow Jumping Mouse
Southern Red-backed Vole
Northern Short-tailed Shrew
Masked Shrew
Arctic Shrew
American beaver
Common porcupine
White-tailed deer
Snowshoe hare
Eastern cottontail

Herptile List

Blue-spotted salamander
Central newt
Mudpuppy
Eastern American toad
Western chorus frog
Northern spring peeper
Eastern gray treefrog
Bullfrog
Green frog
Northern leopard frog
Wood frog
Common snapping turtle
Blanding's turtle
Western painted turtle
Midland painted turtle
Midland smooth softshell turtle
Five-lined skink
Eastern hognose snake
Smooth green snake
Western fox snake
Eastern garter snake
Northern water snake

Appendix D: Compatibility Determinations

Compatibility Determinations

The names and dates of compatibility determinations that were approved through the comprehensive conservation planning process:

- Wildlife Observation and Photography (including the means of access, such as hiking, snowshoeing, cross-country skiing, and canoeing) / 2002
- Interpretation and Environmental Education / 2002
- Hunting / 2002
- Fishing / 2002
- Forest Management / 2002
- Trapping / 2002
- Wild Edible Berry Picking / 2002
- Interim Compatibility Determination / 2000

Appendix E: Compliance Requirements

Appendix E / Compliance Requirements

Rivers and Harbor Act (1899) (33 U.S.C. 403): Section 10 of this Act requires the authorization by the U.S. Army Corps of Engineers prior to any work in, on, over, or under a navigable water of the United States.

Antiquities Act (1906): Authorizes the scientific investigation of antiquities on Federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Migratory Bird Treaty Act (1918): Designates the protection of migratory birds as a Federal responsibility. This Act enables the setting of seasons, and other regulations including the closing of areas, Federal or non Federal, to the hunting of migratory birds.

Migratory Bird Conservation Act (1929): Establishes procedures for acquisition by purchase, rental, or gift of areas approved by the Migratory Bird Conservation Commission.

Fish and Wildlife Coordination Act (1934), as amended: Requires that the Fish and Wildlife Service and State fish and wildlife agencies be consulted whenever water is to be impounded, diverted or modified under a Federal permit or license. The Service and State agency recommend measures to prevent the loss of biological resources, or to mitigate or compensate for the damage. The project proponent must take biological resource values into account and adopt justifiable protection measures to obtain maximum overall project benefits. A 1958 amendment added provisions to recognize the vital contribution of wildlife resources to the Nation and to require equal consideration and coordination of wildlife conservation with other water resources development programs. It also authorized the Secretary of Interior to provide public fishing areas and accept donations of lands and funds.

Migratory Bird Hunting and Conservation Stamp Act (1934): Authorized the opening of part of a refuge to waterfowl hunting.

Historic Sites, Buildings and Antiquities Act (1935), as amended: Declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. Provides procedures for designation, acquisition, administration, and protection of such sites.

Refuge Revenue Sharing Act (1935), as amended: Requires revenue sharing provisions to all fee-title ownerships that are administered solely or primarily by the Secretary through the Service.

Transfer of Certain Real Property for Wildlife Conservation Purposes Act (1948): Provides that upon a determination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency can be transferred without reimbursement to the Secretary of Interior if the land has particular value for migratory birds, or to a State agency for other wildlife conservation purposes.

Federal Records Act (1950): Directs the preservation of evidence of the government's organization, functions, policies, decisions, operations, and activities, as well as basic historical and other information.

Fish and Wildlife Act (1956): Established a comprehensive national fish and wildlife policy and broadened the authority for acquisition and development of refuges.

Refuge Recreation Act (1962): Allows the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient funds are available to manage the uses.

Wilderness Act (1964), as amended: Directed the Secretary of Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems and to recommend to the President the suitability of each such area or island for inclusion in the National Wilderness Preservation System, with final decisions made by Congress. The Secretary of Agriculture was directed to study and recommend suitable areas in the National Forest System.

Land and Water Conservation Fund Act (1965): Uses the receipts from the sale of surplus Federal land, outer continental shelf oil and gas sales, and other sources for land acquisition under several authorities.

National Wildlife Refuge System Administration Act (1966), as amended by the *National Wildlife Refuge System Improvement Act (1997)* 16 U.S.C. 668dd668ee. (Refuge Administration Act): Defines the National Wildlife Refuge System and authorizes the Secretary to permit any use of a refuge provided such use is compatible with the major purposes for which the refuge was established. The Refuge Improvement Act clearly defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation and photography, or environmental education and interpretation); establishes a formal process for determining compatibility; established the responsibilities of the Secretary of Interior for managing and protecting the System; and requires a Comprehensive Conservation Plan for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

National Historic Preservation Act (1966), as amended: Establishes as policy that the Federal Government is to provide leadership in the preservation of the nation's prehistoric and historic resources.

Architectural Barriers Act (1968): Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

National Environmental Policy Act (1969): Requires the disclosure of the environmental impacts of any major Federal action significantly affecting the quality of the human environment.

Uniform Relocation and Assistance and Real Property Acquisition Policies Act (1970), as amended: Provides for uniform and equitable treatment of persons who sell their homes, businesses, or farms to the Service. The Act requires that any purchase offer be no less than the fair market value of the property.

Endangered Species Act (1973): Requires all Federal agencies to carry out programs for the conservation of endangered and threatened species.

Rehabilitation Act (1973): Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the Federal government to ensure that anybody can participate in any program.

Archaeological and Historic Preservation Act (1974): Directs the preservation of historic and archaeological data in Federal construction projects.

Clean Water Act (1977): Requires consultation with the Corps of Engineers (404 permits) for major wetland modifications.

Surface Mining Control and Reclamation Act (1977) as amended (Public Law 95-87) (SMCRA): Regulates surface mining activities and reclamation of coal-mined lands. Further regulates the coal industry by designating certain areas as unsuitable for coal mining operations.

Executive Order 11988 (1977): Each Federal agency shall provide leadership and take action to reduce the risk of flood loss and minimize the impact of floods on human safety, and preserve the natural and beneficial values served by the floodplains.

Executive Order 11990: Executive Order 11990 directs Federal agencies to (1) minimize destruction, loss, or degradation of wetlands and (2) preserve and enhance the natural and beneficial values of wetlands when a practical alternative exists.

Executive Order 12372 (Intergovernmental Review of Federal Programs): Directs the Service to send copies of the Environmental Assessment to State Planning Agencies for review.

American Indian Religious Freedom Act (1978): Directs agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Fish and Wildlife Improvement Act (1978): Improves the administration of fish and wildlife programs and amends several earlier laws including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out a volunteer program.

Archaeological Resources Protection Act (1979), as amended: Protects materials of archaeological interest from unauthorized removal or destruction and requires Federal managers to develop plans and schedules to locate archaeological resources.

Federal Farmland Protection Policy Act (1981), as amended: Minimizes the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses.

Emergency Wetlands Resources Act (1986): Promotes the conservation of migratory waterfowl and offsets or prevents the serious loss of wetlands by the acquisition of wetlands and other essential habitats.

Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species, and an interdisciplinary approach with the cooperation of other Federal and State agencies.

Native American Graves Protection and Repatriation Act (1990): Requires Federal agencies and museums to inventory, determine ownership of, and repatriate cultural items under their control or possession.

Americans With Disabilities Act (1992): Prohibits discrimination in public accommodations and services.

Executive Order 12898 (1994): Establishes environmental justice as a Federal government priority and directs all Federal agencies to make environmental justice part of their mission. Environmental justice calls for fair distribution of environmental hazards.

Executive Order 12996 Management and General Public Use of the National Wildlife Refuge System (1996): Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the System.

Executive Order 13007 Indian Sacred Sites (1996): Directs Federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

National Wildlife Refuge System Improvement Act (1997): Considered the “Organic Act of the National Wildlife Refuge System. Defines the mission of the System, designates priority wildlife-dependent public uses, and calls for comprehensive refuge planning.

National Wildlife Refuge System Volunteer and Community Partnership Enhancement Act (1998): Amends the Fish and Wildlife Act of 1956 to promote volunteer programs and community partnerships for the benefit of national wildlife refuges, and for other purposes.

National Trails System Act: Assigns responsibility to the Secretary of Interior and thus the Service to protect the historic and recreational values of congressionally designated National Historic Trail sites.

Treasury and General Government Appropriations Act of 2001 (Public Law 106-554): In December 2002, Congress required federal agencies to publish their own guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information that they disseminate to the public (44 U.S.C. 3502). The amended language is included in Section 515(a). The Office of Budget and Management (OMB) directed agencies to develop their own guidelines to address the requirements of the law. The Department of the Interior instructed bureaus to prepare separate guidelines on how they would apply the Act. The U.S. Fish and Wildlife Service has developed “Information Quality Guidelines” to address the law.

Appendix F: Refuge Operating Needs System (RONS) and Maintenance Management System (MMS)

Refuge Operating Needs System (RONS) and Maintenance Management System (MMS)

Annual Project Funding Needs

Projects	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<i>High Priority Projects</i>													
38. Remodel Annex Building				51,000									
3. Install staff water gauges	75,000												
4. Install well & solar pump		80,000											
2. Sub-divide Sprague-Mather Pool		292,250	292,250	292,250	292,225								
13. Survey/post easements	112,500	112,500	112,500	112,500									
33. <i>New drinking water system</i>	2,666	2,666	2,666	2,666	2,666	2,666	2,666	2,666	2,666	2,666	2,666	2,666	2,666
5. Disturbance regimes	30,066	30,066	30,066	30,066	30,066	30,066	30,066	30,066	30,066	30,066	30,066	30,066	30,066
7. Acquire hydro-axe			201,000										
19. Complete mapping	51,500	51,500	51,500										
23. Ellen Allen Learning Center	12,000												
12. Develop media presentations				5,000									
26. Develop trails		55,000											
11. <i>Acquire voluntary agreements</i>		250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
27. Design/erect 100 signs		66,000	66,000										
6. 30 miles of firebreaks	17,777	17,777	17,777	17,777	17,777	17,777	17,777	17,777	17,777				
30. Accessible blind and trails				40,000		40,000							
29. Design/build visitor center				3,000,000									
<i>Cost of High Priority Projects</i>	\$301,509	\$957,759	\$1,023,759	\$3,801,259	\$592,759	\$340,509	\$300,509	\$300,509	\$300,509	\$282,732	\$282,732	\$282,732	\$282,732
<i>Number of Projects</i>	7	10	9	10	5	5	4	4	4	3	3	3	3

Annual Project Funding Needs (Continued)

Projects	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<i>Medium Priority Projects</i>													
15. Monitor easements		54,500	54,500	54,500	54,500	54,500	54,500	54,500	54,500	54,500	54,500	54,500	54,500
8. Acquire pump engine			108,000										
39. Complete volunteer kit		10,000											
18. 2 sedge meadow studies	5,000	5,000	5,000	5,000									
24. Design/print nature guide			10,000										
22. Develop Fishing Pier		15,000											
10. Rare plant inventory		5,000					5,000					5,000	
20. Develop Observation Tower				30,000									
9. Construct storage building (fire)			100,000										
14. Implement active mgmt.			13,333	13,333	13,333	13,333	13,333	13,333	13,333	13,333	13,333		
17. Research/Doc. water rights		129,000	129,000										
31. Accessible brochures/videos			17,500		17,500								
28. Jr. Duck Stamp contest	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
34. Construct storage building		60,000											
35. Update security system		57,000											
32. New containment facilities		105,000											
36. Hire FT Pr. Lands employee		35,666	35,666	35,666	35,666	35,666	35,666	35,666	35,666	35,666	35,666	35,666	35,666
16. Archaeologist survey			250,000	250,000									
37. Hire FT Wage Gr. employee			26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500
<i>Cost of Medium Priority Projects</i>	\$10,000	\$481,166	\$754,499	\$419,999	\$152,499	\$134,999	\$139,999	\$134,999	\$134,999	\$134,999	\$134,999	\$126,666	\$121,666
<i>Number of Projects</i>	2	11	12	8	6	5	6	5	5	5	5	5	4

Annual Project Funding Needs (Continued)

Projects	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<i>Low Priority Projects</i>													
21. Create 2 parking areas			5,000										
1. Restore 2 wet. complexes		40,500			40,500			40,500			40,500		
25. Develop/install signage	10,000				10,000								
<i>Cost of Low Priority Projects</i>	\$10,000	\$40,500	\$5,000	0	\$50,500	0	0	\$40,500	0	0\$	40,500	0	0
<i>Number of Low Priority Projects</i>	1	1	1	0	2	0	0	1	0	0	1	0	0
Grand Total Costs	\$321,509	\$1,479,425	\$1,783,258	\$4,221,258	\$795,758	\$475,508	\$440,508	\$476,008	\$435,508	\$417,731	\$458,231	\$409,398	\$404,398
Grand Total Number of Years	10	22	22	18	13	10	10	9	9	8	9	8	7
Total Cost All Years													

Appendix G: Mailing List

Mailing List

Elected Officials

Governor Jim Doyle

U.S. Sen. Russ Feingold

U.S. Sen. Herb Kohl

U.S. Rep. Ron Kind

U.S. Rep. David Obey

U.S. Rep. Tom Petri

State Sen. Julie Lassa (District 24)

State Sen. Dale Schultz (District 17)

State Sen. Ron Brown (District 31)

State Sen. Robert Welch (District 14)

State Rep. Marlin Schneider (District 72)

State Rep. Sheryl Albers (District 50)

State Rep. Amy Sue Vruwink (District 70)

State Rep. Louis Molepske, Jr. (District 71)

State Rep. Luther Olsen (District 41)

State Rep. J.A. Hines (District 42)

State Rep. DuWayne Johnsrud (District 96)

State Rep. Terry Musser (District 92)

State Rep. Robin Kreibich (District 93)

State Rep. Jeffrey Wood (District 67)

State Rep. Mary Williams (District 87)

State Rep. Gary Sherman (District 74)

State Rep. Dan Meyer (District 34)

State Rep. Donald Friske (District 35)

State Rep. Jerry Petrowski (District 86)

Local Communities

Town of Cutler

Town of Necedah

Town of Finley

Town of Armenia

Town of Germantown

State Agencies

Wisconsin Department of Natural Resources

University of Wisconsin, Stevens Point

Federal Agencies

USDA, NRCS, Richland Center

U.S. Fish & Wildlife Service, Green Bay Ecological Services Office

Businesses

Pacific Railroad

Georgia Pacific

A&C LTD.

C&B Investments

Castle Rock Estates
Castle Rock Gardens
Castle Rock Lake
Circle Z Corporation
Coltec Industries Inc.
Cranberry Creek
Creative Builders Inc.
Cutler Cranberry
Dairyland Power
Doe Haven Acres
Duckcreek Lodge
First National Bank
For My God and My Country
General Telephone
GMS Builders & Lumber
H&H Cranberries, LLC
H.M. Lake LLC
H.M.S. Company
Half Moon Bay
Halo Rentals Inc.
Hatch Cranberry
JaJo, LLC
Krause Excavating
McKeough Land
Meadow Valley Log Homes
Merz, Inc.
Nekoosa Corporation
Nekoosa Papers Inc.
Northland Cranberries
O'Dells Bay Community
O'Dells Bay Sanitary
Okray Family Farms
Petenwell Corporation
Port Tack, LTD.
Potts and Sonnenburg
Rettop Real Estate Co.
River City Developers
Saks Paint Stores, Inc.
Timberlands, Inc.
TR Development, LLC
TT Dye of Illinois, Inc.
Whitetail Corporation
Wisconsin Land Company
Wisconsin River Power
Wisconsin Weapons, Inc.

Non-governmental Organizations

Defenders of Wildlife
National Wildlife Refuge Association
PEER Refuge Keeper
Sierra Club, Midwest Office
Wolf Haven International
Wisconsin Wildlife Federation

Wisconsin Waterfowl Association
Wisconsin Society for Ornithology
Wisconsin Sharp-tailed Grouse Society
Wisconsin Muzzleloaders Association
Wisconsin Falconers Association
Wisconsin Wildlife Society
Wildlife Forever
Wildlife Conservation Society
Wild Turkey Federation
Whitetails Unlimited
Wetlands for Wildlife
Wildlife Society
Trumpeter Swan Society
Ruffed Grouse Society
River Otter Alliance
The Nature Conservancy
Fund for Animals
Forest History Society
Canvasback Society
Tall Timbers Research
Society of American Foresters
Society for Ecological Restoration
River Network
River Federation
Quail Unlimited
Professional Bowhunters
Prairie Grouse Technical Council
Outdoors Forever
North American Loon Fund
North American Bear Society
New Lisbon Sportsman's Club
National Wildlife Federation
National Wild Turkey Federation
National Trust for Historic Preservation
National Trappers Association
National Rifle Association
National Muzzleloaders Association
National Hunters Association
National Foundation to Protect Eagles
National Audubon Society
International Wilderness
International Osprey Foundation
International Crane Foundation
Hawkwatch International
Greenpeace
Great Bear Foundation
Game Conservation International
Friends of the River
Friends of the Earth
Friends of Animals
Foundation of NA Big Game
Fort McCoy Rod & Gun Club
Environmental Defense Fund
Entomology Society of America

Earth Island Institute
Earth Foundation
Ducks Unlimited
Defenders of Wildlife
Cooper Ornithogological Society
Conservation International
Citizens NR Association of Wisconsin
Camp Douglas Sportsman's Club
Association of Field Ornithologists
American Water Resources
American Fisheries Society
American Conservation Association
American Bass Association
Illinois Outdoor Men's
Istrouma Area Council
Mauston School
Yellow River Property Owners Association
Yellow River Rod & Gun Club
Gateway Area Boy Scouts Council
Society of Tympanuchus Cupido Pinnatus

Tribes

News Media

Adams County Times
Banner Journal & Shopper
Chicago Tribune
Country Today
Dunn County News
Green Bay Press Gazette
Juneau County Star Times
LaCrosse Tribune
Leader-Telegram, Eau Claire
Madison Newspapers
Marshfield News Herald
Milwaukee Journal Sentinel
Portage Daily Register
Sparta Herald
Minneapolis Star Tribune
Stevens Point Journal
The Daily Journal
Tomah Journal
WBOG Radio
WEAU-TV13
Wisconsin Outdoor News
Wisconsin State Journal

Libraries

Kendall Public Library
Adams County Library
Elroy Public Library
New Lisbon Public Library
Hatch Public Library

Necedah Memorial Library
Wonewoc Public Library
University Library, University of Wisconsin-Stevens Point
Portage Public Library
Madison Public Library
McMillan Memorial Library

Appendix H: List of Preparers

List of Preparers

<i>Gabe DeAlessio</i>	<i>Biologist/GIS, Division of Conservation Planning, Great Lakes/Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for GIS mapping.</i>
<i>Jeff Gosse</i>	<i>Regional National Environmental Policy Act Coordinator, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for environmental assessment review and editing and NEPA compliance.</i>
<i>Jane Hodgins</i>	<i>Technical Writer/Editor, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for CCP/environmental assessment review and editing.</i>
<i>Sean Killen</i>	<i>Cartographer, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for GIS development and maps.</i>
<i>Richard King</i>	<i>Biologist, Necedah National Wildlife Refuge, Necedah, Wisconsin. Responsible for CCP/environmental assessment preparation and review.</i>
<i>Jane Lardy Nelson</i>	<i>Editorial Assistant, Division of Conservation Planning, Great Lakes/Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for production assistance and review.</i>
<i>Thomas Larson</i>	<i>Chief, Division of Conservation Planning, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for CCP/environmental assessment review.</i>
<i>Thomas Magnuson</i>	<i>Formerly a planner within the Division of Conservation Planning; currently Fish and Wildlife Biologist, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for project coordination and CCP/environmental assessment preparation and review and editing.</i>
<i>Mary Mitchell</i>	<i>Regional GIS Coordinator, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for GIS development.</i>
<i>Rebecca Power</i>	<i>Park Ranger, Necedah National Wildlife Refuge, Necedah, Wisconsin. Responsible for public involvement, CCP/environmental assessment preparation and review and editing.</i>
<i>Larry Wargowsky</i>	<i>Refuge Manager, Necedah National Wildlife Refuge, Necedah, Wisconsin. Responsible for CCP/environmental assessment review and editing.</i>
<i>Claudia Wondra</i>	<i>Former Editorial Assistant, Ascertainment and Planning, Great Lakes-Big Rivers Regional Office, Ft. Snelling, Minnesota. Responsible for CCP/environmental assessment review and editing.</i>

Appendix I: Resource Conservation Priority Species

Appendix I: Resource Conservation Priority Species

U.S. Fish & Wildlife Service Resource Conservation Species, Region 3

Common Name	Scientific Name	Class
Double-crested cormorant	<i>Phalacrocorax auritus</i>	Birds
Hellbender	<i>Cryptobranchus allenganiensis</i>	Amphibians
Gray bat	<i>Myotis grisescens</i>	Mammals
Indiana Bat	<i>Myotis sodalis</i>	Mammals
American bittern	<i>Botaurus lentiginosus</i>	Birds
Least bittern	<i>Ixobrychus exilis</i>	Birds
Snow Goose	<i>Chen caerulescens</i>	Birds
Canada goose - Migrant population	<i>Branta canadensis</i>	Birds
Canada goose - Eastern Prairie population	<i>Branta canadensis</i>	Birds
Trumpeter swan	<i>Cygnus buccinator</i>	Birds
Wood duck	<i>Aix sponsa</i>	Birds
American black duck	<i>Anas rubripes</i>	Birds
Mallard	<i>Anas platyrhynchos</i>	Birds
Blue-winged teal	<i>Anas discors</i>	Birds
Canvasback	<i>Aythya valisineria</i>	Birds
Bald eagle	<i>Haliaeetus leucocephalus</i>	Birds
Northern goshawk	<i>Accipiter gentilis</i>	Birds
Red-shouldered hawk	<i>Buteo lineatus</i>	Birds
Yellow rail	<i>Coturnicops noveboracensis</i>	Birds
Black rail	<i>Laterallus jamaicensis</i>	Birds
Piping plover - Great Lakes Population	<i>Charadrius melodus</i>	Birds
American woodcock	<i>Scolopax minor</i>	Birds
Common tern - Great Lakes population	<i>Sterna hirundo</i>	Birds
Least tern - Interior population	<i>Sterna antillarum</i>	Birds
Black tern	<i>Chlidonias niger</i>	Birds
Loggerhead shrike	<i>Lanius ludovicianus</i>	Birds
Sedge wren	<i>Cistothorus platensis</i>	Birds

U.S. Fish & Wildlife Service Resource Conservation Species, Region 3

Common Name	Scientific Name	Class
Wood thrush	<i>Hylocichla mustelina</i>	Birds
Golden-winged warbler	<i>Vermivora chrysoptera</i>	Birds
Kirtland's warbler	<i>Dendroica kirtlandii</i>	Birds
Cerulean warbler	<i>Dendroica cerulea</i>	Birds
Grasshopper sparrow	<i>Ammodramus savannarum</i>	Birds
Henslow's sparrow	<i>Ammodramus henslowii</i>	Birds
Dickeissel	<i>Spiza americana</i>	Birds
Bobolink	<i>Dolichonyx oryzivorus</i>	Birds
Eastern meadowlark	<i>Sturnella magna</i>	Birds
Copperbelly watersnake - Northern pop.	<i>Nerodia erythrogaster neglecta</i>	Reptiles
Copperbelly watersnake - Southern pop.	<i>Nerodia erythrogaster neglecta</i>	Reptiles
Lake Erie watersnake	<i>Nerodia sepedon insularum</i>	Reptiles
Eastern massasauga	<i>Sistrurus catenatus catenatus</i>	Reptiles
Lean lake trout - Great Lakes population	<i>Salvelinus namaycush</i>	Fish
Deepwater lake trout - Lakes MI & Huron	<i>Salvelinus namaycush</i>	Fish
Brook trout - Great Lakes population	<i>Salvelinus fontinalis</i>	Fish
Brook trout - Inland population	<i>Salvelinus fontinalis</i>	Fish
Chinook salmon - Great Lakes population	<i>Oncorhynchus tshawytscha</i>	Fish
Coho salmon - Great Lakes population	<i>Oncorhynchus kisutch</i>	Fish
Lake whitefish - 1836 Ceded Territory &	<i>Coregonus clupeaformis</i>	Fish
Kiyi - Great Lakes population	<i>Coregonus kiyi</i>	Fish
Shortjaw cisco - Great Lakes population	<i>Coregonus zenithicus</i>	Fish
Rainbow trout - Lake Taneycomo pop.	<i>Oncorhynchus mykiss</i>	Fish
Lake sturgeon - Great Lakes population	<i>Acipenser fulvescens</i>	Fish
Lake sturgeon - Inland population	<i>Acipenser fulvescens</i>	Fish

U.S. Fish & Wildlife Service Resource Conservation Species, Region 3

Common Name	Scientific Name	Class
Pallid sturgeon	<i>Scaphirhynchus albus</i>	Fish
Shovelnose sturgeon	<i>Scaphirhynchus platyrhynchus</i>	Fish
Paddlefish	<i>Polyodon spathula</i>	Fish
Walleye - 1836, 1837, 1842 Ceded Territory Pop.	<i>Stizostedion vitreum</i>	Fish
Yellow perch - Great Lakes population	<i>Perca flavescens</i>	Fish
Plains minnow	<i>Hybognathus placitus</i>	Fish
Western silvery minnow	<i>Hybognathus argyritis</i>	Fish
Arkansas darter	<i>Etheostoma cragini</i>	Fish
Crystal darter	<i>Ammocrypta asprella</i>	Fish
Eastern sand darter	<i>Ammocrypta pellucida</i>	Fish
Longhead darter	<i>Percina macrocephala</i>	Fish
Niangua darter	<i>Etheostoma nianguae</i>	Fish
Spotted darter	<i>Etheostoma maculatum</i>	Fish
Muskellunge - 1836, 1842 Ceded Territory Pop.	<i>Esox masquinongy</i>	Fish
Neosho madtom	<i>Noturus placidus</i>	Fish
Scioto madtom	<i>Noturus trautmani</i>	Fish
Ozark cavefish	<i>Amblyopsis rosae</i>	Fish
Blue sucker	<i>Cycleptus elongatus</i>	Fish
Sturgeon chub	<i>Hybopsis gelida</i>	Fish
Sicklefin chub	<i>Hybopsis meeki</i>	Fish
Flathead chub	<i>Hybopsis gracilis</i>	Fish
Sea lamprey	<i>Petromyzon marinus</i>	Fish
Eurasian ruffe	<i>Gymnocephalus cernuus</i>	Fish
Round goby	<i>Neogobius melanostomus</i>	Fish
Bighead carp	<i>Hypophthalmichthys nobilis</i>	Fish
Grass carp	<i>Ctenopharyngodon idella</i>	Fish
Black sandshell	<i>Ligumia recta</i>	Mussels
Clubshell	<i>Pleurobema clava</i>	Mussels
Curtis' pearlymussel	<i>Epioblasma florentina curtisii</i>	Mussels
Elktoe	<i>Alasmodonta marginata</i>	Mussels

U.S. Fish & Wildlife Service Resource Conservation Species, Region 3

Common Name	Scientific Name	Class
Fanshell	<i>Cyprogenia stegaria</i>	Mussels
Fat pocketbook	<i>Potamilus capax</i>	Mussels
Higgins' eye pearlymussel	<i>Lampsilis higginsii</i>	Mussels
Mapleleaf	<i>Quadrula quadrula</i>	Mussels
Monkeyface	<i>Quadrula metanevra</i>	Mussels
Northern riffleshell	<i>Epioblasma rangiana</i>	Mussels
Pimpleback	<i>Quadrula metanevra</i>	Mussels
Pink mucket pearlymussel	<i>Lampsilis abrupta</i>	Mussels
Pistolgrip	<i>Tritogonia verrucosa</i>	Mussels
Purple cat's paw pearlymussel	<i>Epioblasma obliquata obliquata</i>	Mussels
Rabbit's foot	<i>Quadrula cylindrica cylindrica</i>	Mussels
Rock pocketbook	<i>Arcidens confragosus</i>	Mussels
Rough pigtoe	<i>Pleurobema plenum</i>	Mussels
Round pigtoe	<i>Pleurobema coccineum</i>	Mussels
Salamander mussel	<i>Simpsonaias ambigua</i>	Mussels
Scaleshell mussel	<i>Leptodea leptodon</i>	Mussels
Sheepnose	<i>Plethobasus cyphus</i>	Mussels
Slippershell	<i>Alasmidonta viridis</i>	Mussels
Snuffbox	<i>Epioblasma triquetra</i>	Mussels
Spectaclecase	<i>Cumberlandia mondonia</i>	Mussels
Threeridge	<i>Amblema plicata</i>	Mussels
Washboard	<i>Megaloniais nervosa</i>	Mussels
White cat's paw pearlymussel	<i>Epioblasma obliquata</i>	Mussels
Winged mapleleaf	<i>Quadrula fragosa</i>	Mussels
Asiatic clam	<i>Corbicula fluminea</i>	Mussels
Zebra mussel	<i>Dreissena polymorpha</i>	Mussels
Iowa Pleistocene snail	<i>Discus macclintocki</i>	Snails
Tumbling creek cavesnail	<i>Antrobia culveri</i>	Snails
Briarton pleistocene vertigo	<i>Vertigo brierensis</i>	Snails
Karner blue butterfly	<i>Lycaeides melissa samuelis</i>	Insects
Mitchell's satyr butterfly	<i>Neonympha mitchellii mitchellii</i>	Insects

U.S. Fish & Wildlife Service Resource Conservation Species, Region 3

Common Name	Scientific Name	Class
Hungerford's crawling water beetle	<i>Brychius hungerfordi spangler</i>	Insects
Wabash belted skimmer	<i>Macaromia wabashensis</i>	Insects
Hine's emerald dragonfly	<i>Somatochlora hineana</i>	Insects
Pseudoscorpion (no common name)	<i>Apochthonous hobbsi</i>	Arachnids
Illinois cave amphipod	<i>Gammarus acherodytes</i>	Crustaceans
Big Creek crayfish	<i>Orconectes peruncus</i>	Crustaceans
Bristly Cave crayfish	<i>Cambarus setosus</i>	Crustaceans
Coldwater crayfish	<i>Orconectes eupunctus</i>	Crustaceans
Belted crayfish	<i>Orconectes harrisoni</i>	Crustaceans
Crayfish (O. illinoisensis)	<i>Orconectes illinoisensis</i>	Crustaceans
Crayfish (O. neglectus chaenodactylus)	<i>Orconectes neglectus chaenodactylus</i>	Crustaceans
William's crayfish	<i>Orconectes williamsi</i>	Crustaceans
Crayfish (O. inermis testii)	<i>Orconectes inermis testii</i>	Crustaceans
Crayfish (O. kentuckiensis)	<i>Orconectes kentuckiensis</i>	Crustaceans
Crayfish (O. sloanii)	<i>Orconectes sloanii</i>	Crustaceans
Crayfish (O. stannardi)	<i>Orconectes stannardi</i>	Crustaceans
Indiana crayfish	<i>Orconectes indianensis</i>	Crustaceans
Mammoth Spring crayfish	<i>Orconectes marchandi</i>	Crustaceans
St. Francis River crayfish	<i>Orconectes quadruncus</i>	Crustaceans
Rusty crayfish	<i>Orconectes rusticus</i>	Crustaceans
Decurrent false aster	<i>Boltonia decurrens</i>	Plants
Dwarf lake iris	<i>Iris lacustris</i>	Plants
Eastern prairie fringed orchid	<i>Platanthera leucophaea</i>	Plants
Fassett's locoweed	<i>Oxytropis campetris var. chartac</i>	Plants
Glade (Darlington's) spurge	<i>Eurphorbia purpurea</i>	Plants
Hall's bulrush	<i>Schoenoplectus hallii</i>	Plants
Hill's thistle	<i>Cirsium hillii</i>	Plants
Houghton's goldenrod	<i>Solidgo houghtonii</i>	Plants
Lakeside daisy	<i>Hymenoxys acaulis var. glabra</i>	Plants
Leedy's roseroot	<i>Sedum integrifolium ssp. leedyi</i>	Plants

U.S. Fish & Wildlife Service Resource Conservation Species, Region 3

Common Name	Scientific Name	Class
Mead's milkweed	<i>Asclepias meadii</i>	Plants
Michigan monkey-flower	<i>Mimulus galbratus</i> var. <i>michigane</i>	Plants
Minnesota trout lily	<i>Erythronium propullans</i>	Plants
Missouri bladderpod	<i>Lesquerella filiformis</i>	Plants
Northern wild monkshood	<i>Aconitum noveboracense</i>	Plants
Pale false foxglove	<i>Agalinus skinneriana</i>	Plants
Pitcher's thistle	<i>Cirsium pitcheri</i>	Plants
Prairie bush-clover	<i>Lespedeza leptostachya</i>	Plants
Running buffalo clover	<i>Trifolium stoloniferum</i>	Plants
Western prairie fringed orchid	<i>Platanthera praeclara</i>	Plants
Peregrine Falcon	<i>Falco peregrinis anatum</i>	Birds
Common loon	<i>Gavia immer</i>	Birds
Northern pintail	<i>Anas acuta</i>	Birds
Lesser scaup	<i>Aythya affinis</i>	Birds
Northern harrier	<i>Circus cyaneus</i>	Birds
Upland sandpiper	<i>Bartramia longicauda</i>	Birds
Barn owl	<i>Tyto alba</i>	Birds
Short-eared owl	<i>Asio flammeus</i>	Birds
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Birds
Northern flicker	<i>Colaptes auratus</i>	Birds
Olive-sided flycatcher	<i>Contopus cooperi</i>	Birds
Bell's vireo	<i>Vireo bellii</i>	Birds
Bewick's wren	<i>Thryomanes bewickii</i>	Birds
Blue-winged warbler	<i>Vermivora pinus</i>	Birds
Prairie warbler	<i>Dendroica discolor</i>	Birds
Worm-eating warbler	<i>Helmitheros vermivorus</i>	Birds
Swainson's warbler	<i>Limnothylops swainsonii</i>	Birds
Bachman's sparrow	<i>Aimophila aestivalis</i>	Birds
Field sparrow	<i>Spizella pusilla</i>	Birds
Ozark big-eared bat		
	<i>Plecotus townsendii lingens</i>	Mammals

U.S. Fish & Wildlife Service Resource Conservation Species, Region 3

Common Name	Scientific Name	Class
Canada lynx	<i>Lynx canadensis</i>	Mammals
Gray wolf	<i>Canis lupus</i>	Mammals
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Birds
Swainson's hawk	<i>Buteo swainsonii</i>	Birds
King rail	<i>Rallus elegans</i>	Birds
Common moorhen	<i>Gallinula chloropus</i>	Birds
Whooping crane - Eastern population	<i>Grus americana</i>	Birds
Piping plover - Northern Great Plains Population	<i>Charadrius melodus</i>	Birds
Greater yellowlegs	<i>Tringa flavipes</i>	Birds
Whimbrel	<i>Numenius phaeopus</i>	Birds
Hudsonian godwit	<i>Limosa haemastica</i>	Birds
Marbled godwit	<i>Limosa fedoa</i>	Birds
Stilt sandpiper	<i>Calidris himantopus</i>	Birds
Buff-breasted sandpiper	<i>Tryngites subruficollis</i>	Birds
Short-billed dowitcher	<i>Limnodromus griseus</i>	Birds
Wilson's phalarope	<i>Phalaropus tricolor</i>	Birds
Forster's tern	<i>Sterna fosteri</i>	Birds
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Birds
Long-eared owl	<i>Tyto alba</i>	Birds
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>	Birds
Whip-poor-will	<i>Caprimulgus vociferus</i>	Birds
Acadian flycatcher	<i>Empidonax virescens</i>	Birds
Cape May warbler	<i>Dendroica tigrina</i>	Birds
Black-throated blue warbler	<i>Dendroica caerulescens</i>	Birds
Prothonotary warbler	<i>Protonaria citrea</i>	Birds
Louisiana waterthrush	<i>Seiurus motacilla</i>	Birds
Kentucky warbler	<i>Oporornis formosus</i>	Birds
Connecticut warbler	<i>Oporornis agilis</i>	Birds
Canada warbler	<i>Wilsonia canadensis</i>	Birds
Le Conte's sparrow	<i>Ammodramus leconteii</i>	Birds

U.S. Fish & Wildlife Service Resource Conservation Species, Region 3

Common Name	Scientific Name	Class
Nelson's sharp-tailed sparrow	<i>Ammodramus nelsonii</i>	Birds
Western meadowlark	<i>Sturnella neglecta</i>	Birds
Rusty blackbird	<i>Euphagus carolinus</i>	Birds
Orchard oriole	<i>Icterus spurius</i>	Birds
Ozark hellbender	<i>Cryptobranchus allenganiensis</i>	Amphibians
Timber rattlesnake	<i>Crotalus horridus horridus</i>	Reptiles
Logperch (P. evermanni)	<i>Percina evermanni</i>	Fish
Logperch (P. manitou)	<i>Percina manitou</i>	Fish
Northern cavefish	<i>Amblyopsis spelaea</i>	Fish
Topeka shiner	<i>Notropis topeka</i>	Fish
Western fanshell	<i>Cyprogenia aberti</i>	Mussels
Tubercled-blossom pearlymussel	<i>Epioblasma torulosa torulosa</i>	Mussels
Cracking pearlymussel	<i>Hemistena lata</i>	Mussels
Neosho mucket	<i>Lampsilis rafinesqueana</i>	Mussels
Ring pink mussel (= golf stick)	<i>Obovaria retusa</i>	Mussels
White wartyback mussel	<i>Plethobasus cicatricosus</i>	Mussels
Orange-foot pimpleback	<i>Plethobasus cooperianus</i>	Mussels
Midwest pleistocene vertigo	<i>Vertigo hubrichti hubrichti</i>	Snails
Occult vertigo	<i>Vertigo hubrichti variabilis</i>	Snails
Iowa pleistocene vertigo	<i>Vertigo iowaensis n. sp.</i>	Snails
Bluff vertigo	<i>Vertigo meramecensis</i>	Snails
Snail (V.bollesiana)	<i>Vertigo bollesiana</i>	Snails
Snail (V. cristata)	<i>Vertigo cristata</i>	Snails
Snail (V. morsei)	<i>Vertigo morsei</i>	Snails
Snail (V. paradoxa)	<i>Vertigo paradoxa</i>	Snails
Dakota skipper	<i>Hesperia dacotae</i>	Insects
Ottoe skipper	<i>Hesperia ottoe</i>	Insects
Powesheik skipper	<i>Oarisma powesheik</i>	Insects
Short's bladderpod	<i>Lesquerella globosa</i>	Plants
Virginia sneezeweed	<i>Helenium virginicum</i>	Plants
Cliff cudweed (Rock catfoot)	<i>Pseudognaphalium saxicola</i>	Plants
Short's goldenrod	<i>Solidago shortii</i>	Plants

U.S. Fish & Wildlife Service Resource Conservation Species, Region 3

Common Name	Scientific Name	Class
Geocarpon (no common name)	<i>Geodarpon minimum</i>	Plants
Virnigia spirea	<i>spiraea virginiana</i>	Plants
Price's potato-bean	<i>Apios priceana</i>	Plants
Leafy prairie clover	<i>Dalea foliosa</i>	Plants
Pondberry	<i>Lindera melissifolia</i>	Plants
Small whorled pagonia	<i>Isotria medeoloides</i>	Plants
Earleaf foxglove	<i>Agalinus auriculata</i>	Plants
Roundstem foxglove	<i>Agalinis gattingeri</i>	Plants
American hart's-tongue fern	<i>Asplenium scolopendrium ver. americanum</i>	Plants

Appendix J: References

References

- Dahl, T.E. 1990. Wetlands losses in the United States 1780's to 1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 21pp.
- Forman, R. and M. Godron. 1986. Landscape ecology. J. Wiley and Sons, New York, 619pp.
- Justis, R.T., R. Judd, and D. Stephens. 1985. Strategic Management and Policy. Prentice-Hall, Inc., New Jersey. 641 pp.
- Keys, Jr., J., et al. 1995. Ecological units of the eastern United States - first approximation (map and booklet of map tables), Atlanta, Ga.: U.S. Department of Agriculture, Forest Service.
- Kohler, M.A., T.J. Nordenson, and D.R. Baker; 1959. Evaporation maps for the United States: US Weather Bureau Tech. Paper 37.
- National Wetlands Policy Forum. 1988. Protecting America's wetlands: and action agenda. The Conservation Foundation, Washington, D.C. 69pp.
- Naugle, D. F., K. F. Higgins, M. E. Estey, R. R. Johnson and S. M. Nusser 2000. Local and landscape-level factors influencing black tern habitat suitability. *Journal and Wildlife Management* 64: 253-260.
- Necedah National Wildlife Refuge. 1994. Forest Management Plan. Unpublished.
- Necedah National Wildlife Refuge. 1994. Oak Barrens Restoration Plan. Unpublished.
- Necedah National Wildlife Refuge. 1979. Refuge Master Plan. Unpublished.
- Necedah National Wildlife Refuge. 1998. Economic Impact Assessment for the Necedah National Wildlife Refuge Comprehensive Conservation Plan. Unpublished.
- Nuzzo, V.A. 1986. Extent and status of mid-west oak savanna: pre-settlement and 1985. *Natural Areas Journal* 6(2): 6-36.
- Oliver, C.D., and B.C. Larson. 1996. Forest stand dynamics. John Wiley and Sons, New York, New York.
- Rosenfield, R. N., J. Bielefeldt, D. R. Trexel, and T. Doolittle. 1998. Breeding distribution and nest-site habitat of northern goshawks in Wisconsin. *Journal of Raptor Research* 32: 189-194.
- Sample, D.W., and M. J. Mossman. 1997. Managing Habitat for Grassland Birds: A Guide for Wisconsin. Wisconsin DNR Publication. 154 pp.
- Samson, F.B., and F.L. Knopf. 1994. Prairie conservation in North America. *BioScience* 44:418-421.
- U.S. Geological Survey Fact Sheet. FS-068-00. May 2000.
- Weeks, E.P., and H.G. Strangland, 1971, Effects of irrigation on streamflow in the Central Sand Plains of Wisconsin: US Geological Survey Open-file Report. 113 p.

Wydeven, A. P. and R. N. Schultz, 1993 and Addendum, 1995. Management policy for wolf den and rendezvous sites background information. Unpul. Report Wis. DNR.

Selected Readings:

Blaustein, A.R., D. B. Wake, and W. P. Sousa. 1994. Amphibian declines: judging stability, persistence, and susceptibility of populations to local and global extinctions. *Conservation Biology* 8(1): 60-71.

Broderson, W. D. 1991. From the surface down, an introduction to soil surveys for agronomic use. Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C, 26 pp.

Cowling, R.M., and W.J. Bond. 1991. How small can reserves be? An empirical approach in Cape Fynbos. *Biological Conservation*. 58:243-256.

Dahl, T.E., C.E. Johnson. 1991. Status and trends of wetlands in the conterminous United States, mid-1970's to mid-1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 28 pp.

Gladwin, D. A., D. A. Asherin, and K. M. Manci. 1987. Effects of aircraft noise and sonic boom on fish and wildlife: results of survey of U.S. Fish and Wildlife Service endangered species and ecological services field offices, refuges, hatcheries, and research centers. U.S. Fish and Wildlife Service, National Ecol. Res. Cent. NERC-88/30).

Herkert, J.R. 1994. The effects of habitat fragmentation on mid-western grassland bird communities. *Ecological Applications* 4(3): 461-471.

Holmes, R.R., Jr. 1997. Suspended-sediment budget for the Kankakee River basin, 1993-95. U.S. Geological Surv., Water-Resources Investigations Rept. 97-120. 8pp.

Johns, D. and M. Soule. 1995. Getting from here to there: an outline of the wild lands reserve design process. *Wild Earth* 5(4): 32-46.

Leach, M.K. and L. Ross, 1995. Midwest oak ecosystems recovery plan: a call to action. Midwest Oak Savanna and Woodland Ecosystems Conference. Springfield, Missouri.

Missouri Dept. of Conservation. 1994. Missouri Department of Conservation launches public-private partnership to restore landscape aspect of grassland habitat. *Habitat Restoration Newsletter* 1(2): 4.

Myers, N. 1996. Two key challenges for biodiversity: discontinuities and synergisms. *Biodiversity and Conservation* 5(9): 1025-1034.

O'Connell, M.A. and R. F. Noss. 1992. Private land management for biodiversity conservation. *Environmental Management* 16(4): 435-450.

Office of Migratory Bird Mgt. 1995. Migratory nongame birds of management concern in the United States: the 1995 list. U.S. Fish and Wildlife Service, Washington, D.C.

Pressey, R. L., I. R. Johnson, and P. D. Wilson. 1994. Shades of irreplaceability: towards a measure of the contribution of sites to a reservation goal. *Biodiversity and Conservation* 3: 242-262.

Ricklefs, R.E. 1990. *Ecology*. W. H. Freeman and Company. New York.

Thiel, R. P., 1993. Eastern Timber Wolf. Life Tracks. Wisconsin Department of Natural Resource and Bureau of Endangered Resources. Publ-500 93REV.

Tiner, R. 1984. Wetlands of the United States: Current Status and Recent Trends, U.S. Fish and Wildlife Service Publication.

Appendix K: Summary and Response to Public Comments

Summary and Response to Public Comments

General Comments and Questions

We received a tremendous number of comments on the Draft Comprehensive Conservation Plan. In this document, the comments and our responses are summarized. A complete list of questions and responses is available online at <http://midwest.fws.gov/planning/necedah/index.html>.

Several people wrote letters supporting Alternative 3, the preferred alternative. Their comments included the following:

- We support Alternative 3 because it provides the most ecological and economic benefits to the region; it is a balanced approach to resource management.
- I support Alternative 3 because it is clear that this is the environmentally-appropriate planning direction for the Refuge.
- I support Alternative 3 because National Wildlife Refuge belongs to everybody and the measures outlined in this alternative will improve habitat and biological diversity.
- I support Alternative 3 because it will provide a high quality of life for all.
- I support Alternative 3 because it expands conservation efforts on private land which Aldo Leopold deemed necessary more than 50 years ago.
- I support Alternative 3 because it correctly identifies the importance of private landowners, maintains a strong emphasis on retaining land in private ownership, and includes working with private landowners as a priority.
- I support Alternative 3 because the Refuge should be able to continue and grow in its achievements.
- We support Alternative 3 for this extremely valuable and biologically-rich region. The people of Wisconsin and the entire United States place a high value on these ecologically critical lands. Only through adoption of Alternative 3 can a full range of positive actions be taken to benefit these lands and waters to the greatest extent possible.
- I support Alternative 3 because it is the only option that suits the needs of the Refuge, the natural community, and the strong conservation goals of both the state and the Necedah area.
- We support Alternative 3 as it best addresses needs of wildlife while including the well-being of landowners surrounding the Refuge.
- I own property next to the Refuge and support Alternative 3, as I would like to see the Refuge increase both habitat and production of waterfowl.
- We support Alternative 3 because it not only addresses the concerns and environment for today, but also looks to the long-term benefits for our natural resources and provides conservation opportunities for private landowners.
- I support Alternative 3 because the Refuge is a rare jewel and deserves protection.
- I support Alternative 3 because the more wildlife areas we have, the better.
- I support Alternative 3 because it represents the best choice for responsible stewards of our Nation's natural resources to pursue.
- My wife and I have been very pleased that the Fish and Wildlife Service is working with us to provide wildflower vegetation on our farmland. This fits with our goal to be good stewards on our farmland. What a great opportunity for us, and now the FWS is able to expand its effectiveness well beyond the boundaries of the Necedah NWR. Win-Win. I am also pleased

to see that you will be expanding services to visitors at the refuge. Thanks for all of your efforts. Our grandchildren will thank you as well!

Some comments suggested that the planning process had been inadequate and that the Service should start over. One writer suggested that instead of preparing a CCP, the Service set up a panel of local people to find ways to prevent the degradation of sensitive land without purchasing land. Acquiring land is just one element of the Refuge's proposal to conserve land in the Yellow River Area; the Refuge is very interested in assisting private landowners with projects on their property. The Refuge is mandated by Congress to prepare a CCP, and this process has included many opportunities for people to voice their ideas on how sensitive land can be conserved.

Another writer suggested that the Service "return to the drawing board" and improve its research tactics, cross-reference statistics, "really involve the public," work more closely with non-profits, and "...prepare a plan that demonstrates a real working knowledge of the culture, people, economy and habitat of the Juneau and Wood County areas."

The Refuge began work on this comprehensive conservation plan in 1997. Many people from Wood and Juneau counties have contributed their time to reviewing the document. We feel that it would be irresponsible to abandon this effort. Our efforts to involve people have included scoping meetings at the beginning of the planning process, project updates, open houses, public meetings, informational meetings, one-on-one meetings, and news releases to local newspapers, television stations and radio stations.

Most of the criticism this comprehensive conservation has drawn has focused on the proposal to expand the Refuge into the Yellow River Focus Area. The comprehensive conservation plan outlines direction for Refuge management for the next 15 years. While some comments have opposed expanding the Refuge, we do not believe that comments about the course we are setting for wildlife and habitat warrant throwing out a document that incorporates comments received from a broad range of people over the course of several years.

Another writer criticized the draft CCP for failing to clarify whether the 150,000 visitors cited in the document includes all activities, Refuge staff and researchers, students, and WCC crews. The writer also states that the draft CCP does not state which activities the figure applies to. The figure refers to all public visits for consumptive (hunting and fishing, for example) and non-consumptive uses (bird watching and hiking, for example). It does not include Refuge staff, volunteers, or WCC crews. This point was clarified in the final CCP.

Data included in the draft CCP was criticized by some reviewers. One individual said that budget information conflicted, noting that number of parking spaces described for a proposed visitor center would barely cover staff parking needs. The writer describes the costs for the proposed visitor center as exorbitant and unsupported. Refuge staff would continue to park private vehicles at the Headquarters building, which has ample parking for staff and Refuge vehicles. Costs for the maintenance shop were less than what had been outlined in the draft plan, in part because a smaller building was built than originally planned. The Service is required to meet a variety of mandates, including the Americans with Disabilities Act, which can make buildings more expensive. Some reviewers described discrepancies between acreages provided both in figures and text. We have attempted to present acreages more clearly in the final CCP.

Another writer questions how the September 11, 2001, terrorist attack on the United States may impact future Refuge budgets. Refuge funding depends on congressional appropriations, and we can never be certain of what funding will occur in the future. As a long-term guide to Refuge management, the CCP has to make some assumptions about funding, however. The funding we describe are based on our experience with the budget process. It is important to note that CCPs are intended to guide

management of a refuge, but they do not constitute a commitment for staffing increases, operational maintenance increases, or funding for future land acquisition.

A reviewer said that the Planning Team used dated numbers for in reporting cord wood harvested from the Refuge. The length of time involved in preparing the Necedah NWR CCP has made some numbers out of date before the plan was completed. Because timber harvest is done to restore and manage wildlife habitat, not for economic reasons, we have not updated this figure.

Some reviewers said that the management alternatives did not address the Refuge's status in terms of complying with statutory mandates. Complying with the law was assumed in all three alternatives considered.

The Refuge's compliance with the 1979 Archaeological Resources Act was noted by one reviewer. The writer questioned why a schedule for step-down plans addressing this issue was not identified in the draft CCP. The revised draft CCP included language addressing this (Objective 5.3.4: "By 2017, in accordance with the Archaeological Resource Preservation Act, protect 100 percent of the known archaeological and cultural resources on the Refuge." Strategies under that objective relate to developing a step-down plan to fulfill requirements of the Archaeological and Cultural Preservation Act.

One person said that the Service provided too little time for review of the draft CCP. Two alternatives were based on another document, the 1979 Master Plan, and review of that document was critical to understanding the CCP, the reviewer said. The original 30-day public review period was expanded by 60 days, which we felt was adequate time to review additional documents. Summary information from the 1979 Master Plan was provided in the draft CCP, which was intended to reduce the need to review the Master Plan.

One reviewer asked for additional information on mitigation of smoke issues and the budget for prescribed burns. The reviewer noted that the budget for prescribed fires had increased, and yet the Refuge would perform the burns with staff. First, smoke mitigation includes but is not limited to transport wind direction, atmospheric conditions, temperature, humidity, fuel moisture, time of day and other factors that relate to how much smoke is created and which direction it moves. Essentially, we try to perform prescribed burns when conditions offer the least potential for heavy smoke. Secondly, federal burning requirements have changed over the years in response to concerns about safety. It takes roughly twice the number of people to conduct a burn, and the Refuge hires burn specialists from other federal agencies to assist at Necedah NWR. These individuals are paid by the Refuge or by their employing agency under a cooperative agreement contract. The federal government has very specific training and physical testing procedures, and for that reason we are not able to call in local fire department personnel. However, individuals who have the minimum requirements can be hired to help conduct prescribed burns. In addition to personnel costs, we also have equipment needs. The Refuge's newest piece of equipment is a 1992 pickup with a 200-gallon water tank. Most of the equipment is of 1960s vintage. Seventy percent of the equipment is military surplus because that is all the Refuge has been able to afford.

Another reviewer questioned how satisfied private landowners have been with the Service's technical assistance. We have not conducted scientific surveys of landowners. Anecdotally, personal contacts indicate that landowners are satisfied with the assistance they receive.

Land Acquisition Comments and Questions

Many questions related to the impacts of land acquisition by the U.S. Fish & Wildlife Service. For instance, one writer asked if drainage on his or her property would change as a result of wetland

restoration. Service staff work with adjacent landowners and drainage districts to ensure that existing drainage facilities or patterns are not negatively impacted by Refuge activities. Like all landowners, the Service is legally prohibited from creating changes in drainage that would negatively impact another landowner.

An individual questioned whether the Drainage District would retain right of access if the Refuge acquired property with an active drainage district for maintenance of drainage ditches, tile and outlets. Like any landowner, the Service is subject to any outstanding rights (easements) on any of the land it acquires.

A reviewer questioned what kind of uses would be deemed compatible on new Refuge lands if they were acquired in the Yellow River Focus Area. It is difficult to anticipate what wildlife-dependent activities would be available without knowing how much land the Service might acquire in the area or when land might be acquired. In general, priority wildlife-dependent activities such as hunting, fishing, wildlife observation and wildlife photography, environmental education and environmental interpretation would be considered as the Service acquired enough land to support those activities.

An individual who was considering buying land in the Yellow River Focus Area questioned whether the Service's possible acquisition of land would impact his or her use of the land, such as building a house or one day selling the land. The U.S. Fish & Wildlife Service cannot have any effect on what you do with your land, so there would be no implications for building a home or selling the land. Your use of your land would be the same with or without the Service as a neighbor.

Another reviewer asked how the Service's ownership of land would affect the local real property tax situation. Because the Service is a federal agency, lands it owns are removed from the tax rolls. However, under provisions of the Refuge Revenue Sharing Act, the county or other local unit of government receives an annual revenue sharing payment to help off-set the loss of taxes. It is difficult to predict how land acquisition within the Yellow River Focus Area would affect property taxes because the Service would be buying from willing sellers only and we cannot predict where land might become available.

Public Involvement Comments and Questions

The Refuge received one comment asking for information on how the Service involved the public in the development of the Necedah NWR CCP. Public participation is a vital part of refuge planning and the Service has worked hard to ensure inclusive public participation in this proposal (see Chapter 6, Table 17). Federal, state, local, and private entities were involved in the CCP/EA development process. These include Wisconsin's Congressional Delegations, the U.S. Department of Agriculture, U.S. Department of Interior, Federal legislative members representing the counties involved, the Wisconsin Department of Natural Resources, representatives from county, township, and other local governments, representatives of national, state, and local conservation organizations, landowners, and other interested groups and citizens. Information about the project was provided to stakeholders and the general public through news releases, presentations, interviews, informational letters, public meetings, briefings, and the Internet. Questionnaires, focus groups, and one-on-one discussions were used to gather input. The Service hosted public scoping meetings at the Refuge and the Necedah Town Hall to exchange information on the refuge proposal. Informational meetings continued over the next 3 years at the request of the general public, government agencies, conservation organizations, and Congressional staff.

One individual said that "statements contained in the CCP vastly over-state the involvement of units of government and the general public in the preparation of the CCP." The individual expressed the belief that affected landowners in the Refuge area had little contact from Refuge staff during the planning process, that input by people opposed to Refuge projects or expansion was severely limited,

and that a breakdown in mediation between the Refuge and landowners indicated that “the refuge does not adhere to policy #96-09.” The number of open houses, public meetings, presentations to groups, and project updates suggests that Refuge staff made every effort to involve the public in this planning process. Two draft CCPs were issued and we asked for comments on both documents and made revisions to the document based on those comments. We did not agree with every comment and did not base every decision on those comments, however. It is important to distinguish between involving and informing the public and reaching total consensus with everyone on every issue discussed in the CCP.

An individual submitted a comment criticizing the Refuge’s partnering and communication with state and local agencies. Specifically, the individual suggested that the Refuge was not working with the U.S. Department of Agriculture and FSA, legislators, U.S. Army Corps of Engineers, and Wisconsin Department of Natural Resources and local drainage ditches, specifically the Little Yellow River Drainage District. Another writer suggested that the Refuge had not sufficiently involved key players and deliberately ignored others.

The planning process afforded numerous opportunities to participate, and no one was ever “intentionally ignored” in this planning process. Partnerships are a way of doing business and the Refuge has worked hard over the years to identify and perpetuate partnerships that enhance the Service and Refuge mission. The Refuge has many active partnerships. The Refuge works with the local drainage board on issues of drainage on and off the Refuge. We have not worked with the Little Yellow River Drainage District because neither the Refuge nor any private lands north of the Refuge are in the drainage District. Refuge staff have working relationships with the Natural Resource Conservation Service on issues of wetland determination, wetland restoration, swamp buster mitigation restorations, and more recently the Wetland Reserve Program since implementation of the 1985 Farm Bill began in 1987. Up to this point, only one Juneau County property has been accepted into the Wetland Reserve Program, but several properties have been evaluated. While not required by the Federal Farm Bill, local agencies, such as Farm Service Agency and the Wisconsin DNR, are frequently consulted in the evaluation process, though not in every case. An example of Refuge partnership is one involving our Partners for Wildlife Private Lands Program and the Hurley property in Juneau County near Lyndon Station. Several wetlands were restored on this tribal property through partnership efforts with Natural Resource Conservation Service and the Wisconsin DNR, with financial contributors being the U.S. Fish and Wildlife Service, the Wisconsin Waterfowl Association, a local heavy equipment contractor, and the Ho-Chunk Nation. At a recognition event held on August 31, 2001, State Senator Shultz, who was a keynote speaker at the event, praised the partnership. The Refuge works closely with members of the Ho-Chunk Nation on issues of archaeological and cultural resource protection.

Wildlife Comments and Questions

In addition to questions about the CCP and criticism of the document, the Service also received several comments supporting the selection of Alternative 3 as the preferred alternative. Comments included:

- I support Alternative 3 because the Refuge is one of the few remaining places people can observe wildlife in a natural state.
- I support Alternative 3 because it allows the Refuge to continue conserving red-shouldered hawks and whooping cranes.
- I support Alternative 3 because it allows the Refuge to conserve threatened and endangered species while protecting thousands of acres of habitat.
- I support Alternative 3 because it is biologically sound and will result in positive gains for the wildlife resources found there, especially the eastern massasaugas.

- I support Alternative 3 because southern Wisconsin is rapidly losing habitat for wildlife and we need to protect what habitat we can in central Wisconsin.
- Numerous people commented on the Refuges whooping crane project and its success. The whooping crane project is a fantastic project which spans our beautiful country. Keep up the good work, you get an “A” on your report from this taxpayer.
- I support Alternative 3 because it is the most favorable for wildlife and provides for new ways to work creatively with adjacent landowners.
- I support Alternative 3 because the whooping crane is still very much endangered and this alternative outlines measures to recover this species.
- I support Alternative 3 because it offers local communities the greatest benefit while it creates a very reasonable land management plan, which will protect endemic and treasured species.
- I support Alternative 3, as it is essential to protect and conserve the gray wolf, whooping crane, bald eagle, and migratory birds that are holding on to survival in this rich ecosystem.
- I support Alternative 3 because it will provide immeasurable benefits for our nation’s wildlife.
- I support Alternative 3 of the draft CCP as it favors endangered and threatened species as well as recovers hundreds of thousands of acres of wild lands.
- I support Alternative 3 because it will benefit wildlife and allow the environment to recover from human abuse.
- We support Alternative 3 because it allows for protection of endangered and threatened species, proper management of waterfowl and other migratory birds, and management of biological diversity while allowing public enjoyment of the property.

In other comments, an individual urged the Refuge to evaluate the effects of roadways within the Refuge, particularly road kills occurring State Highway 80. The Refuge has gated several roads that it maintains and in the CCP reaffirms its commitment to keeping those roads closed. However, township and state roads will remain open to the public as the Refuge has no jurisdiction over them. Per Refuge-specific regulations, the speed limit is 35 miles per hour within the Refuge.

One reviewer questioned why the CCP included an objective to thin some pine plantations even though another objective is to increase the breeding population of Goshawks. The Refuge has documented one Goshawk nest, and this nest occurred in a pine plantation. The Refuge has proposed to conduct “Minimal” management activities on nearly 10,000 acres, and several pine plantations occur within these areas that could benefit Goshawks. Thinnings are proposed on the remaining pine plantations to mimic the natural thinning that is already occurring. All pine plantations will be surveyed for active Goshawk nests prior to thinning.

Several stakeholders recommended strengthening the Refuge’s pest management strategy, saying that the Refuge should strive to reduce or eliminate pest species rather than reducing these species to current (2002) levels. Reviewers said that the Refuge should use pesticides only as a last resort. The Refuge seeks to maintain pest species at 2002 levels because pest species are currently at manageable levels. In general, the Refuge uses pesticides for only one species, spotted knapweed. In 2001, pesticides were used to eliminate a small (<one-quarter acre) patch of leafy spurge that was discovered on the Refuge.

The Refuge was urged to increase the buffer zones around wolf dens designed to protect this species. In an effort to protect wolf dens, we have incorporated wolf management guidelines used by the Wisconsin DNR.

Some reviewers questioned whether expansion of the Hardwood Bombing Range could have negative connotations on Refuge wildlife and whether expansion would occur. In the CCP, the Refuge stated that increased military aircraft activity could negatively affect staging waterfowl and nesting Bald Eagles. This has been documented in scientific literature (see Gladwin, D. A., D. A. Asherin, and K. M. Mancini. 1987. Effects of aircraft noise and sonic boom on fish and wildlife: results of survey of U.S. Fish and Wildlife Service endangered species and ecological services field offices, refuges, hatcheries, and research centers. U.S. Fish and Wildlife Service, National Ecol. Res. Cent. NERC-88/30). Regarding the likelihood of expansion to aircraft activity, in February 2002 the Secretary of the Air Force signed a Record of Decision authorizing the expansion of the Hardwood Bombing Range by over 7,000 acres.

One writer noted that "...conservation of rare and threatened resources should be among the highest priorities for Necedah NWR. The highest priority should be placed on securing high quality natural areas through appropriate management, work with private landowners or when that is not possible fee title acquisition." In recent years the Refuge has placed more emphasis on conservation of listed species and their habitats. The Refuge's savanna restoration efforts are one good example. Work in the Yellow River Area would benefit the Karner blue butterfly and eastern Massassauga.

An individual asked for a description of the Service's policy regarding crop damage resulting from increases in wildlife populations and asked whether the Service intends to make wildlife food plots part of its management plan. Service policy is to use tools such as hunting, lure crops, and habitat manipulation to assure that wildlife, particularly local Canada Geese, do not cause depredation problems on neighboring farmland. While the development of wildlife food plots is not a primary objective of this Refuge, it does remain an option, depending on the site, type of wildlife, and type of food plot. Service policy is to use the most natural means available to meet wildlife objectives. The Service currently uses water-level management on Refuge pools to produce moist soil food for waterfowl and wading birds. This is a more efficient natural food source than food plot row crops and is available for a longer period of time. It also does not add fertilizers and pesticides into the environment. If a localized depredation problem were to arise, the Service, working in concert with the USDA Animal Damage Control Division, would be available to assist in developing a damage abatement program specific to the problem.

Several stakeholders wanted the Refuge to manage ecosystems and ecosystem processes, such as fire, to conserve a wide suite of species rather than focusing on single-species management. Stakeholders saw species protection as the primary goal for managing ecosystems, however, they understood the efficiency of an "umbrella" approach that benefits many species with a single management strategy. The "Ecosystem Approach" is a new standard for the National Wildlife Refuge System. While we have mimicked ecosystem processes by using management tools such as fire and timber harvest for many years, we are now using them in more informed and focused ways. We will continue to refine this approach over the next 15 years by incorporating results from research and monitoring into Refuge management decisions.

One comment stated that the general public was unhappy to learn about the Refuge's eastern massassauga rattlesnake study after snakes had already been placed on the Refuge. The writer perceived a conflict between a CCP statement that the Refuge will not be conducting any Massassauga-related activities on the Refuge proper and references to the methodology that is to be incorporated for reintroduction (See Handbook for Land Managers: 2000; "eliminate all take of eastern Massassauga rattlesnake," p.68). The CCP does not state that any methodology will be used for reintroducing eastern Massassauga rattlesnakes, on the Refuge or within the Yellow River area. The CCP states: "Should the eastern Massassauga rattlesnake occur on the Refuge, the protective measures in 'The Eastern Massassauga Rattlesnake: A Handbook for Land Managers 2000' will be implemented", and "Continue to assist landowners in the Yellow River area, Monroe County, LaCrosse, and Buffalo County with Eastern Massassauga Rattlesnake management support and surveys, in accordance with 'The Eastern Massassauga Rattlesnake: A Handbook for Land Managers'". The handbook referred to here would be used should eastern massassauga rattlesnakes

re-colonize the Refuge from the Yellow River, where a wild population currently exists. As a candidate species for federal listing, managing eastern massasauga, if they occur on federal property, is part of the Service's mission and is mandated by federal law. There are no plans to re-introduce massasauga rattlesnakes on the Refuge or in the Yellow River Area, or to restrict private land use due the presence of massasauga snakes.

A reviewer perceived the CCP as including little active management of mammals on the refuge and said the only management of invertebrates deals with the Karner blue butterfly. Very little active management of mammals occurs on the Refuge. Managing habitat has proven to be the most effective way of managing wildlife, and thus most of the focus is placed on management of habitats, not indigenous species. However, certain game species and small mammals are regulated through hunting and trapping programs.

One comment stated that the CCP fails to address or outline wildlife management problems currently faced on the Refuge. The individual said that a great deal of on-Refuge work is incomplete and there appears to be intentional disregard for several statutory mandates. In the CCP, see Chapter 2 "Planning Process" and the appended Environmental Assessment, Chapter 1, "Purpose and Need for Action." In these sections we discussed the relevant issues currently facing the Refuge, especially in the areas of Service trust resources, habitat, public use, and the Yellow River Focus Area. If there are problems we may have overlooked, then we hope you will bring those to our attention at your earliest convenience. There has been no intentional or unintentional disregard for any statutory mandate.

One writer stated that massasaugas became abundant in the Yellow River only after intensive logging efforts were begun and, therefore, the decline of this species in the Yellow River was due to changes in logging practices. Extensive logging creates ideal habitat for eastern massasaugas as food sources and protection from avian predators become abundant. However, there are many natural disturbances that also contribute to creating and/or maintaining massasauga habitat including herbivory, wildfires, insect outbreaks, disease outbreaks, extreme flooding events, etc. As these disturbances have always been part of the Yellow River landscape (controlled only recently by humans) we can assume that eastern massasaugas have always been part of that landscape as well.

A writer stated that expanded turkey populations will result in high predation rates of eastern massasaugas, thereby thwarting potential recovery efforts. Turkeys will opportunistically kill snakes. This does not preclude eastern massasauga recovery but emphasizes the importance of including woody plant cover in the massasaugas habitat to prevent predation from avian and land-based predators.

A writer stated that woodpecker populations have not changed in the Yellow River and suggested that Refuge personnel may have missed them. A wealth of data demonstrates that some species, including the Red-headed Woodpecker and Cerulean and Prothonotary Warblers, have seen dramatic population declines across North America. The Refuge assumes that given their low abundance in the Yellow River area today, these rare species have declined there as well.

Habitat Comments and Questions

Several stakeholders commented that they support Alternative 3 because it provides ecological and economic benefits. Comments supporting Alternative 3 noted modifications that reviewers would like made to the alternative, including 1) Eliminate any cap on fee-title acquisition of land in the Yellow River Focus Area, 2) adequately protect species such as Goshawks and Red-shouldered Hawks needing interior forests conditions, 3) begin study to address road-kill along Highway 80, 4) expand the size of reference areas, 5) increase the proportion of forest lands in old-growth conditions, and 6) identify roads for elimination to increase security habitat for sensitive species. Comments also included:

- The Refuge and other public properties form the largest wild land complex in the Upper Midwest. The presence of active wolf packs attests to the area's remote qualities. I support Alternative 3 because it provides the most ecological and economic benefits to this region.
- I support Alternative 3 because it outlines efforts to restore early succession habitats. Earlier disappearance of these habitats on the Refuge caused the loss of both prairie chickens and sharp-tailed grouse in the area.
- I support Alternative 3 because wetlands do not have adequate protection and entire ecosystems are threatened.
- I support Alternative 3 because it provides for landscape level management and conservation of critical habitat and other means of ensuring long-term commitment to protection for this important area.
- I support Alternative 3 because the Necedah Refuge deserves adequate protection.
- We support Alternative 3 because it allows the Refuge to move forward with plans such as savanna restoration, which will greatly improve the Refuge for future generations.
- I support Alternative 3 because the work the Refuge conducts is extremely important as loss of wildlife habitat in the Nation is continuous.
- I support Alternative 3 because wilderness habitat is priceless and wonderful and important for our future.

A reviewer questioned why are no floral or faunal surveys were conducted for timber harvest. The Refuge currently conducts pre-harvest vegetation, songbird, and Karner blue butterfly surveys on all of its savanna restorations. Thinning type timber harvest are assumed to not change species composition and are therefore not surveyed. Timber harvests designed to reduce fuel loads in high fire hazard areas are not surveyed as the sales are conducted for safety purposes which has a higher priority than species composition. The Refuge will be conducting precut songbird surveys in all the habitats being converted to open landscape per the CCP and forest management plan.

Some reviewers encouraged the Refuge to eliminate non-native cool season grasslands. The Refuge is taking a proactive approach to suppression or elimination of cool season grasslands. The CCP outlines open landscape and savanna restoration activities which will eliminate several thousand acres of cool season grasses. The Refuge's extensive prescribed burn program targets cool season grasses by burning in the spring after cool season grasses have emerged but the warm season grasses are still dormant.

Although several stakeholders commented that they support Alternative 3 because it provides ecological and economic benefits, they suggested modifications to the alternative: 1) Eliminate any cap on fee-title acquisition of land in the Yellow River Focus Area; 2) adequately protect species such as Goshawks and Red-shouldered Hawks needing interior forests conditions; 3) begin study to address road-kill along Highway 80; 4) expand the size of reference areas; 5) increase the proportion of forest lands in old-growth conditions; and 6) identify roads for elimination to increase security habitat for sensitive species. Regarding the suggestion that we eliminate any cap on fee-title acquisition in the Yellow River Focus Area, we believe that the most successful conservation efforts are those that have the support of the local community. While many people within the Yellow River Focus Area support the Refuge's work there, others have voiced concern about federal land acquisition and involvement in the area. We believe we could accomplish more for conservation without the cap in the short-term, but ultimately we would like to have a positive working relationship with landowners in the Yellow River area. At this time, a cap on land acquisition seems like a good start to building this relationship. Alternative 3 supports Goshawk and Red-shouldered Hawk protection, and we have identified a couple of roadway spurs on the Refuge that could be closed because they are not necessary for either

local access or emergency response vehicles. The suggestion that the Refuge begin a study to address road-kill along Highway 80 is a good one and we will make a note of it.

A writer encouraged the Refuge to increase the amount of “old growth” forests on the property. In the CCP, the Refuge committed to “minimal” management on 10,085 acres. Within these areas, old growth forests will continue to develop. Therefore, the Refuge went from 0 to 10,085 acres of area designated as “old growth areas” as a result of the CCP.

An individual stated that the Refuge has no reason to consider neighboring cranberry marshes a threat to the Refuge. The Refuge maintains that the cranberry industry uses a variety of pesticides that pose threats to wildlife and water quality. Although none of these pesticides have been shown to adversely impact water quality or wildlife on the Refuge, the vectors for contamination currently exist.

One writer took issue with a statement in the CCP concerning partnerships. “The CCP states that in the 12-county area, containing 400 basins and in ‘partnership’ with the Refuge, resulted in the protected status of only 1,824 acres since 1986, with apparently 25 restorations per year. That same page states that in 11 of 17 counties, 41 easements are now in place, conserving 2,475 acres with 418 acres currently under review. It is not clear – as no map of the acreages is provided – to show whether these acreages now under some conservation are one and the same. Furthermore, the document fails to explain how having one additional staff will achieve the goal of restoring 15 acres of wetland per year and 60 acres of grassland within the 12-county area, and 250 acres per year of easements and land acquisition towards the stated 2017 target goal of 3,750 acres, when their current capabilities with existing staff managed to accomplish only 25 restorations per year, and no clarification is provided as to the type of restoration accomplished.”

The comment refers to the Refuge’s Partner for Wildlife program. It should be noted that no mention is made on the pages in question regarding “protected status” as all lands restored through that program remain in private ownership. The 41 Conservation Easements totaling 2,475 acres refers to easements that were transferred to the U.S. Fish and Wildlife Service from the Farmers Home Administration. Those lands (which also remain in private ownership) are encumbered with perpetual easements. However, the 400 basins the writer referred to are wetland restorations on private land and are not under any long-term easement, but only a 10-year cost/share (handshake) agreement.

A writer stated that “Specific mention is made of cranberry bog acreage and expansion of cranberry bogs are stated as a threat. However, prices of cranberries have been at all time lows, with the federal government even providing subsidies in the last year. Thus, the 4 percent expansion per year figure used in the IEc model is highly unlikely, and, in fact, unfounded.” The projection used by Industrial Economics Inc. was made at a point in time (mid-1990s) when the industry was still expanding, and expectations were for a continuation of that growth. We are aware of the recent contraction in that industry.

A reviewer noted that a comprehensive inventory is needed as there may be rare species of plants that have not been identified. *The writer suggested that that work should be a priority for Refuge staff.* Part of what goes into the planning effort is weighing the risk to the resources the Service is mandated to conserve. Because wildlife species such as the Red-shouldered Hawk and the gray wolf (both which use the Yellow River Area) are area-dependent and sensitive to habitat fragmentation, and because working with private landowners takes more time than working on Service land, we felt that Service involvement with private landowners in the Yellow River was a high priority. Staff funding for Yellow River Focus Area technical assistance is a separate fund account and cannot be used for funding staff work on the Refuge proper.

An individual said that an emphasis on specific types of habitat management is absent in step down management plans, which the individual said emphasize bricks and mortar and land acquisition,

including a main office, visitor information system, and housing to accommodate overnight guests. Comprehensive conservation plans are designed to be strategic in nature. Step-down management plans are the planning mechanism the National Wildlife Refuge System uses to get at the details of day-to-day management. However, the Refuge CCP provides a much higher level of detail than most CCPs. Specific habitat management is not absent as the CCP addresses oak savanna restoration, water level management, sedge meadow management, and forest management.

One reviewer criticized the CCP for not containing sufficient information backing up references to air, noise, and water pollution, all things which are viewed as ongoing threats. The writer also noted that descriptions such as “large block” were not defined. Potential expansion of the Hardwood Bombing Range was one of the threats identified in the draft CCP. Since the writing of the draft CCP, that threat has been realized with the recent approval by the Secretary of the Air Force for an additional 7,000 acres to be added to that range. Threats to Refuge water quality (and associated aquatic habitats) from potential agricultural runoff remain. This includes former areas of forest land converted to pivot-irrigation agricultural land for potatoes, sweet corn, and sweet peas. This also includes land converted for cranberry bed establishment. Table 8 in the draft EA states that 510,395 acres of agricultural land are present in the Castle Rock Watershed, in which the Refuge is located. The CCP states that “many of the large natural areas around the Refuge....” Defining “large blocks” can be accomplished, although the definition is only pertinent to the type of habitat being defined and species likely to benefit. For instance, in Chapter 4 of the CCP, one of the grassland strategies states: “establish and maintain a mosaic of small (40 to 1,000 acres) and medium-sized (1,000 to 5,000 acres) native grasslands comprised of short, medium, and tall height-density patches containing diverse structure to provide nesting, brood-rearing, and foraging habitat for grassland birds...”

A reviewer expressed concern that bird and other wildlife populations may be carriers of oak wilt disease and that Refuge policies may endanger the health of oak stand timber stands on private lands. Red oak stands on private land are not at greater risk due to Refuge policies. The fungus is widespread in the state and increases in risk result from individual trees being weakened or damaged. The Refuge policy states that timber sales will not be conducted during times that would spread oak wilt. The opposite may occur as adjacent private landowners unknowingly trim or cut oak wilt-infested trees in April through June. This activity may result in its spread to the Refuge and neighboring properties.

An individual reviewing the Draft CCP was concerned about prescribed fire being used on the Refuge and the potential for fire to escape onto his land. In our policies governing the use of prescribed fire, the Service makes every effort to assure the safety of neighboring properties. The Refuge has conducted prescribed burns for more than 40 years. In that time, more than 100 prescribed burns have been conducted safely with none ever escaping to private property.

Economic Comments and Questions

Comments in support of Alternative 3 included:

- I support Alternative 3 because the Refuge is an important part of Juneau County's tourist industry and deserves our support to continue to develop.
- I support Alternative 3 because it will benefit my business and is the reason I chose to locate my business in close proximity to the Refuge.
- I support Alternative 3 because it provides the most ecological and economic benefits to the region and beyond and provides a balanced approach to resource management on the Refuge and in the Yellow River Focus Area.

One reviewer said that timber harvest data used in the CCP is vague. “The only notation supplied is 40-400 acres per year / 2-4 sales per year. Given annual issuance of permits and contracts in this

regard, more specific data should be disclosed, and would lend some credibility on at least one issue related to economic impact.” The discussion of timber harvest is in reference to savanna restoration, not economic gains or losses associated with Refuge timber harvest activities. The Service prefaced the discussion of social and economic resources with the following statement: “Some of the data used to generate the economic report is associated with uncertainty. As a result, the estimates in the report should be interpreted with uncertainty in mind.” More detailed information is available to the public upon request, and is also available in our Forest Management Plan, a CCP step-down plan. The CCP is not designed to contain this level of detail. Additional data could easily be provided if it is a genuine concern. The Refuge has the number of sales, acreage figures, cruising tallies, and monetary bid information available.

A reviewer criticized the numbers used in evaluation of economic impact, specifically referencing the use of visitor use days as opposed to population figures for the Village of Necedah. The CCP states the “Village of Necedah and surrounding area” total about 3,000 permanent residents. There is no correlation between the number of permanent residents/seasonal occupants and the 106,000 visitors days used in the economic impact assessment.

An individual questioned why a staffing chart totaled 11.55 positions currently, but that an economic indicator of 18 positions is used to calculate contributions to the local economy. The reviewer questioned which number is correct. These are two different numbers. The chart refers to the 11.55 staff positions currently employed at the Refuge. The number in the Economic Impact Assessment refers the number of “jobs” generated by Refuge-related commercial and management economic activities (total 18). These are jobs in the community, not at the Refuge.

An individual stated that no assumptions were made as to the negative economic impact on the local hotel industry, despite the high priority 2002 objective of remodeling the annex for the purpose of housing. Nor is it clear as to whether the annex project is the same as the 2004 volunteer housing project, carrying an expenditure of \$51,000. We believe there would be no negative impact to the local hotel industry. The number of student volunteers is very low (fewer than five) and only occur during the summer months. It has proven nearly impossible to recruit student volunteers to the Refuge without being able to provide housing. These students, even if housed in Refuge housing, would still be purchasing food, gas, and other needed items in the local communities.

A reviewer was critical of the data included in the CCP. “Estimates and ‘factual’ information in the CCP may be inaccurate. The document is rife with different statistics for the same subject matter. The CCP lacks explanations as to how estimates were derived and as presented, calling into question the credibility of the economic impact assessments. Some numbers supplied are antiquated or averaged – more recent information should be available and factored into calculations. Furthermore, some numbers appear to be gross exaggerations. As a result, it is our fear that much of information results in conclusions which are misleading. All of this makes reading the CCP very difficult, confusing, conflicting and perplexing – entirely unacceptable for a federal agency with plenty of staff to research and cross-reference information.” It is difficult to respond to this comment without reference to specific numbers that the writer is questioning. The Economic Impact Assessment was an unbiased report prepared by Industrial Economics Inc., located in Cambridge, Massachusetts. We have made every effort to use the most current data available in the preparation of the Refuge CCP, including this report.

Welfare value estimates (IEc study page 5-5) indicate that each Wisconsin citizen over the age of 18 is willing to contribute \$17 annually toward the existence of the NWR. An annual state parks sticker is approximately this much, but not anywhere near every resident over the age of 18 purchases a pass. Regardless, the 18-years and older principle was not applied to the refuge visitor numbers. Rather, the IEC model used 106,835 annual trips, then applying a societal value of \$21 lower-bound and \$31 upper-bound number to calculate the annual estimated values of \$2.2 million to \$3.3 million of societal contributions. Were we to pose in a survey of 18-year old constituents whether they would willingly

each contribute \$17 per years toward Eagle protection statewide, we predict that more than half of responders would decline to willingly contribute this suggested amount. Were a similar questioned posed to those that fish as to whether they willingly would contribute \$17 annually, we think the response would again be “no,” and if given the opportunity to state a willing contribution, the number would be even smaller, given the limited fishing opportunities on the refuge and our state’s unfortunate tax climate. Were a similar question posed to sportsmen in the hunt for waterfowl and migratory birds, giving them a range of \$14 to \$47 per trip of willing contribution for maintenance of the refuge, again, we believe the response would be similar. We do not contest the figures that big game sportsmen may well be willing to contribute somewhere between \$35 and \$45 per annual trip or that small game hunters may well be willing to contribute \$21 to \$55 per annual trip to the refuge (page 5-11), if nearer the lower end than the upper end of the range. Regardless, using national or statewide averages does not produce accurate data, given Juneau County’s current economic situation. What assumptions were made to calculate the number of visits by those fishing, hunting, photographing since no permits are issued for those activities? Permits are issued for trapping, timber removal, biological research and specimen collecting, commercial photography, and special access for disabled. Why was not this available data not supplied to IEc as it conducted its study? How many permits were issued in recent years in each for each of the permits noted? The CCP and associated study provides no data in this regard.

Assumptions and methodology provide the backbone of economic effects research. The Refuge provided the Industrial Economics economists the best available information at the time the study was prepared. The assumptions made by Industrial Economics relating to social welfare benefits were derived from studies conducted across the country. The above statement that “Welfare value estimates (IEc study page 5-5) indicate that each Wisconsin citizen over the age of 18 is willing to contribute \$17 annually towards the existence of the NWR” is taken out of context. Page 5.5 contains a discussion of research relating to activity day values. Page 5-15 contains a discussion of “Value of Endangered Species” and summarizes research conducted by Boyle and Bishop (1987) in the State of Wisconsin. This research estimated an annual willingness to pay of \$17 for Bald Eagle preservation by Wisconsin households.

As far as permits issued for special uses on the Refuge, we can provide the following:

Special access for the disabled: 2001 = 9; 2000 = 8; 1999 = 4; 1998 = 3.
Commercial photography: 2001 = 19; 200 = 1; 1999 = 0; 1998 = 0.
Specimen Collection: 2001 = 2; 2000 = 3; 1999 = 2; 1998 = 2.
Biological Research: 2001 = 10; 2000 = 0; 1999 = 2; 1998 = 7
Timber Removal: 2001 = 38; 2000 = 31; 1999 = 39; 1998 = 27
Trapping: 2001 = 6; 2000 = 6; 1999 = 6; 1998 = 6.

A reviewer questioned the relationship between Necedah NWR and the local units of government in relation to the comprehensive planning process, saying that the CCP did not specify the obligation of local units of government to devise their own local plans or mention the refuge’s intended participation in local planning processes. The Refuge has not been invited to participate in any local planning effort. The Refuge is however, involved with the State of Wisconsin in management planning for Meadow Valley and other areas through the Central Wisconsin Basin Partnership. If requested, the Refuge will provide support to the local units of government in their respective comprehensive planning process.

A reviewer offered sharp criticism of the Industrial Economic study prepared as part of the planning process, saying that the report is “fatally flawed” because inadequate information was provided. Data provided by the Refuge, such as visitation numbers, are unsupported, according to the reviewer. “Data supplied is not relevant, current, or credible, given the sources in combination with Juneau County’s

depressed economy and significant number of layoffs occurring in the last 8 months, the value of land being substantially higher than figures used in the model, the use of national data in the model, the use of antiquated 1994 data from BLS, BEA, OMB/SIC, and the use of a survey developed by FWS which uses national data (National Survey of Fishing Hunting Wildlife Associated Recreation - 1991)," according to the reviewer. The Service feels the report prepared by Industrial Economic was adequate for this application. Again, the Refuge (and Industrial Economics) used the best information available when completing the Economic Impact Assessment, CCP, and EA. The Economic Impact Assessment was completed in 1998, so some of the data used to generate the report is now outdated.

One reviewer stated that the economic impact and how it was calculated (what multipliers were used and why) needs to use current information and, rather than a regional approach, should provide information specific to Juneau County and Wood County. The reviewer also asked for clarification as to specific segments of the local economy that will benefit and more exact information as to negative impacts is also needed. The economic study was developed to better understand the economic contributions the Refuge makes to the local and regional economy. We feel Industrial Economics Inc. provided the Refuge with an adequate product for the intended purpose.

Public Use Comments and Questions

Comments related to public use supporting Alternative 3 included:

- My family supports Alternative 3 because it allows for construction of a visitor center, restoration of two new wetlands complexes, restoration of savannas and grasslands that will benefit numerous species like the red-headed woodpecker; recovery of endangered species like the Karner blue butterfly and whooping crane, provision of resources to residents in the Yellow River to help them conserve wild turkeys, white-tailed deer, cerulean warblers, Karner blue butterflies, and red-shouldered hawks.
- I support Alternative 3 as it provides education opportunities for the kids of the future and the people of Wisconsin.
- We support Alternative 3 as it provides the greatest number of benefits to these people interested in recreational activities such as hunting, trapping, fishing, and birding.
- I deer hunt on the Refuge but also enjoy walking through the savannas. I support Alternative 3 because it will increase the savannas while allowing for purchase of conservation easements from willing sellers.
- I have been taking students to the refuge for 17 years now; it is an essential part of my conservation class. I see dedicated refuge professionals both paid and volunteer do great things for conservation with nothing more than determination and some left over ex-Army engineer equipment. In the scope of things in this nation their budget is a pittance, but the rewards are unmeasurable.
- I support Alternative 3 because it insures that, like me, my children and grandchildren will see their first porcupine, trumpeter swan, and pileated woodpecker on the Refuge.

Several hunters felt that deer numbers were lower than they had been in the past and many hunters expressed a desire for more deer; although the same hunters sometimes wanted both more deer and bigger bucks. The Refuge is currently part of the State's Deer Management Unit 56 with harvest goals set by the Wisconsin DNR. While the Refuge manages open landscapes and forested areas for a variety of wildlife species, including white-tailed deer, it cannot reliably manipulate deer numbers unless it is managed as a separate management unit.

Many stakeholders felt the Refuge needed to be more active in promoting its programs and presence. More outreach, educational programs and better signs directing people to the Refuge were some suggestions. The Refuge would very much like to be more active in promoting its programs and presence. The CCP lists several objectives under Public Recreation and Education that address the need for clearer, up-to-date signs. Increased funding for staff in this area would greatly improve this program. Present management has greatly elevated this program area at the Refuge in recent years.

Many stakeholders expressed a desire for more fishing opportunities, more full-pool management, and fish stocking programs to enhance fishing success rates. As part of this CCP, the Refuge plans to work closely with state and Service fishery biologists to enhance fish stocks for recreational fishing and food for wildlife. The Refuge currently hosts an annual celebration of National Fishing Day, which usually includes fishing workshops, a fishing contest, and a demonstration of fishing techniques. The Refuge plans to enhance fishing opportunities at Harvey's Pond that will include an accessible fishing pier and a trail around the pond with benches for relaxation.

Several stakeholders expressed concern about Refuge savanna restoration efforts, namely, how that program might impact the quality of their goose hunting. This issue was relative to the Refuge's intent to restore savanna habitat near Suk Cerny Pool. Several meetings occurred with these stakeholders and the issue was resolved when the Refuge agreed to delay savanna restoration efforts in this area for at least 10 years.

One reviewer noted that the CCP described a need for \$57,000 of security-related expenses in 2002 and suggested that it indicated that Refuge staff expect trouble in the future. The reviewer said that if true partnerships were established with neighboring landowners, users/visitors, as well as with county and township officials, such improvements would not be deemed so immediate, nor would such a sizeable expenditure be required. Security-related expenditures are in no way a reflection of how the Refuge perceives relationships within the community. The \$57,000 referred to here is designated to replace and improve the outdated alarm system in the office buildings and provide new security systems for five buildings. We think that we owe it to taxpayers to protect Refuge property and maintain facilities that are secure. A vehicle break-in resulting in the loss of tools and supplies valued at over \$1,500 occurred on November 6, 2001. There were nearly 200 cases of violations against natural resources and property documented in the most recent Refuge Annual Law Enforcement Report submitted to our Washington Office.

A reviewer said that information as to how estimates used in the environmental impact study were derived would provide credibility as to the economic impact. The example cited concerned the CCPs estimate of 10,000 hunting trips in 1996 and 10,500 in 1999. The reviewer questioned what percentage of hunter/sportsmen are primarily within driving distance (e.g. local residents), or what percentage of hunters drove a significant distance, with an overnight stay in the area, thereby actually contributing to the local economy. Informal surveys of hunters by Refuge staff indicates that a large percentage of them come from outside the local area (mostly from the Madison and Milwaukee area). In 1998 the Refuge distributed approximately 5,000 "windshield" questionnaires to deer hunters on the Refuge. Hunters were asked which zip code did they reside in. The majority of the responses came from the Madison and Milwaukee area. It should be noted that the questionnaire was for informational purposes only.

A reviewer questioned the CCP's estimate of fishing trip numbers at 7,000 in 1996, saying that numbers for 1999 state half the 1996 amount of fishing visits – 3,500. The reviewer asks for an explanation of why a significant reduction occurred in only a 3-year period and how the number of visits was determined. The Refuge annually performs a vehicle survey during gun deer season to determine numbers of hunters. The Refuge also has collected data on numbers of out-of-state hunters in recent years. This lends a greater degree of accuracy to hunter number estimates than for fishing. Different survey methodology can account for the difference in Refuge fishing use numbers. The current system is thought to be more accurate than the previous system. The Economic Impact

Assessment notes “Caveats on the Activity Data.” Again, the Service used the best available information available to prepare the draft and final CCP and associated documents.

Another reviewer noted discrepancies in the estimated visitor numbers in different places within the CCP and questions the assertion that visitors result in economic benefit to the community. The reviewer offers the CCP’s estimate that 20,000 visitors came in 1999 to take photographs as an example. The 20,000 figure used in the document pertains just for photographers and refers to visits, not visitors. The majority of these visits were not of the K-12 age group. The sentence reads “almost 20,000 visits were made....” The remaining 96,000 visits were from wildlife observers. According to the Wisconsin Department of Tourism, in the year 2000 Juneau County contributed \$84 million dollars to Wisconsin’s multi-billion dollar tourism industry. We feel the Refuge contribution of \$2.3 million (as stated in the Economic Impact Assessment) is a conservative estimate.

A reviewer questioned the numbers used in describing the economic benefits of trapping on the Refuge. Trapping is rarely seen as an economic activity anymore, but rather a recreational activity that has wildlife management benefits. We believe the \$1,000 figure stated in the CCP is adequate for the intended purpose. Some full-time trappers have reported taking in excess of 100 muskrats daily.

An individual questioned whether Refuge facilities meet Service standards and asked for clarification on improvements proposed in the CCP. The reviewer questioned how the Refuge is going to address special needs and how the type and location of accommodations for disabled people were determined. The Refuge currently has one universally accessible fishing pier and one universally accessible waterfowl blind. We also provide vehicle gate access for class A/B deer hunters. Our office meets all accessibility requirements. We are planning one additional fishing pier at Harvey’s Pond for the disabled. The pier has been funded and installed at a cost of \$15K. Trail work, signing, and parking is yet to be developed with the remaining projected budget.

The CCP states that a press release will be issued annually prior to deer season regarding coyote closure, and a reviewer stated that prior to deer season neither the local radio station nor the local newspaper had received a public service announcement. An article was published the opening day of gun deer season (2001). Please understand, the Refuge has no control over when (or if) the local media chooses to print an item received from the Refuge. Also, objectives and strategies in the CCP are not necessarily effective until the CCP is approved, and it had not been approved in 2001.

A reviewer questioned the location of future parking areas identified in the CCP and who would benefit from the parking areas. The parking area will accommodate mostly deer hunters using the Refuge as well as small game hunters. However, berry pickers and birders will also benefit.

A reviewer asked whether determining appropriate deer hunter use/day numbers means that the Refuge intends to limit hunter opportunities in the future. It might, if hunting conditions pose a safety issue. Twenty percent of the Refuge is open to all small game, waterfowl, and deer hunting (except October Zone T, if applicable). The remaining 80 percent, except for a 2-square-mile safety zone around the office complex, is open for gun deer, late archery deer, and late small game. The entire Refuge is open for spring turkey season, except for a 2-mile safety zone. Refuge hunting opportunities have increased in recent years, both for big game and small game hunting.

An individual questions the IEC study’s statement on deer, turkey, grouse populations related to large block timber cuttings and asks for specific numbers on the amount of acreage now in timber that would no longer exist. The CCP states that by 2017, the Refuge will maintain 10,400 acres of forest land (all types); the Refuge currently has roughly 16,500 acres. We do not agree with Industrial Economics statement that deer and turkey populations, as well as hunter/visitor numbers, will decrease as a result of forest land being converted to open landscapes (i.e., savanna).

A reviewer questions a statement in the CCP regarding abandonment of some township roads, subject to the township's approval, and whether this would mean less access for physically disabled people, local residents and emergency vehicles. The only roads that may be abandoned in the foreseeable future are a couple of dead end spurs, which end at a Refuge gate or wetland site.

Yellow River Focus Area

The Service received several comments supporting conservation work within the Yellow River Focus Area. Comments included:

- I support Alternative 3 because it allows for full utilization of the Refuge and Yellow River. Also, Alternative 3 allows the Refuge to secure lands from willing sellers, which is needed, as the Yellow River is one of the few remaining high-quality northern floodplain forests in Wisconsin.
- I support Alternative 3 because it insures protection of the environment, which should be our main goal with rapid population growth.
- I support Alternative 3 because it insures protection of the Yellow River and Refuge for future generations.
- We support Alternative 3 because it demonstrates the U.S. Fish and Wildlife Service's commitment to cooperatively work with private and state landowners to maximize conservation objectives while also helping to meet quality of life and economic needs of surrounding communities.
- We support Alternative 3 because it would increase the opportunities to work with private landowners to pursue voluntary conservation practices.
- I am a landowner in the Yellow River Focus Area and along with my husband, support Alternative 3 because the resources Refuge staff have provided us.
- We support Alternative 3 because it allows the Refuge to continue and expand work in the Yellow River Focus Area.
- I support Alternative 3 because it helps surrounding landowners protect the area.
- I support Alternative 3 because it best serves the needs of local wildlife and preservation and health of the Yellow River.
- We support Alternative 3 because it would increase the opportunities to work with private landowners to pursue voluntary conservation practices.
- I support Alternative 3 because I own land in the Yellow River Focus Area and this alternative reaffirms landowner rights. This alternative gives us the opportunity to work with whichever government agency we chose to enhance our land which is our right.
- We support Alternative 3 because it proposes a unique private/public voluntary partnership program to work with landowners along the biologically critical Yellow River.
- I support Alternative 3 because it allows the Refuge to acquire additional properties from willing sellers, which will enhance the ability of the Refuge to accomplish its mission. I also believe this will benefit the remaining privately held property in central Wisconsin.
- I am aware of the continuing work with private landowners and the state to protect and restore Yellow River habitats. This, together with the savanna restoration, in my opinion, are the appropriate focal points for the immediate future.
- We support Alternative 3 because the approach that is being taken appears to be an excellent project that will enhance the Yellow River Focus Area, the Refuge and surrounding community.
- I support Alternative 3 because it focuses attention on the Yellow River, which deserves as much protection as a large river like the Mississippi.

- I support Alternative 3 because I believe that voluntary, community-based land conservation, including purchase of conservation easements, holds the greatest potential for both achieving conservation objectives and preserving the rights of property owners.
- I support Alternative 3 because it insures long-term protection of trumpeter swans and fosters important relationships with local land owners in the Yellow River watershed, and such relationships are critical from landscape perspective to providing important breeding habitat for neotropical migratory birds.
- We support Alternative 3 because it supports protection of significant resources found within the Necedah National Wildlife Refuge and the Yellow River Focus Area.
- I support Alternative 3 because it provides for maintenance and restoration of wetlands and acquisition of conservation easements to create a local network of wildlife habitat.
- My strong personal opinion is that the overall good afforded to the citizens of our community by having professionally managed/preserved Yellow River Basin far outweighs the potential loss of tax revenue to the townships and the county. The Yellow River and adjoining forest has an intangible value, not the least of which is its ability to enhance the quality of our lives within Juneau County.
- I support Alternative 3, which would permit interaction with private landowners in the Yellow River in a voluntary manner.
- I support Alternative 3 because I am a landowner in the Yellow River Focus Area and I appreciate the Refuge helping me to clear brush from my property which I can't do because I am too old, as is my equipment.
- I support Alternative 3 because I am a landowner in the Yellow River and the U.S. Fish and Wildlife Service restored my prairie at no expense when I didn't have the means myself.
- I am especially excited about the proposed assistance to be provided to private landowners in the Yellow River Focus Area. We need to expand efforts like this to gain more conservation initiatives through voluntary efforts on privately owned lands. As Aldo Leopold pointed out over 50 years ago, we cannot expect government to set aside enough lands to meet future needs. Efforts like this, to work with willing landowners to benefit habitat on private lands is the key to future conservation success.
- I support Alternative 3 because without it, much of the habitat within and adjoining the Refuge will be lost forever.
- We strongly support your efforts to protect land along the Yellow River Focus Area through conservation easements. We also encourage you to boost your public outreach and education efforts to help explain the advantages of such efforts.
- I believe you're on the right track. Protection of small rivers is, in my opinion, just as important as protecting the Mississippi. In fact, I don't think it's possible to protect the Mississippi without guarding tributaries such as the Yellow.

A reviewer asked for a definition of the term "focus area." The Yellow River Focus Area is just a term the Refuge uses to describe a 21,953-acre area that encompasses a portion of the lower Yellow River that runs parallel to the Refuge to its east. It is an area where the Refuge would like to work with landowners through cooperative agreements, easements, and acquisition to conserve and restore some of the wildlife and habitat associated with the area, such as neotropical song birds that rely on the bottomland forests. It is not a Refuge boundary and is not an official term. "Study area", "area of interest", and "area of opportunity" are other terms often used to describe similar areas of interest to the Service.

A reviewer questioned where would the Service get the money for land acquisition in the Yellow River Focus Area. Typically, money to acquire land for national wildlife refuges comes from the Land and Water Conservation Fund. The Land and Water Conservation Fund derives its money primarily from

the sale of products on federal land, such as offshore oil and gas leases. However, people often donate land to the Service, or money could come in the form of a grant.

Another comment asked whether the Yellow River Focus Area is associated in any way with the Nature Conservancy. The Nature Conservancy has not been involved in any way with the Yellow River Focus Area project.

A reviewer questioned whether he or she would ever be forced to sell land if it were within the Yellow River Focus Area. All habitat conservation, restoration, and management performed in the Yellow River Focus Area by Necedah NWR would be on a voluntary basis. No one will ever be forced to sell their land. From its initiation, landowner participation in all conservation opportunities has been, and always will be, completely voluntary. If a landowner decides to sell land, he or she may sell to whomever they choose.

Another reviewer questioned whether land owned in or around The Yellow River Focus Area or in an area that the Service says has high natural resource value would ever be condemned. Service policy is to acquire land only from willing sellers. While the Service has authority to condemn property, it doesn't use it except to clear title or conserve critically imperiled endangered species (which are rare). The latter is not the case in with this project. Condemnation was used in less than 1 percent of all transactions. In fact, we were directed by Congress to use it in one of the few cases on record. Landowners within the Yellow River Area retain all of their rights, privileges, and responsibilities of private land ownership regardless whether it is a Service focus area or not. The presence of Refuge lands in the Yellow River Focus Area Basin would not afford the Service any authority to impose restrictions on any private lands. Service control of access, land use practices, water management practices, hunting, fishing, and general use is limited only to those lands in which the Service purchases an appropriate realty interest.

An individual questioned whether his or her rights as a property owner would be infringed upon as a result of being in a the Yellow River Focus Area. Private landowners retain all the rights, privileges, and responsibilities of private land ownership, including the right of access, control of trespass, and right to sell or not to sell.

The Service was urged to increase the amount of fee-title acquisitions from willing sellers in the Yellow River Focus Area beyond 250 acres per year as this unnecessarily constrains the ability to purchase large parcels should become available. On the other hand, some stakeholders would like to see the Refuge decrease the proposed fee-title acquisition to zero acres. In an effort to strike a balance among all interested parties, the Refuge decided on 250 acres. In the Environmental Assessment (section 4.6.3.2) it states: "In reality, this figure could be more or less given the uncertainty of future funding scenarios and the presence of willing sellers." The Service supports the right of every property owner to make his or her own decision about land acquisition.

An individual encouraged the Refuge to work with private land owners to conserve large, forested stands in the Yellow River Focus Area to benefit Red-shouldered Hawks. The Refuge encourages landowners to conserve intact bottomland hardwood forest with the exception of areas that hold open-canopy species of concern such as the Golden-winged and Blue-winged Warblers and the eastern massasauga.

A reviewer questioned whether or not it is a conflict of interest if Service employees own land within a Service Focus Area, and whether or not he or she would have inside information regarding the availability of grants or programs and whether he or she would receive a better price if they sold land. It is not a conflict of interest for a Service employee to own land in an area proposed for habitat conservation, restoration, and management by the Service. While he or she may be better informed about the existence of the Service's private lands programs, the individual would not have any inside

information on grants or programs that are available to landowners, nor would he or she have any better access to such programs. If the individual chooses to sell land to the Service, he or she would not get a higher dollar value for his property. The Service is legally mandated to pay fair market value for any land acquired, which means that we cannot pay anyone less than fair market value and we cannot pay anyone more than fair market value.

Some people are concerned that the presence of Service employees and researchers with other agencies might increase their legal liability. The Service is not aware of any circumstance where insurance premiums were ever increased as a result of private land being associated with a Service focus area or private land being located adjacent to a national wildlife refuge.

One reviewer questioned a reference to the Yellow River Focus Area containing 21,952 acres, noting that the number supplied to IEC (the Massachusetts firm which conducted the 1998 study) was 18,100 acres and a total of acreage of the Yellow River Focus Area using map numbers is 21,550, a differential of 402 acres. The reviewer questioned how the same document can contain three different numbers for the same focus area. The correct number is 21,953 acres. Industrial Economics was given the 18,100 acre figure in 1996 before any planning began. Acreage figures were initially derived using Plat Book Maps and later using Geographic Information System (GIS) data supplied through the Wisconsin GAP project. Similarly, no surveys on individual tracts has been done to verify acreage.

A reviewer took issue with the use of a \$1,000 per acre estimate and a weighted assessment ratio used in estimating appraisals as part the discussion of tax implications and noted increases in assessed values in various locations in Wisconsin. The analysis was prepared to illustrate potential tax implications. The \$1,000 per acre figure used in the analysis was out of convenience. We feel it is a fair estimate for the diverse lands (and associated land values) for the Yellow River Area.

An individual disagreed with the Environmental Assessment's analysis of the impact of land acquisition by the Refuge on county tax revenues. The EA described land acquisition as having a neutral effect on tax revenues, and the writer stated that: "To suggest that impact of federal land acquisition is revenue neutral is a gross misrepresentation. In fact, units of government reliant on their tax base would almost certainly experience a negative impact if the federal government purchased additional land in the YRFA. The fact that the CCP attempts to lead readers to believe that would not be the case is inexcusable." In the fall of 2001, an analysis was conducted by the Wisconsin Department of Revenue to estimate tax impacts associated with the Yellow River Focus Area project. According to that study, acquisition of land by the Service in the Yellow River Focus Area would result in a very minimal increase in property taxes for individual landowners in some local municipalities. In others, taxes would actually decrease as a result of Service acquisition. Details of this analysis will be provided in the final Comprehensive Conservation Plan.

In another comment, a reviewer differed with population projections and how they were reported in the CCP and EA. The reviewer also disagreed with housing trends reported in the plan. In the years 1998-2000, the Township of Necedah approved 40, 42, and 47 new sanitary system permits. These numbers were far higher than any of the other townships in the county.

An individual disagreed with the Service's characterization of land within the Yellow River Focus Area as being unprotected from future development, and said that the plan failed to note the number of properties subject to zoning, ordinance and conservation program protections. The writer estimated that 31 percent of the 21,550-acre focus area, or 6,680 acres, could be called "at risk," and noted that that number is higher than the Service's target goal of projected conserved YRFA acreage of 3,750 acres and still leaves considerable acreage at risk. The 3,750 acre per year estimate is based on a potential future funding scenario accommodating up to 250 acres per year (best guess estimate). Further, there are other areas in the Yellow River Focus Area currently under varying degrees of conservation. While the Service applauds private efforts to conserve land, we recognize that some conservation programs do not afford permanent conservation of habitat.

An individual asked for information on how the public and landowners might have input into the review and revision of Refuge step-down plans, and expressed interest in planning concerning the eastern massasauga rattlesnake. The writer is concerned that landowners who killed a massasauga to protect themselves or family members would be breaking federal law. We are prohibited from establishing committees to gather input on step-down management plans by the Federal Advisory Committee Act. While we cannot put you on a committee to develop Refuge management plans, we do invite you to share your concerns with Refuge staff. Regarding your question on eastern massasauga rattlesnakes and laws protecting them, the species is protected by state law presently, not federal law. The eastern massasauga is listed as an endangered species by the State of Wisconsin. If the massasauga were to become federally-listed, it would become one of the trust species for which the Service has management responsibilities. We would also like to point out that occurrence of the species is very rare. One sub-adult eastern massasauga rattlesnake was found on Refuge land east of Highway 80 in 1993, and they are found in very low numbers within the Yellow River Focus Area.

A reviewer questioned how the FWS intends to address tamarack tannic acid discoloration of the Yellow River and associated pH problems in the groundwater. The writer also questions how the Service would address invasive species control without help from the WCC. The Service is not aware of pH data being available for the Yellow River, so we are unable to assess whether there might be impacts for fish populations. The WCC, which assists the Refuge with invasive species control (i.e. leafy spurge) for less than one day a year, is not a major part of the Refuge's invasive species control program. Refuge staff will be able to make up for the loss of WCC assistance.

Another person questioned several statements in the CCP and EA: In reference to statements regarding technical assistance provided and additional land being conserved, what management techniques have been implemented that were not previously available, or what changes have private landowners made that will enhance wildlife habitat; in reference to a statement in the CCP and EA to the effect that conservation easements and acquisition can begin following CCP approval, does that mean that publication of the document will commence the start of the acquisition process regardless of public input; which of the Refuge's goals and objectives can be achieved without acquiring land; and can objectives to increase breeding pairs of waterfowl be achieved without acquiring land in the Yellow River Focus Area.

References in the CCP to technical assistance provided to private landowners illustrates our desire to work with private landowners and our belief that private landowners can make a valuable contribution to conservation. Their efforts will not contribute to Refuge visitor opportunities. Technical assistance helps landowners provide fish and wildlife species with the habitat they need to feed, breed and raise young. This may involve reducing chemical runoff into water, setting land aside from agricultural uses, planting native grass species, installing nesting boxes or a whole host of other techniques. Regarding the question on what publication of the CCP means to land acquisition, completion of the CCP does mean that the Service is adopting the preferred alternative. Adopting the CCP in no way launches the acquisition process, however. It means that if a landowner is interested in pursuing a conservation easement or selling land, the Refuge is authorized to talk to that landowner. Approval of the CCP in no way guarantees that the Refuge will have the funds to buy land even if there are willing landowners. Individuals who do not want to sell land to or work with the Service are not obliged to, and their use of their land will not be affected by the Refuge. We have heard both positive and negative comments about acquiring land in the Yellow River Focus Area, and we have considered all of the comments. The Refuge's goals and objectives were written for the Refuge, not the Yellow River Focus Area. With the exception of Objective 4.2, which relates to conservation within the Yellow River Focus Area, all of the objectives can be achieved without acquisition in the Yellow River Focus Area. Certainly the waterfowl breeding pairs objectives concern the Refuge, not the Yellow River Focus Area.

A reviewer questioned whether the Refuge would qualify for Wilderness designation if acquisition within the Yellow River Focus Area occurred. Even if land were acquired from willing sellers in the

Yellow River Focus Area, Refuge ownership would not contain 5,000 contiguous roadless acres and therefore would not qualify for Wilderness designation.

An individual criticized the CCP's lack of detail on step-down management plans, and wildlife-dependent recreational activities and questions how measures or types of actions proposed would result in improved water quality, improved habitat, greater user satisfaction, etc. Our intent has been to be as specific as possible in the CCP. However, the Yellow River Focus Area involves land we do not own, which makes it impossible to provide detailed information on wildlife-dependent recreation, habitat improvement or water quality. To provide this level of detail, we would need to know which land would be purchased, how much land would be purchased, and when it would be purchased. The Service is committed to working with willing sellers only when we acquire land for the National Wildlife Refuge System, which means that we buy land only when the seller is ready to sell. We cannot predict where land might be purchased or how much land might be purchased. In general, we believe that water quality will benefit in the long-term by habitat conservation. Any land acquired by the Service will be evaluated for compatible wildlife-dependent recreation, including hunting, fishing, wildlife observation, wildlife photography, environmental education and environmental interpretation.

Appendix L: Necedah NWR Yellow River Focus Area Land Protection Plan

Land Protection Plan

Revised March 2003

Introduction

In late 1996, the U.S. Fish and Wildlife Service (Service) initiated a planning process aimed at evaluating the feasibility of restoring and conserving approximately 21,953 acres of land located directly adjacent to the Necedah National Wildlife Refuge (Refuge). An expansion of 14,684 acres in the currently authorized Refuge boundaries is proposed under this plan to facilitate habitat restoration and conservation in a part of the Yellow River Focus Area (Figure 1). The planning process, which was done in association with the Refuge's Comprehensive Conservation Plan, included a thorough review of opportunities and issues related to fish and wildlife resource management by the Service in that area, as well as an assessment of roles the Service might take in achieving its mission, that of the National Wildlife Refuge System, and resource objectives for the Great Lakes/Big Rivers Region. The planning process was initiated in response to the declining status of numerous Service trust resources in the area and interest among diverse stakeholders within the area and the region.

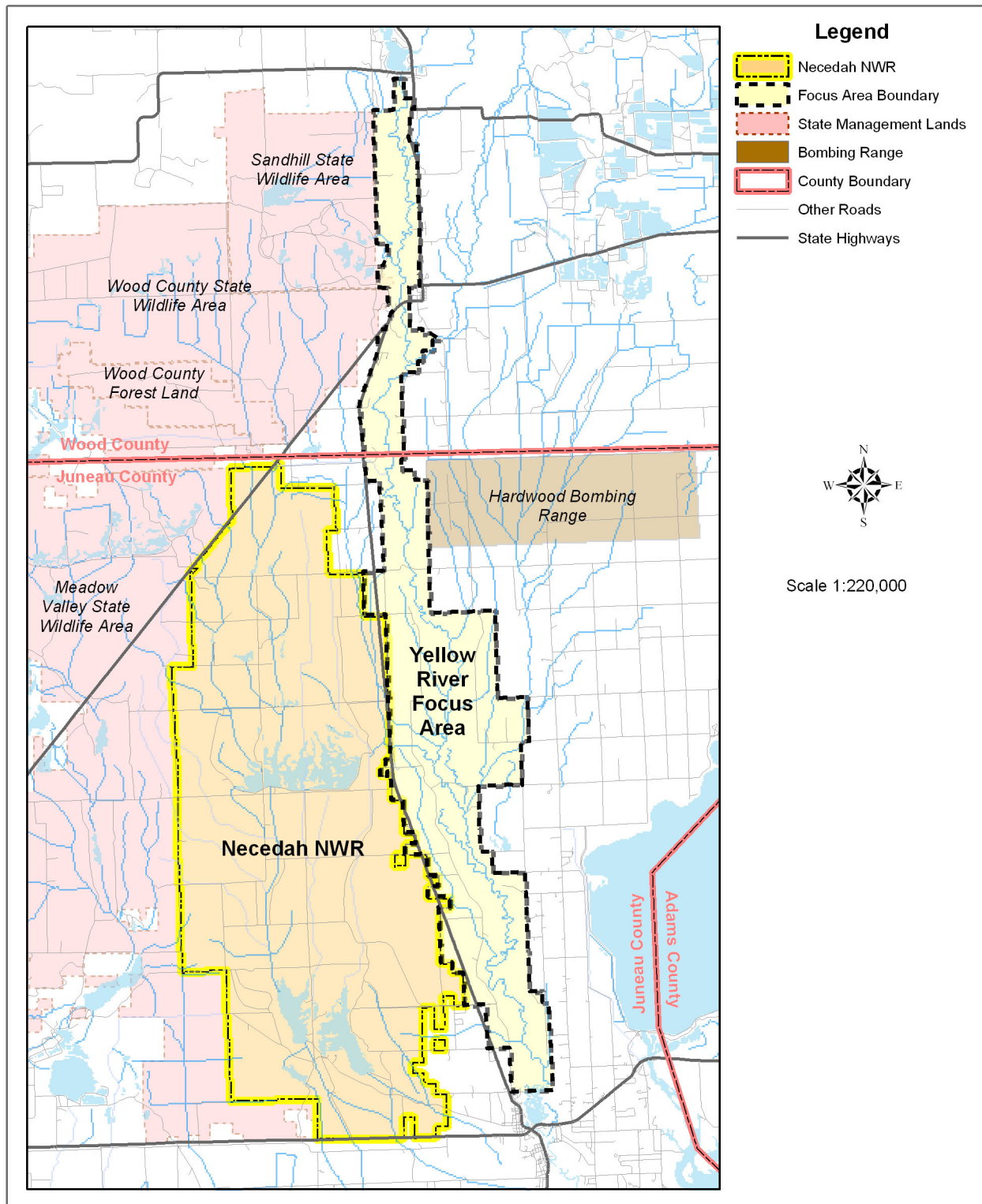
The Yellow River Focus Area (Figure 1) spans roughly 25 miles north and south by 2-3 miles east and west. The project represents a unique opportunity for the Service to conserve rare and declining bottomland forest and adjacent upland habitat for the benefit of migratory birds, threatened and endangered species, public recreation, and environmental education. Many rare, uncommon, and declining species of animals have been documented in the Yellow River Focus Area in recent years. Many of them are sensitive to size, isolation, context, and quality of habitat. These include the Eastern Massasauga rattlesnake, Blanding's turtle, Red-shouldered Hawk, Cerulean Warbler, Acadian Flycatcher, Yellow-crowned Night-heron, Prothonotary Warbler, and Louisiana Waterthrush. Several neo-tropical migrants that are suspected of or exhibiting extensive population declines that use the area include the Veery, Wood Thrush, Sedge Wren, Blue-winged Warbler, and Golden-winged Warbler. Waterfowl species include Mallard, Wood Duck, and Hooded Merganser. Bald Eagles utilize the area year-round and at least one active nest has been documented. Great Blue Heron rookeries are found in the Yellow River Area as well as extensive Wood Duck nesting. Federally listed endangered Karner blue butterflies are also found on Friendship and Plainfield soils throughout the area. These soil types offer potential for expansion of oak savanna and the restoration of essential Karner blue butterfly habitat. The Focus Area is referenced several times in the Draft Karner Blue Recovery Plan (see <http://midwest.fws.gov/Endangered/insects/kbb/kbb-rplan.html>).

Federal, state, and local conservation organizations strongly support stewardship and conservation of the Yellow River Focus Area (see attached letters). The Yellow River Focus Area project was developed out of the Central Wisconsin Basin Partnership (Partnership), which is a Partnership coordinated by the Wisconsin Department of Natural Resources (DNR) that includes federal and state agencies, private conservation organizations, business and industry groups, university faculty, and others committed to conserving the Wisconsin River Basin. The Yellow River is a high priority Partnership project that includes the Upper Yellow River (a State of Wisconsin Priority Watershed project that emphasizes U.S. Department of Agriculture (USDA) programs and private partners), the Middle Yellow River (the Refuge's Yellow River Focus Area project that emphasizes private partnerships, easements, and land acquisition) and the Lower Yellow River (a Wisconsin DNR Focus Area). The Yellow River Focus area is referenced multiple times in the Karner Blue Butterfly Recovery Plan.

Threats To and Status of the Resource

The need for additional wildlife habitat conservation, restoration and management in the Yellow River Focus Area has been made clear by the declining status of numerous grassland, savanna, and wetland

Figure 1: The Yellow River Focus Area



dependent species of birds and numerous studies that have demonstrated that habitat loss or degradation is a common causal factor in many of those declines.

Of the estimated 221 million acres of wetland habitat present in the lower 48 states at the time of colonial America, only 103 million acres remain (47 percent). Draining, dredging, filling, leveling, and flooding have reduced wetlands by 50 percent or more in 22 states, and 10 states have lost 70 percent or more (Dahl 1990). Prior to European settlement, Wisconsin had approximately 10 million acres of wetlands. Currently less than 47 percent remain.

In recent years, many plant and animal species associated with Midwestern grasslands have experienced serious declines, primarily due to habitat loss and alteration of natural structure and function (e.g., predation, exotic species, fire suppression, habitat fragmentation, drainage/flooding). The original tallgrass prairie, which extended from western Indiana to the eastern part of Kansas, Nebraska, and North and South Dakota and south to Oklahoma and Texas, has been virtually eliminated throughout its historic range. Recent surveys suggest that 82.6 to 99.9 percent declines in the acreage of tallgrass prairie have occurred in 12 states and one Canadian province since European settlement. The State of Wisconsin has lost over 99 percent of its original prairies. For years following the initial conversion of native Midwestern prairies, many prairie-dependent wildlife remained relatively stable through their ability to colonize agricultural grasslands. However, 20th century agricultural grassland loss has followed a similar path of decline as native prairie loss in the 19th century. In many parts of the Midwest, agricultural grasslands are at their lowest level in more than 100 years.

Similarly, oak savanna, which covered approximately 27-32 million acres of the Midwest prior to European settlement (Nuzzo 1985), has become one of the nation's most endangered ecosystems (Noss et al. 1995). Nationwide, over 99 percent of our original savanna has been lost, and Midwestern oak savannas are among the rarest ecosystems in the nation. Historically, Wisconsin had roughly 4 million acres of savannas. Today, less than 60,000 acres remain, and much of what remains is highly degraded and of limited value for wildlife. Nuzzo (1985) found that by 1985 only 113 sites (2,607 acres) of quality oak savanna remained across the Midwest. Development has destroyed, fragmented, and disrupted the natural processes needed to maintain quality oak savanna ecosystems.

The wide-scale loss of oak savanna and pine barren ecosystems across 12 states and the province of Ontario, Canada, has had severe negative impacts on Karner blue butterflies (Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement, 1999). As a result, the Karner blue butterfly was proposed for federal listing on January 21, 1992, and listed as endangered on December 14, 1992. Today scattered populations are only found in portions of New Hampshire, New York, Michigan, Wisconsin, Indiana, and Minnesota. The Refuge is home to the world's largest remaining population of Karner blue butterflies, providing habitat for 12 population complexes. No critical habitat has been designated for this species. The long-term effect of these landscape-scale losses of important ecosystems has yet to be determined.

The long-term declines in early successional forests across the north-eastern and north-central United States has contributed to the decline of many bird species. Selective harvesting, fire suppression, urban sprawl, and cessation of agricultural abandonment contributed to the present imbalance in distribution of young forests (Oliver and Larson, 1999).

While rich in biological diversity, the Yellow River Area is experiencing degradation, primarily due to rural development and lack of habitat management. The Yellow River Area would benefit from habitat conservation and management practices designed to sustain its ecological value, namely conservation of habitat through financial incentives to landowners, prescribed fire, mowing, wetland and upland restorations, forest management. Recreational development pressures are high in the area. An expansion of agricultural activities could directly impact Yellow River habitats, and create many indirect impacts due to fragmentation, withdrawal and discharge of surface and ground waters, and

construction of infrastructure. Of late, a new round of human-induced change threatens many remaining ecosystems in the Yellow River Focus Area. In a trend called “rurbanization,” rural areas containing quality wildlife habitat are being converted to a more densely developed state. In recent years, the population surrounding the Refuge has expanded, while the size of the undeveloped land base continues to shrink, leaving many natural areas as scattered fragments of increased importance for scientific study, education, and conservation of natural ecological processes. According to the U.S. Census, the Town of Necedah and the Town of Finley grew by 34 percent and 27 percent, respectively, between 1990 and 2000. As a result, many of the large natural areas around the Refuge (and in the Yellow River Area) are at risk of being fragmented through housing development, driveways, etc., which diminishes the value of these areas for area-sensitive wildlife like the Bobolink, Prairie Chicken, and many large mammals. Habitat size, shape, and amount and type of edge are important factors in the reproductive success of many grassland birds. It is this type of development that particularly threatens the remaining oak savanna habitat in this region. Without management, most areas will continue to degrade due to their size, isolation, absence of natural processes such as fire and hydrologic cycle maintenance, and inadequate buffers protecting them from surrounding agricultural and urban land uses. It also places greater demands on the Refuge and its partners in terms of safeguarding Refuge ecosystem structure and function for the benefit of Service trust resources.

The Yellow River Focus Area provides a unique opportunity for the Service to conserve rare and declining bottomland forest and adjacent upland habitat for the benefit of listed species, waterfowl and other migratory birds, and native biological diversity. According to Wisconsin’s Statewide Natural Area Inventory, extensive field reconnaissance by the Refuge and other sources, the Yellow River Area represents one of the few remaining quality bottomland hardwood forest ecosystems in the Midwest. Silver maple, swamp white oak, green ash, and river birch dominate the floodplain, while the lower sandy ridges, slightly higher than the flood plain, support white oak, bur oak, shagbark hickory, basswood, and white pine. The highest of these areas were once oak and pine savannas, one of North America’s most endangered habitats, with only .02 percent of its pre-settlement acreage remaining. The shrub spectrum within the area varies in density from sparse to impenetrable, and includes buttonbush, dogwoods, prickly ash, winterberry, and wild grapes. The herbaceous layer of the forested areas support wood nettle, coneflowers, ferns, and many sedges. Aggressive non-native species are currently not an issue within the area. Table 1 summarizes land cover types found within the Yellow River Focus Area.

Table 1: Current Land Cover Types in the Yellow River Focus Area

Land Cover Type	Acres
Open Landscapes (grasslands, savannas, shrub land, old fields, agricultural lands)	2,593
Coniferous Forests	483
Mixed Deciduous and Coniferous Forests	1,329
Broad-leaf Deciduous Forests	3,909
Emergent Wetlands and Wet Meadows	1,847
Forested Wetlands	10,259
Lowland Shrubs	1,485
Open Water Areas	45
Total all cover types in the Yellow River Focus Area	21,953

Many Federal, state, and local conservation organizations support stewardship and conservation of the natural resources in the Yellow River area. Several property owners have indicated an interest in selling their land and/or a conservation easement on their land to the Service. Many landowners within the 21,953-acre Yellow River Focus Area have contacted the Refuge in recent years in search of technical assistance in managing their land for wildlife. The Refuge strives to accommodate these landowners through its Partners for Wildlife Program and by facilitating technical assistance through partnerships with other government and non-government entities.

Proposed Action

The Service is proposing to facilitate the restoration, conservation, and management of up to 21,953 acres of land within the Yellow River Focus Area. Of the total acreage, 3,135 acres are in public ownership already. The Service would work with landowners and governmental agencies in the northern 4,748-acre portion of the Focus Area (Figure 2) through voluntary partnerships to accomplish the conservation goals. In the 17,234 acre southern portion (Figure 2), the Service's first priority would also be to work with landowners and agencies through voluntary partnerships to conserve and restore habitats. However, if private landowners in the southern portion were only interested in selling an easement or fee-title to their land, the Service would consider acquisition there, depending upon the tract's priority and the availability of funds. There are 14,684 acres of private land in the southern portion, amounting to 67 percent of the entire 21,953 acre focus area.

Protection Alternatives

This section outlines and evaluates three strategic alternatives for the restoration and conservation of approximately 21,953 acres of wetland, upland, and riparian habitats within the Yellow River Focus Area. See the Necedah NWR Comprehensive Conservation Plan Environmental Assessment for a more detailed description of the alternatives.

Alternative 1& 2:

Under Alternatives 1 and 2, the Service would not seek realty interests in land and water within the Yellow River Focus Area. The Refuge would continue to offer landowners support through the Refuge's Partners for Wildlife program. The wetlands, uplands, plants, wildlife, and people of the area would continue to be impacted by the lack of a central management plan for the area, which may lead to residential and agricultural development in undesirable locations or proportions, unmonitored water quality changes, declines in quality recreational and aesthetic experiences, and declines in the economic value of the Yellow River to local communities. Waterfowl, Sandhill Cranes, other waterbirds, songbirds, fish, and many resident wildlife species would likely decrease over time as habitat degradation occurred. Unique plant communities could be degraded or lost due to conversion of additional wetlands to agricultural lands, namely cranberry production. Archeological resources would be offered little conservation and subject to loss. Public use opportunities would be limited to private landowners, others with permission from landowners, and the general public on the public lands in the area.

Alternative 3: (Preferred)

Under this alternative, the Service would seek to partner in habitat restoration and conservation efforts with the public land managers and with the private landowners within the Partnership Area 1 portion of the Focus Area (northern portion of the Focus Area). Land acquisition by the Service is not an option in this area but the Service would be able to provide technical assistance and possibly financial assistance through the Partners for Fish and Wildlife Program. Within that portion of the Focus Area designated as Partnership Area 2 (southern portion of the Focus Area), the Service could also provide technical and financial assistance through the Partners for Fish and Wildlife program. However, the Service would also facilitate the conservation of approximately 250 acres per year from willing sellers using outreach and technical assistance, cooperative management agreements, conservation easements and fee-title purchase of land (and/or donations from private parties) or a

combination of all methods, depending on site, circumstances, and landowner interests. The estimate of 250 acres per year is based upon historical land acquisition funding levels in Region 3 of the U.S. Fish & Wildlife Service, which includes Wisconsin. Only the private ownerships in the area would be eligible for Service acquisition and then only if the landowner was interested.

In addition, the Service would seek to partner with the public agencies holding 3,134 acres of land within the entire Focus Area, however; acquisition of easements or fee-interest would not be an option on those lands. This alternative would lead to additional restoration and conservation of wetlands, uplands, and riparian habitats for the benefit of trust resources (assuming adequate funding). Any acquisition of lands would be from willing sellers only, regardless of the type of interest. The Service would only acquire the minimum interest necessary to reach management objectives for this area.

Areas acquired in fee-title through donation or purchase would be owned by the Service and managed as units of the National Wildlife Refuge System – Necedah NWR. Tracts in which an easement or lease is negotiated would remain in private ownership. Under any acquisition scenario, administration and management of the tracts would be done by the staff at Necedah NWR. This alternative would be carried out on a tract-by-tract basis as land and funding become available over an undetermined period of time.

Alternative Conservation Tools

The alternative conservation tools proposed for the Yellow River Focus Area are fee acquisition, conservation easements, wildlife management agreements, and private lands extension agreements. Other acquisition methods that could be utilized by the Service include donations, partial donations, or transfers.

Wildlife Management Agreements

These agreements are negotiated between the Refuge Manager and a landowner and specify a particular management action the landowner will do, or not do, with his or her property. For example, a simple agreement would be for the landowner to agree to delay hayland mowing until after a certain date to allow ground nesting birds to hatch their young. More comprehensive agreements are possible for such things as wetland or upland restoration, or public access. These agreements are strictly voluntary on the part of the landowner and are voided if the property is sold.

As long as a landowner abides by the terms of the agreement, this conservation can be effective in meeting certain conservation objectives. Unfortunately, because these agreements are voluntary and temporary, there is no long-term assurance the terms will continue to be met.

Direct Service costs for this alternative are generally low, but can add up to near fee or easement costs if the agreement is for several years. Staff time and administrative costs are relatively high since agreements must be monitored yearly and renegotiated when land ownership changes.

Leases

Under a lease agreement, the Service would negotiate with a landowner to receive use of the land or for some maintenance of the land in a given condition. Generally, the landowner would receive an annual lease payment. For example, the Service could lease 40 acres of grassland habitat to provide safe nesting for ground nesting birds. The landowner would not be able to hay or otherwise disturb the ground during the lease period.

Cost effectiveness of leases would vary depending on the length and payment terms of the lease. In many cases, the cost of a lease rapidly approaches the cost of outright purchase in a few years. Also, leases do not offer the long-term conservation of habitat, and are more complex for the Service to administer than fee or easement because of the monitoring, coordination, and administration requirements.

Conservation Easements

With a conservation easement, the Service in effect purchases a specific interest from a private landowner. For example, the Service may purchase a wetland easement that protects a wetland from draining, filling, and burning. The landowner gives up his or her right to drain, fill, and burn, but no other land rights. The wetland may still be cropped, or hayed, as natural conditions allow.

An easement that is commonly used on refuges is a conservation or non-development easement. Typically, a landowner would agree to refrain from commercial, industrial, or residential development or other major alteration of habitat. The landowner may continue to use the land as before the easement and retains rights such as hunting, control of trespass, etc.

Easements are voluntary and purchased only from willing sellers. Payments for conservation easements are generally based on a percentage of the appraised value of the land and varies according to the use restrictions imposed. Easements are most often perpetual and compensation is a one-time, up-front payment.

Easements can be useful when existing land uses on a tract within a refuge boundary are partially compatible with refuge purposes, and when the landowner desires to use the land for some compatible purpose. Examples of land uses that are normally restricted under terms of a conservation include:

- Development rights, both agricultural, commercial and residential.
- Alteration of natural topography.
- Uses negatively affecting the maintenance of plant and wildlife communities.
- Excessive public access and use; and
- Alteration of natural water level.

Depending on the type of easement, this option may be cost effective in meeting certain Refuge management purposes. If the easement is not perpetual, long-term resource conservation is not guaranteed. However, some easements may cost the Service so much (occasionally greater than 75 percent of fee value), that cost efficiency is compromised.

Easements are more difficult to manage than fee title transactions because of the monitoring, coordination, and administrative requirements. If a landowner fails to honor the easement contract, the Service must take steps to re-establish the terms of the contract.

In the short run, easements have more impact on the tax base of local municipalities than cooperative management agreements and leases. However, they have less impact in the short run on the tax base than fee-title acquisition. In the long run, Service acquisition of interest in Yellow River lands may be beneficial to the tax base of local municipalities because of increased desirability of land, increased access to land management services, and increased recreational opportunities.

Fee-Title Acquisition

A fee-title acquisition of land assures permanent conservation of resources and complete control of lands necessary for things such as wetland development and water level control. All rights of ownership are transferred to the Service in fee title acquisition. Land is purchased only from willing sellers with offers based on fair market value appraisals. Some fee title acquisitions are accomplished through donation or exchange. Although initially the most costly for the Service, in the long run it is easier to manage and plan for because the Service has complete control. Staff time is saved by not having to renegotiate terms for less-than-fee title arrangements.

There are approximately 3,135 acres in public ownership in the Focus Area. The overall cost of the project if all private lands within Alternative 3, the Preferred Alternative (14,684 acres) were acquired

would be in the vicinity of \$14,684,000 based upon an average cost per acre of about \$1,000. The reality is that much of the area would not be acquired. Many of the landowners are interested in conserving or improving habitat themselves, reducing the need to acquire the land. Others are probably not interested in selling.

In the short run, fee-title acquisition will have the greatest impact on the tax base of local municipalities of any alternative conservation tools. In the long run, Service acquisition of interest in Yellow River lands may be beneficial to the tax base of local municipalities because of increased desirability of land, increased access to land management services, and increased recreational opportunities.

It should be noted that lands acquired within the Focus Area would involve low operations and maintenance costs. Private landowner agreements have already begun the work of conserving or restoring habitats. Much of the management would be passive, low cost in nature, ensuring that development or other disruptive land use practices do not destroy the wildlife value of the area.

Coordination and Consultation

The Service publicly announced it was preparing a CCP for the Refuge in June 1997. Since that time, information about the planning project, as well as the Service's intent to evaluate the feasibility of restoring and conserving additional habitat in the Yellow River Focus Area, has been provided to the public through news-releases, presentations, interviews, informational letters, and one-on-one briefings. Federal, state, local, and private entities were involved in the scoping process. More than 6,000 people were sent information on the Refuge CCP. This includes Wisconsin's Congressional Delegation, the U.S. Department of Agriculture, elected officials representing Juneau and Wood counties, Wisconsin DNR personnel, local governments, representatives of national, state, and local conservation organizations, neighboring landowners, and other interested publics. Public input was considered at all phases of the CCP planning process. All landowners within the Yellow River Focus Area were contacted. The Service held several meetings with Yellow River Focus Area landowners to discuss conservation strategies. The Service has met with nearly every landowner one-on-one in the project area. To date, 121 landowners collectively owning 17,308 acres have requested technical from the Service. Of these, 16 have signed long-term wildlife management agreements encompassing 1,233 acres of land in the Yellow River Focus Area. The Service coordinated its scoping effort closely, and corresponded frequently with many of the aforementioned entities, including Yellow River Focus Area landowners.

Sociocultural Impacts

Restoration, conservation, and management of additional lands by the Service in the Yellow River Focus Area will affect to some degree the current lifestyles of individuals in and around the proposed project area, and the communities in the area. Landowners who choose to sell their land to the Service will be most affected. Owners of homes or farms who relocate will be reimbursed for moving expenses. Renters also receive certain relocation benefits, including assistance in finding suitable alternate housing that is affordable. Under certain conditions, some homeowners may be able to reserve a "life estate" on their homes, meaning they could remain in their homes for the rest of their lives after selling to the Service. This type of reservation does, however, reduce the amount paid for their homes. Other landowners who negotiate easements or other less-than-fee transactions may have to change certain land management practices in-line with conditions of the easement.

All land transactions will be purely voluntary in keeping with Service policy to purchase lands or rights only from willing sellers. The property rights of landowners who choose not to sell their land will not be directly affected by purchases around them since they will retain all right of landownership. The Service will always take into account the interests of adjacent landowners when managing acquired land.

Use of the Refuge and surrounding area will probably increase over current levels. This increased use, and thus traffic, may make some landowners uncomfortable. Lands in which the Service acquires a fee interest will eventually be open to public hunting, fishing, hiking, photography, canoeing, and other compatible refuge uses.

A comprehensive resource, facility, and public use management plan will be completed after a sufficient land base has been acquired in the area by the Service. This plan will be written with full input from the landowners and the general public to meet their needs and address their concerns.

Summary of Proposed Action

As described earlier, the Service proposes to restore and conserve up to 21,953 acres of wetlands, uplands, and riparian habitats within the Yellow River Focus Area. Of this acreage, the conservation and restoration efforts on the approximately 7,298 acres held by private landowners in the north and public agencies throughout the Focus Area would be through voluntary technical assistance programs. On the approximately 14,684 acres of private land in the southern portion of the Focus Area (Partner Area 2), the Service would seek habitat restoration and conservation on a voluntary basis from landowners through technical assistance, and where it was the landowners preference, by acquiring fee title or conservation easements.

The following is a ranked list of priorities for conserving lands in the Yellow River Focus Area. Service acquisition of fee or easement interests in lands would be available only to interested landowners in the southern portion of the area (Partner Area 2, Figure 3). This list will guide Service in choosing when and where to use the various available conservation tools. The list includes criteria that would rank the priority of a parcel of land considered for fee title purchase in the southern portion of the Focus Area, although other conservation tools would always be considered first.

This list will assure that the limited resources available to the Service and its partners are used in ways that efficiently and effectively promote desired outcomes in the Yellow River. It is also reflective of the Service's commitment to communicate clearly to Yellow River stakeholders and to be consistent and equitable in its interactions with Yellow River landowners.

High Priority Land:

- Eastern Massasauga rattlesnake documented on parcel during most recent survey.
- Karner blue butterflies documented on parcel during most recent survey.
- Other federal or state listed species documented on parcel during most recent survey.
- Existing eastern massasauga habitat within 1 mile of a recent documented sightings (within the past 20 years) or existing populations.
- Existing Karner blue butterfly habitat within 1 mile in open landscape, or within 1/8 mile without open canopy corridor, of existing populations or recent documented sightings (within the past 5 years).
- Bottomland habitat associated with Algansee-Glendora soils.

Medium Priority Land:

- Restorable eastern massasauga habitat within 1 mile of recent documented sightings (within the past 20 years) or existing populations.
- Restorable Karner blue butterfly habitat within 1 mile in open landscape, or 1/8 mile without open canopy corridor, of existing populations or recent documented sightings (within the past 5 years).
- Existing eastern massasauga habitat 1-3 miles from recent documented sightings (within the past 20 years) or existing populations.

- Natural heritage elements that are not covered by previously listed categories (e.g. federal or state listing), but have a global ranking of G3 or higher and/or with a state ranking of S3 or higher.
- Opportunities to manage habitat blocks greater than 160 acres in size.
- Opportunities to manage habitat blocks with contiguous upland and wetland habitat.

Low Priority Land:

- Opportunities to manage habitat blocks greater than 80 contiguous acres, but less than 160 contiguous acres.
- Other quality fish and wildlife habitats or community types.

While the future condition of the lands in the Focus Area are unknown and recognizing that changes in land use or species occurrence could change the conservation priorities, the tracts within the Focus Area have been prioritized for conservation on the following maps (Figure 2) and in the attached table (Table 2). The Focus Area acreage in Table 2 is 21,982 compared to the 21,953 acres that is used elsewhere in this document. Acreage in Table 2 is calculated via the ArcView Geographic Information System program and includes roads that would be excluded from the actual ownership acreage.

There are 319 tracts total in the Focus Area, of which 301 are privately owned. There are approximately 261 individual private owners, some of which are corporate. Eighteen of the tracts are owned by a village, county, or the State of Wisconsin. There is no intention to purchase the publicly owned property. There are approximately 3,135 acres in public ownership and approximately 18,847 acres in private ownership. Of the private ownership, 14,684 acres in Partner Area 2 would be eligible for Service acquisition, and then only from willing sellers.

Conservation of any tract in the Focus Area would first be sought by working with the landowners to achieve conservation goals they are interested in and that are consistent with Service interests. If a landowner in the southern portion of the Focus Area is interested in other options, such as an easement or in selling fee rights to the property, the Service would base its decision of whether to acquire an interest in the land upon the availability of funds and the priority of the tract for conservation. Assistance to landowners for conservation work on their property will be provided through the Service's Partners for Fish and Wildlife Program and through any other programs that may be available in the future.

Figure 2: Land Status and Conservation Options, Yellow River Focus Area, Necedah NWR

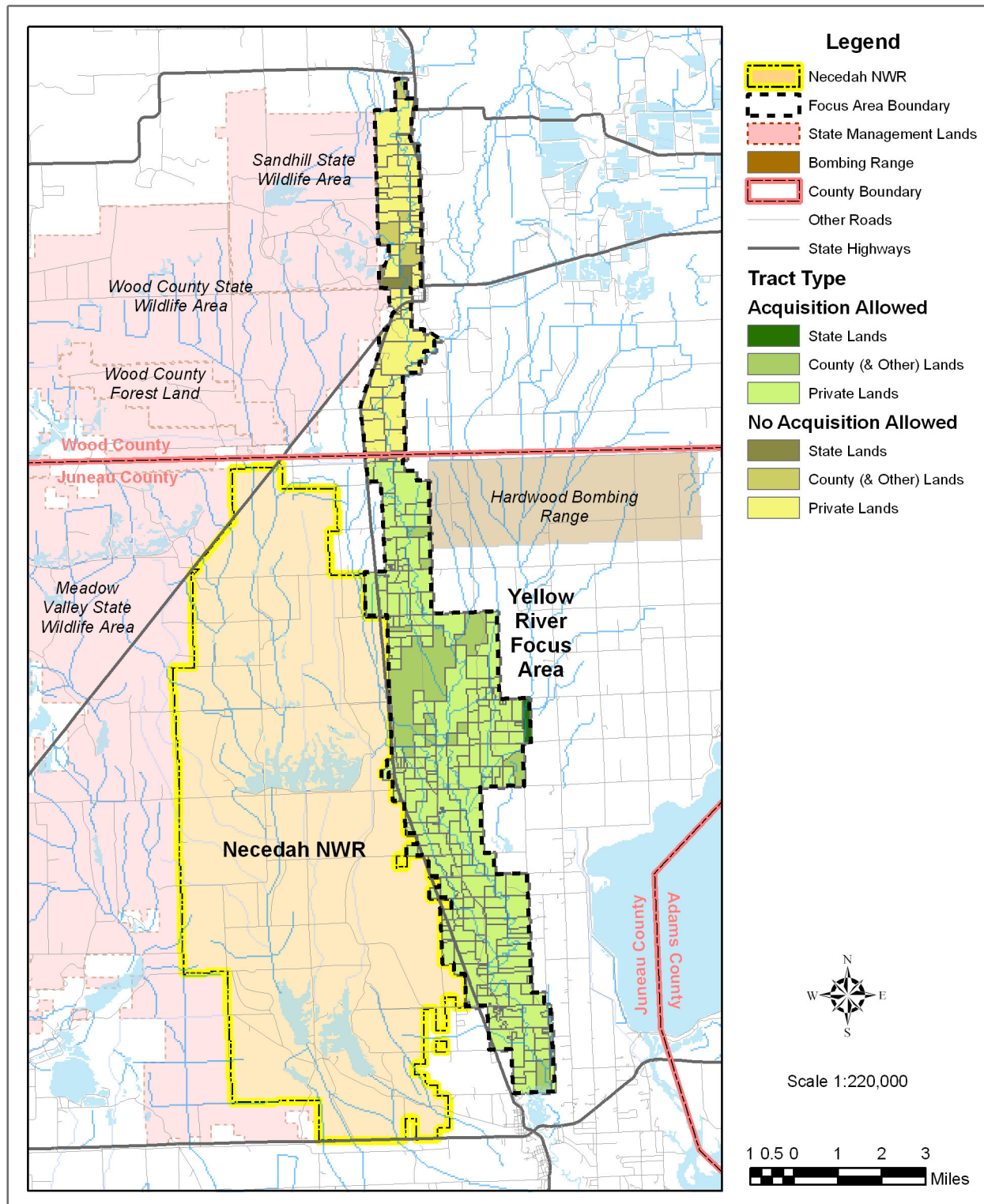


Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
2	Wood County FCL	71.97	higher	NO
3	Private	435.91	higher	NO
4	Private	7.32	higher	NO
5	Private	4.03	lower	NO
6	Private	39.86	higher	NO
7	Private	116.82	lower	NO
8	Private	81.50	lower	NO
10	Private	148.40	lower	NO
11	Private	114.06	higher	NO
12	Private	38.15	medium	NO
13	Private	77.14	lower	NO
14	Private	37.52	lower	NO
15	Private	96.08	lower	NO
16	Private	37.95	higher	NO
17	Private	18.72	lower	NO
18	Private	48.18	higher	NO
19	Private	141.83	lower	NO
21	Private	21.78	higher	NO
22	Wood County FCL	43.81	higher	NO
23	Private	75.17	lower	NO
24	Private	20.78	lower	NO
25	Private	22.76	lower	NO
26	Private	44.38	higher	NO
27	Wood County FCL	149.90	higher	NO
28	Private	20.35	lower	NO
30	Private	81.47	higher	NO
31	Private	11.56	lower	NO
32	J. T. School District #1	141.29	higher	NO
33	Private	36.16	lower	NO
34	Private	11.38	lower	NO
35	Private	103.93	higher	NO
36	Private	32.90	higher	NO
38	State of WI/Conservation Com	177.26	higher	NO
39	Private	44.70	lower	NO

Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
40	Private	37.41	higher	NO
41	Private	34.57	higher	NO
42	Private	74.15	lower	NO
43	Private	23.40	lower	NO
44	Private	37.68	higher	NO
45	Private	3.83	lower	NO
46	Private	247.37	lower	NO
51	Private	500.50	lower	NO
52	Private	8.97	lower	NO
53	Private	8.36	lower	NO
54	Private	42.56	higher	NO
55	Private	100.14	higher	NO
57	Private	118.66	higher	NO
58	Private	100.61	lower	NO
60	Private	228.10	higher	NO
61	Private	42.94	higher	NO
62	Private	77.18	lower	NO
63	Private	153.79	lower	NO
64	Private	10.15	higher	YES
65	Private	12.39	higher	NO
66	Private	47.22	higher	YES
67	Private	91.64	higher	YES
68	Private	93.02	higher	YES
69	Private	133.98	higher	YES
70	Private	80.67	higher	YES
71	Juneau County Forest Crop	84.39	higher	NO
72	Private	85.05	higher	NO
73	Private	172.55	higher	Yes
74	Private	79.64	higher	Yes
75	Private	5.57	higher	Yes
76	Private	29.72	higher	Yes
77	Juneau County (Tax Deed)	44.86	higher	No
78	Private	22.59	higher	Yes
79	Private	10.53	higher	Yes
80	Private	16.93	higher	Yes

Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
81	Private	9.58	higher	Yes
82	Private	4.92	higher	Yes
83	Private	2.85	higher	Yes
84	Private	2.85	higher	Yes
85	Private	6.39	higher	Yes
86	Private	174.30	higher	Yes
87	Private	40.74	higher	Yes
88	Private	42.98	higher	Yes
89	Private	8.14	higher	Yes
90	Private	193.13	higher	Yes
91	Private	1.46	higher	Yes
92	Private	46.26	higher	Yes
93	Private	0.90	higher	Yes
94	Private	83.69	higher	Yes
95	Private	68.42	higher	Yes
96	Private	84.75	higher	Yes
97	Private	85.06	higher	Yes
98	Private	80.05	higher	Yes
99	Private	85.57	higher	Yes
100	Juneau County Forest Crop	305.34	higher	No
102	Private	1.83	higher	Yes
103	Private	18.61	higher	Yes
104	Private	21.19	higher	Yes
105	Private	38.84	higher	Yes
106	Private	79.25	higher	Yes
107	Private	224.02	higher	Yes
108	Private	117.97	higher	Yes
109	Juneau County (Tax Deed)	39.73	higher	No
110	Private	42.08	higher	Yes
111	Private	38.42	higher	Yes
112	Private	40.57	higher	Yes
113	Private	40.54	higher	Yes
114	Private	253.42	higher	Yes
115	Private	3.75	higher	Yes
117	Private	43.17	higher	Yes

Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
119	Private	77.40	higher	Yes
120	Private	122.17	higher	Yes
121	Juneau County Forest Crop	38.28	higher	No
122	Private	39.48	higher	Yes
123	Private	11.66	higher	Yes
124	Private	61.11	higher	Yes
125	Private	28.11	higher	Yes
126	Private	92.19	higher	Yes
127	Private	20.79	higher	Yes
128	Private	6.42	higher	Yes
129	Private	118.58	higher	Yes
130	Private	200.33	higher	Yes
131	Private	5.42	higher	Yes
133	Private	3.89	higher	Yes
134	Private	10.55	higher	Yes
135	Private	18.92	higher	Yes
136	Private	25.74	higher	Yes
137	Private	57.78	higher	Yes
138	Private	39.37	higher	Yes
139	Private	2.60	higher	Yes
141	Private	140.77	higher	Yes
142	Private	12.94	higher	Yes
143	Private	39.53	higher	Yes
144	Private	83.78	higher	Yes
145	Private	35.28	higher	Yes
146	Private	3.10	higher	Yes
147	Private	39.17	higher	Yes
148	Private	27.37	higher	Yes
149	Private	88.53	higher	Yes
151	Private	81.32	higher	Yes
155	Private	85.41	higher	Yes
157	Private	35.92	higher	Yes
158	Private	1.88	higher	Yes
159	Private	76.25	higher	Yes
160	Private	160.94	lower	Yes

Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
162	Private	166.55	higher	Yes
163	Private	83.33	higher	Yes
164	Private	74.06	higher	Yes
165	Private	11.09	higher	Yes
166	Private	39.38	higher	Yes
167	Private	36.85	lower	Yes
169	Private	20.68	higher	Yes
170	Private	36.73	higher	Yes
171	Private	38.94	higher	Yes
172	Private	29.63	higher	Yes
173	Private	86.23	higher	Yes
174	Private	40.14	higher	Yes
175	Private	18.31	higher	Yes
176	Private	18.46	higher	Yes
177	Private	12.96	higher	Yes
178	Private	22.79	higher	Yes
179	Private	20.47	higher	Yes
180	Private	102.74	higher	Yes
181	Private	13.46	higher	Yes
182	Private	94.50	higher	Yes
183	Private	39.30	higher	Yes
184	Private	28.51	higher	Yes
185	Private	39.57	higher	Yes
186	Private	21.11	higher	Yes
187	Private	9.36	higher	Yes
188	Private	71.11	higher	Yes
189	Private	2.38	higher	Yes
190	Private	80.69	higher	Yes
191	Private	69.12	higher	Yes
192	Private	34.96	higher	Yes
193	Private	85.45	higher	Yes
194	Private	129.26	higher	Yes
195	Private	61.67	higher	Yes
196	Private	126.20	higher	Yes
197	Private	106.15	higher	Yes

Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
198	Private	128.03	higher	Yes
199	Private	6.43	higher	Yes
200	Private	6.48	higher	Yes
201	Private	21.58	higher	Yes
202	Private	58.52	higher	Yes
203	Private	148.09	higher	Yes
205	Private	1.25	higher	Yes
207	Private	9.64	lower	Yes
208	Private	70.87	higher	Yes
210	Private	33.16	higher	Yes
211	Private	6.04	higher	Yes
212	Private	37.79	lower	Yes
213	Private	8.34	lower	Yes
214	Private	0.63	lower	Yes
215	Private	1.07	lower	Yes
216	Private	0.58	lower	Yes
217	Private	135.83	higher	Yes
218	Private	46.51	lower	Yes
220	Private	46.06	higher	Yes
221	Private	70.32	lower	Yes
222	Private	0.99	lower	Yes
223	Private	2.56	lower	Yes
224	Private	0.96	lower	Yes
232	Private	145.96	higher	Yes
233	Private	75.85	lower	Yes
234	Private	34.91	higher	NO
235	Private	14.69	higher	NO
236	Private	25.51	lower	NO
237	Private	10.51	higher	NO
238	Private	9.96	higher	NO
239	Private	12.77	higher	NO
240	Private	40.79	higher	Yes
241	Private	181.41	higher	Yes
242	Private	43.11	higher	Yes
243	Private	379.20	higher	Yes

Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
244	Juneau County Forest Crop	1,436.97	higher	No
245	Private	707.79	higher	Yes
247	Juneau County Forest Crop	40.04	higher	No
248	Private	36.58	higher	Yes
249	Private	45.14	higher	Yes
250	Juneau County Forest Crop	41.05	higher	No
251	Juneau County Forest Crop	41.26	higher	No
252	Private	43.85	higher	Yes
254	Private	26.75	higher	Yes
255	Juneau County (Tax Deed)	38.45	higher	No
256	Private	78.19	higher	Yes
257	Private	158.74	higher	Yes
258	Private	118.36	higher	Yes
259	Private	81.30	higher	Yes
260	Private	55.66	higher	Yes
261	Private	40.40	higher	Yes
262	Private	29.37	higher	Yes
263	Private	8.51	higher	Yes
264	Private	10.98	higher	Yes
265	Private	11.58	higher	Yes
266	Private	17.35	higher	Yes
268	Private	40.44	higher	Yes
269	Private	38.22	higher	Yes
270	Private	42.13	higher	Yes
271	Private	75.80	higher	Yes
272	Private	159.73	higher	Yes
273	Private	18.94	higher	Yes
274	Private	1.02	higher	Yes
275	Private	117.36	higher	Yes
276	Private	304.03	higher	Yes
277	Private	52.83	higher	Yes
278	Private	118.44	higher	Yes
279	Private	161.29	higher	Yes
280	Private	76.20	higher	Yes
281	Private	163.97	higher	Yes

Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
282	Private	77.33	higher	Yes
283	Private	44.32	higher	Yes
284	Private	79.95	higher	Yes
285	Private	226.49	higher	Yes
286	Private	40.54	higher	Yes
287	Private	7.27	higher	Yes
288	Private	18.57	lower	Yes
289	Private	4.53	lower	Yes
290	Private	50.54	higher	Yes
291	Village of Necedah	159.88	higher	No
292	Private	42.60	higher	Yes
293	Private	24.78	lower	Yes
294	Private	2.46	higher	Yes
295	Private	2.15	lower	Yes
296	Private	5.59	higher	Yes
297	Private	90.70	higher	Yes
298	Private	5.93	lower	Yes
299	Private	58.83	higher	Yes
300	Private	70.01	higher	Yes
301	Private	76.90	higher	Yes
302	State of WI, Dept. of Nat. Resources	119.71	higher	No
303	Private	4.88	higher	Yes
304	Private	24.62	lower	Yes
305	Private	4.45	higher	Yes
306	Private	109.36	higher	Yes
307	Private	142.06	higher	Yes
308	Private	25.25	higher	Yes
309	Private	61.14	higher	Yes
310	Private	58.71	higher	Yes
311	Private	20.96	higher	Yes
312	Private	39.34	higher	Yes
313	Private	22.50	higher	Yes
314	Private	9.94	higher	Yes
315	Private	33.45	higher	Yes

Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
316	Private	160.85	higher	Yes
317	Private	40.96	higher	Yes
318	Private	44.78	higher	Yes
319	Private	36.67	higher	Yes
320	Private	11.18	lower	Yes
321	Private	3.42	lower	Yes
322	Private	190.62	lower	Yes
323	Private	27.72	higher	Yes
324	Private	22.15	higher	Yes
325	Private	201.08	higher	Yes
326	Private	9.38	lower	Yes
327	Private	79.44	higher	Yes
328	Private	3.91	lower	Yes
329	Private	2.78	higher	Yes
330	Private	14.03	medium	Yes
331	Private	116.69	higher	Yes
332	Private	8.45	lower	Yes
333	Private	123.24	higher	Yes
334	Private	78.24	higher	Yes
335	Private	37.66	higher	Yes
336	Private	38.35	higher	Yes
337	Private	40.39	higher	Yes
338	Private	40.70	higher	Yes
339	Private	182.06	medium	Yes
340	Private	123.89	higher	Yes
341	Private	51.23	higher	Yes
342	Private	1.71	higher	Yes
343	Private	10.83	medium	Yes
344	Juneau County Community Forest	160.44	higher	No
345	Private	20.70	higher	Yes
346	Private	14.05	medium	Yes
347	Private	38.51	higher	Yes
348	Private	40.29	higher	Yes
349	Private	58.81	lower	Yes

Table 2: Yellow River Focus Area Tracts, Ownership, Acreage and Priority

Parcel No.	Owners	Acres	Priority	Is Acquisition an Option?
350	Private	15.93	medium	Yes
351	Private	5.24	lower	Yes
352	Private	38.54	lower	Yes
353	Private	108.38	higher	Yes
354	Private	41.73	higher	Yes
355	Private	122.16	higher	Yes
356	Private	82.28	higher	Yes
Total Acres:		21,982.22		
Total Tracts:		319		
Total # Private Tracts:		301		
Total # of Publicly Owned Tracts:		18		
Total Acres Privately Owned:		18,847.59		
Total Acres Publicly Owned:		3,134.63		
Total Acres where Acquisition is an Option:		14,683.9		
Total Acres where Acquisition is Not an Option		7,298.32		

References:

Dahl, T.E. 1990. Wetlands losses in the United States 1780's to 1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 21pp.

Noss et al. 1995

Nuzzo, V.A. 1986. Extent and status of mid-west oak savanna: pre-settlement and 1985. *Natural Areas Journal* 6(2): 6-36.

Oliver, C.D., and B.C. Larson. 1996. *Forest stand dynamics*. John Wiley and Sons, New York, New York.

U.S. Fish and Wildlife Service. 2001. Karner Blue Butterfly (*Lycaeides melissa samuelis*) Technical/Agency Draft Recovery Plan. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota.

