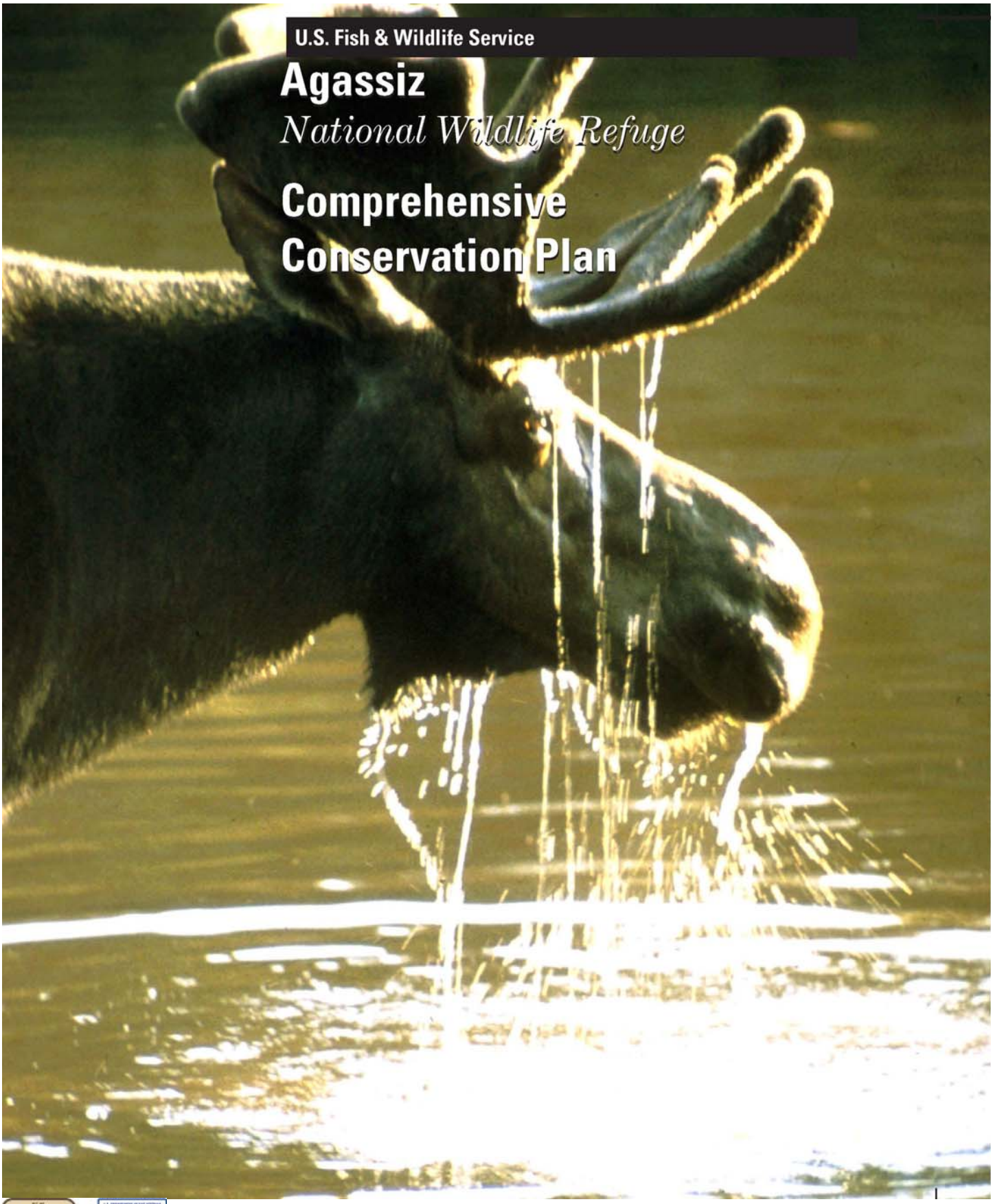

U.S. Fish & Wildlife Service

Agassiz
National Wildlife Refuge

Comprehensive Conservation Plan

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.

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Agassiz

National Wildlife Refuge

Comprehensive Conservation Plan Approval

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Agassiz

National Wildlife Refuge

Comprehensive Conservation Plan

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Summary Comprehensive Conservation Plan

Introduction

Marsh habitat on Agassiz NWR. USFWS

Some 10,000 years ago, the last Ice Age was nearly spent. As the frigid grip of the Pleistocene Epoch weakened, the great continental glaciers that had blanketed the northern expanses of North America under thousands of feet of ice for the better part of two million years melted and receded. One of these glaciers spanned an area greater than that of the present-day five Great Lakes, and meltwater poured from it to form an enormous inland sea. One hundred centuries later, that prehistoric, glacial lake would be named in honor of the Swiss-American naturalist and geologist, Jean Louis Rodolphe Agassiz.

Agassiz National Wildlife Refuge (NWR), established in 1937 as Mud Lake Refuge, was re-named in 1961 for this vast, ancient body of water – Glacial Lake Agassiz – that produced the exceedingly flat terrain characterizing the area today. The Refuge lies in the aspen parkland transitional zone between the coniferous or boreal forest to the north and east and the tallgrass prairie and prairie pothole region to the west and south. This diversity of habitats in turn supports a wide diversity of resident and migratory wildlife, including 287 species of birds, 49 species of mammals, 12 species of amphibians, and nine species of reptiles.

President Franklin D. Roosevelt established the Refuge by Executive Order 7583 on March 23, 1937. Its primary purpose was to be "a refuge and breeding ground for migratory birds and other wildlife." Although its original focus was on waterfowl (ducks and geese), over the years other migratory birds and year-round resident wildlife, including mammals such as moose, deer, and wolves, have received an increasing emphasis in Refuge management.

The National Wildlife Refuge System Improvement Act of 1997 mandated that each national wildlife refuge in the country to develop a Comprehensive Conservation Plan (CCP) to direct its management. To that end, the Service, with the participation of the Red Lake Band of the Chippewa, the Minnesota Department of Natural Resources (DNR), and other partners, developed this draft CCP. It provides management goals and objectives to guide the Refuge and strategies to implement

over the next 15 years. An Environmental Assessment (EA) outlining several future management directions was also written and is published with the CCP.

The CCP is a vital part of the future of Agassiz National Wildlife Refuge. Although prepared by the U.S. Fish and Wildlife Service (Service), the Draft CCP and EA reflects the thoughts, ideas and concerns of many organizations and local residents.

Vital Statistics

The northern boundary of Agassiz NWR is within 40 miles of the Canadian province of Manitoba and Lake of the Woods, which straddles the U.S.-Canadian border. The nearest city is Grand Forks, North Dakota, 75 highway miles to the southwest. The City of Thief River Falls lies 25 miles to the southwest.

The Refuge's 61,500 acres are a key breeding ground for 17 species of ducks and the Refuge is an important migration rest stop for waterfowl. The Refuge is also noted for two resident packs of gray wolves, moose, and nesting Bald Eagles.

Agassiz NWR includes the following habitats, in the approximate acreages shown:

- 37,400 acres of wetland and shallow open water ("pools");
- 11,650 acres of shrubland;
- 9,900 acres of woodland;
- 1,710 acres of grassland;
- 170 acres of cropland managed for the benefit of wildlife; and
- 670 acres of developed land (roads, parking lots, etc.)

Meadow vole, Agassiz NWR. USFWS

Agassiz NWR is an integral part of a sizeable complex of lands managed for wildlife. The Minnesota DNR has acquired and manages over 50,000 acres in three large and several smaller nearby Wildlife Management Areas. The Minnesota DNR works closely with Refuge staff on issues of mutual concern.

As a result of the 1985 Food Security Act, Agassiz NWR assumed additional responsibilities for a seven-county Refuge Management District (RMD). Staff duties expanded to include working with the National Resources Conservation Service (NRCS) and Farm Service Agency (FSA) on wetland determinations, Swampbuster Act provisions, and the Conservation Reserve Program (CRP). The Refuge actively collaborates on habitat restoration projects for both uplands and wetlands on private and CRP lands throughout its Management District.

The Refuge Environment

Agassiz National Wildlife Refuge is located in the Mississippi Headwaters/Tallgrass Prairie Ecosystem as defined by the U.S. Fish and Wildlife Service. This ecosystem is primarily located in Minnesota and North Dakota with small portions extending into Wisconsin and Iowa. The three

major ecological communities within this ecosystem are the tallgrass prairie (which includes oak savanna and barrens), the northern boreal forest, and the eastern deciduous forest. Of the three major ecological communities, the tallgrass prairie is by far the most threatened, with more than 99 percent having been converted to agricultural uses.

Pitcher plants, Agassiz NWR. USFWS

Agassiz NWR is located in the eastern Red River Valley, an area with relatively flat terrain and a gentle gradient averaging 1.5 feet per mile, sloping from east to west across the Refuge. The climate is continental, with long, cold winters and relatively short, hot summers. Winter is relatively dry, and summer is the wettest season; thunderstorms are the main source of rain in the area. The major threat of flooding at Agassiz NWR is the result of spring runoff of snowmelt following wet winters. Flooding is one of the key issues affecting the Refuge – both its habitat and its facilities – as well as the neighboring region.

The Refuge includes 26 impoundments (known variously as lakes, ponds, pools, or moist soil units) and three natural lakes. Whiskey Lake and Kuriko Lake are located within the Refuge's designated Wilderness Area and Webster Lake is located in the northeast area of the Refuge. The artificial impoundments vary widely in size, ranging from 30 acres to the approximately 9,000 acres that comprise the Agassiz Pool. Water is contained within the impoundments by an extensive network of dikes. Water levels can be raised or lowered in any given impoundment by adjusting water control structures at pool outlets. The Refuge's dominant geographic features are its impoundments with their marshes, mudflats, and open water. They are also the focus of the Refuge's aquatic habitat management efforts on behalf of migratory birds.

Who We Are and What We Do

The Refuge is administered by the U.S. Fish and Wildlife Service, the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife populations and their habitats. The Service oversees the enforcement of federal wildlife laws, management and protection of migratory bird populations, restoration of nationally significant fisheries, administration of the Endangered Species Act, and the restoration of wildlife habitat like wetlands. The Service also manages the National Wildlife Refuge System, which was founded in 1903 when President Theodore Roosevelt designated Pelican Island in Florida as a sanctuary for Brown Pelicans. Today, the System is a network of over 545 refuges covering more than 93 million acres of public lands and waters. Most of these lands (82 percent) are in Alaska, with approximately 16 million acres located in the lower 48 states and several island territories.

The National Wildlife Refuge System is the world's largest collection of lands specifically managed for fish and wildlife. Overall, it provides habitat for more than 5,000 species of birds, mammals, fish, reptiles, amphibians, and insects. On national wildlife refuges, "Wildlife Comes First," but they also provide people with unique opportunities for outdoor activities, when they are compatible with wildlife and habitat conservation. Refuges are places where people can enjoy wildlife-dependent recreation such as hunting, fishing, wildlife observation, photography, environmental education, and environmental interpretation. Many refuges have visitor centers, wildlife trails, observation towers

and platforms, automobile tours, and environmental education programs. Nationwide, approximately 30 million people visit national wildlife refuges each year.

Refuge Vision

Agassiz National Wildlife Refuge lies within the shallow depressional lake plains formed by the pre-historic Glacial Lake Agassiz. The Refuge is located within the aspen parkland transitional zone between the tallgrass prairie to the west and northern forest to the east. Agassiz comprises a diversity of plant and animal species, typical of ecotonal communities. Since the beginning of the 20th century, the lands within this area have been manipulated for agricultural purposes, which highly modified natural landscapes and ecosystem functions. Since its establishment, the Refuge has been intensively managed for the benefit of migratory birds and other wildlife through the construction of dikes and water control structures.

Agassiz National Wildlife Refuge and the surrounding area will be the premier natural resource of Marshall County and northwestern Minnesota. The Refuge and its seven-county management district, working with partners, will take a landscape approach to promote functional watersheds and connect natural areas. Refuge management programs and activities will emulate natural functions and processes of the different native habitats for optimal wildlife use. The resulting benefits will be showcased to demonstrate the compatibility of biological diversity, integrity, natural ecological processes and sustainable agriculture.

People will be attracted to the Refuge and northwestern Minnesota to view and enjoy the wonders of natural ecosystems. Visitors will have quality, wildlife-dependent experiences that provide personal and societal benefits, such as a sense of peace and tranquility and support of a strong conservation ethic. Refuge staff, visitors and the community will understand and appreciate a well-functioning landscape and the cultural history of the area. This vision will be the catalyst to further strengthen a positive community-Refuge relationship.

The Planning Process

Agassiz National Wildlife Refuge's CCP has been written with input and assistance from private citizens, non-governmental conservation organizations (NGOs), and employees of tribal, state, and local agencies. The participation of these stakeholders is vital and all of their ideas have been valuable in determining the future direction of the Refuge and its Management District.

Restored CRP wetland, Agassiz NWR. USFWS

On the evening of December 5, 2002, the USFWS and Agassiz staff welcomed the public to an open house and CCP/EA scoping meeting at the Heritage Center in Thief River Falls. About 30 individuals attended the meeting, most of whom were from Marshall County and all of whom were Minnesota residents. Attendees listened to an overview of the CCP and EA processes and then were given the chance to address the gathering.

Public input continued on Saturday, January 18, 2003, during a 1-day focus group or "technical working group" meeting at Northland Community and Technical College in Thief River Falls. The approximately 30 participants in this all-day event had the opportunity to discuss and explore in greater depth the various Refuge issues, goals, and opportunities in a relaxed, congenial setting. Refuge staff sent invitations to a number of stakeholders in the area. Individuals who signed up at the scoping meeting on their own, and all members of the public were welcome, provided they were willing to commit an entire Saturday to helping plan the future of the Refuge.

The Draft CCP/EA was released for public review and comment on March 3, 2005. A Draft CCP/EA or a summary of the document was sent to more than 200 individuals, organizations, and local, state and federal agencies and elected officials. An open house event was held on April 6, 2005, in Thief River Falls following release of the draft document. We received a total of 20 comment lettes and e-mails during the 45-day review period. Appendix K of the CCP summarizes these comments and our responses. Several of the comments resulted in changes int the CCP.

Refuge Issues

The Planning Team organized all of the issues/concerns/opportunities received during the public scoping process into five major categories. Many of the goals, objectives and strategies presented in this draft CCP relate to one or more of the issue categories. The categories include habitat management, water management, wildlife management, public use and cultural resources.

Habitat Management

The Refuge's major habitat management issues include the following: loss of sedge meadow (an increasingly rare habitat type in Minnesota), drawdown frequency to provide shorebird habitat, prairie restoration on old cropfields, invasive plant species, food plots for wildlife, alteration of designated Wilderness habitat due to management of impoundments, prescribed fire, forest habitats, commitment to wildlife and natural resources, and off-Refuge involvement in providing habitat.

Water Management

Water is a central fact of life at Agassiz. Managing flows and levels is critical not only to wildlife and habitat, but to minimizing on and off-Refuge impacts of floods.

Major water management issues include the following: waterfowl versus non-game water-dependent species, flood control, and maintenance of drainage ditches.

Wildlife Management

Managing wildlife populations in perpetuity for the continuing benefit of the American people is the very reason the Refuge exists. Major wildlife management issues include: nuisance wildlife control, non-game species, threatened and endangered species, and wildlife diseases.

Public Use

The Refuge provides the visiting public with opportunities to enjoy a number of wildlife-dependent recreational pursuits. Major public use issues include: deer hunting, upland game and waterfowl hunting, fishing, trapping, wildlife observation platforms and towers, miscellaneous forms of motorized and non-motorized recreation, the visitor center, visitor access, appearance of facilities, outreach, and environmental education.

Cultural Resources

The Refuge has a legal responsibility to preserve its ample cultural resources. A principal cultural resources issue is interpretation of the Mud Lake homesteads and Civilian Conservation Corps (CCC) buildings.

Management Direction

Based on the issues, concerns and opportunities we heard during the scoping process, the Planning Team developed three alternative management scenarios that could be used at Agassiz NWR. These alternatives and the consequences of adopting each were fully presented in the Environmental Assessment that was published with the draft CCP.

Alternative C, Open Landscape/Natural Watercourses, is the preferred alternative and was the basis for development of this CCP.

Cow moose and calf, Agassiz NWR. USFWS

Alternative C – Open Landscape/Natural Watercourses (Selected Alternative)

Under the Open Landscape / Natural Watercourses Alternative (selected alternative), Agassiz NWR's water impoundments continue to be managed to provide a variety of water conditions for waterbirds (e.g., ducks, geese, shorebirds, and wading birds) during spring, summer, and fall. As in the No Action Alternative, furbearers are managed through a trapping program and hunting is used as a management tool to maintain an optimal white-tailed deer population for a quality hunt program and as a food source for gray wolves. Moose are managed for wildlife viewing and a quality hunt program, though their numbers are currently too low to permit hunting on the Refuge.

The Open Landscape / Natural Watercourses Alternative focuses on setting back upland succession in the southeast corner of the Refuge and experimenting with restoring sinuosity on two interior watercourses by lowering water levels in three pools. While there is minimal management of the Refuge's designated Wilderness Area, both prescribed and wildland fires may occur there.

A large focal area of uplands is managed as a grassland/shrubland matrix. Remaining uplands are managed in a mix of aspen forest, oak savannas, open grasslands, and shrub/scrub but only as time and personnel resources allow after activities in the focus area are achieved. Refuge management designates old-growth aspen areas. Prescribed fire is used to control succession. Croplands are phased out over time as natural grassland habitats are established. This alternative's large, open-area approach benefits from partnership with adjacent Minnesota DNR lands and private landowners. Invasive plant species continue to be controlled using a variety of chemical, mechanical and biological methods.

Off-Refuge habitat activities are expanded with a primary focus on lands adjacent to the Refuge, open areas, and riparian areas district-wide. Off-Refuge habitat activities include FSA easements, Partners for Fish and Wildlife programs, CREP activities, participation on inter-agency teams, and other partnership efforts.

Snowshoe hare, Agassiz NWR. USFWS

Public use under the Open Landscape / Natural Watercourses Alternative is served by a variety of on-Refuge environmental education, seasonal auto-tour routes, annual open houses, foot trails, visitor contact station, and observation platforms. Winter wildlife viewing will be enhanced with a designated, ungroomed cross-country/snowshoe/walking trail. The hunting program includes a firearms deer and moose season, when appropriate. New hunting opportunities are provided.

During and after the deer/firearms season, archery/deer, muzzleloader/deer and Ruffed and Sharp-tail Grouse hunting will be permitted in the same areas open to deer/firearms. Following the deer/firearms season strategic parking lots will be opened; however, this will be primarily a walk-in hunt as Refuge roads will not be plowed. A "youth" waterfowl hunt will be permitted in the Farmes Pool area in conjunction with the state youth waterfowl hunt season and regulations. The Refuge's shallow and/or seasonal water bodies do not lend themselves to fishing, so as in the other two alternatives, there is also no fishing under this alternative. Off-Refuge outreach includes school talks, radio programs, informational kits, displays at fairs, etc. Five of the six public uses allowed on the National Wildlife Refuge System are encouraged and take place at Agassiz NWR under this alternative.

Flood waters are accommodated only prior to nesting season or when extreme events have made it uncontrollable.

Planned Refuge Program Highlights

The Comprehensive Conservation Plan, developed from the preferred alternative, identifies a number of key programs and strategies that can be implemented:

Habitat Management and Restoration

A large focal area of uplands will be managed as a grassland/shrubland matrix. We will seek to increase the area of native habitats that have declined locally and in Minnesota over the past century, such as prairie grasslands, sedge meadow, and bur oak/savanna. Simultaneously, the Refuge will aim to reduce the area now taken over by lowland shrub, aspen/mixed hardwood, and cattail or phragmites-dominated marsh, which either have lower intrinsic value for wildlife or have simply become too abundant. In turn, these habitat shifts will help those wildlife species associated with the rarer habitats.

Water Management

The Refuge proposes to restore a more natural sinuosity on two interior watercourses by lowering water levels in three pools. With that effort, the die-off of conifers in the Wilderness Area, which may be related to high water, will be studied.

Partnerships

A principal theme throughout the CCP is the tremendous potential for expanding and reinvigorating partnerships to attain the purpose, goals, and objectives of the Refuge. Existing and potential partners include nearby communities, industries, tribal, state and local governments, private citizens, and non-profit organizations. Many such partnerships already exist, but the Refuge has further potential for bringing together larger and more effective private and public partnerships for the mutual benefit of the Refuge as well as these stakeholders.

Volunteers

We hope to expand on our active pool of volunteers to assist in everything from research, habitat improvement projects, and environmental education on and off-Refuge. The goal of any Refuge volunteer program is to have staff and volunteers working side by side in the most efficient manner to accomplish the goals and objectives of the Refuge.

White-tailed deer, Agassiz NWR

Expanded Public Use Opportunities

Winter wildlife viewing will be enhanced with a designated, un-groomed cross-country/snowshoe/walking trail. New hunting opportunities are proposed. During and after the deer/firearms season, archery/deer, muzzleloader/deer and Ruffed and Sharp-tailed Grouse hunting will be permitted in the same areas open to deer/firearms. A "youth" waterfowl hunt will be permitted in the Farmes Pool area in conjunction with the state youth waterfowl hunt season and regulations.

Plan Implementation, Monitoring and Evaluation

This CCP outlines an ambitious but achievable course of action for the future management of Agassiz NWR. Pursuing and ultimately achieving goals set out in this CCP will require considerable staff and partnership commitment. Throughout the life of this CCP we will monitor our progress on achieving the goals, objectives and strategies it establishes. On a periodic basis, the Service will evaluate Refuge activities in light of the CCP. Additional "step-down" management plans will also be necessary to provide more details on Refuge programs such as visitor services, hunting, law enforcement, habitat, and fire and water management.

Chapter 1: Introduction and Background

Agassiz NWR. USFWS

Introduction

Some 10,000 years ago, the Ice Age was nearly spent. As the frigid grip of the Pleistocene Epoch weakened, the great continental glaciers that had blanketed the northern expanses of North America under thousands of feet of ice for the better part of two million years melted and receded. One of these glaciers spanned an area greater than that of the present-day five Great Lakes, and meltwater poured from it to form an enormous inland sea. One hundred centuries later, that prehistoric, glacial lake would be named in honor of the Swiss-American naturalist and geologist, Jean Louis Rodolphe Agassiz.

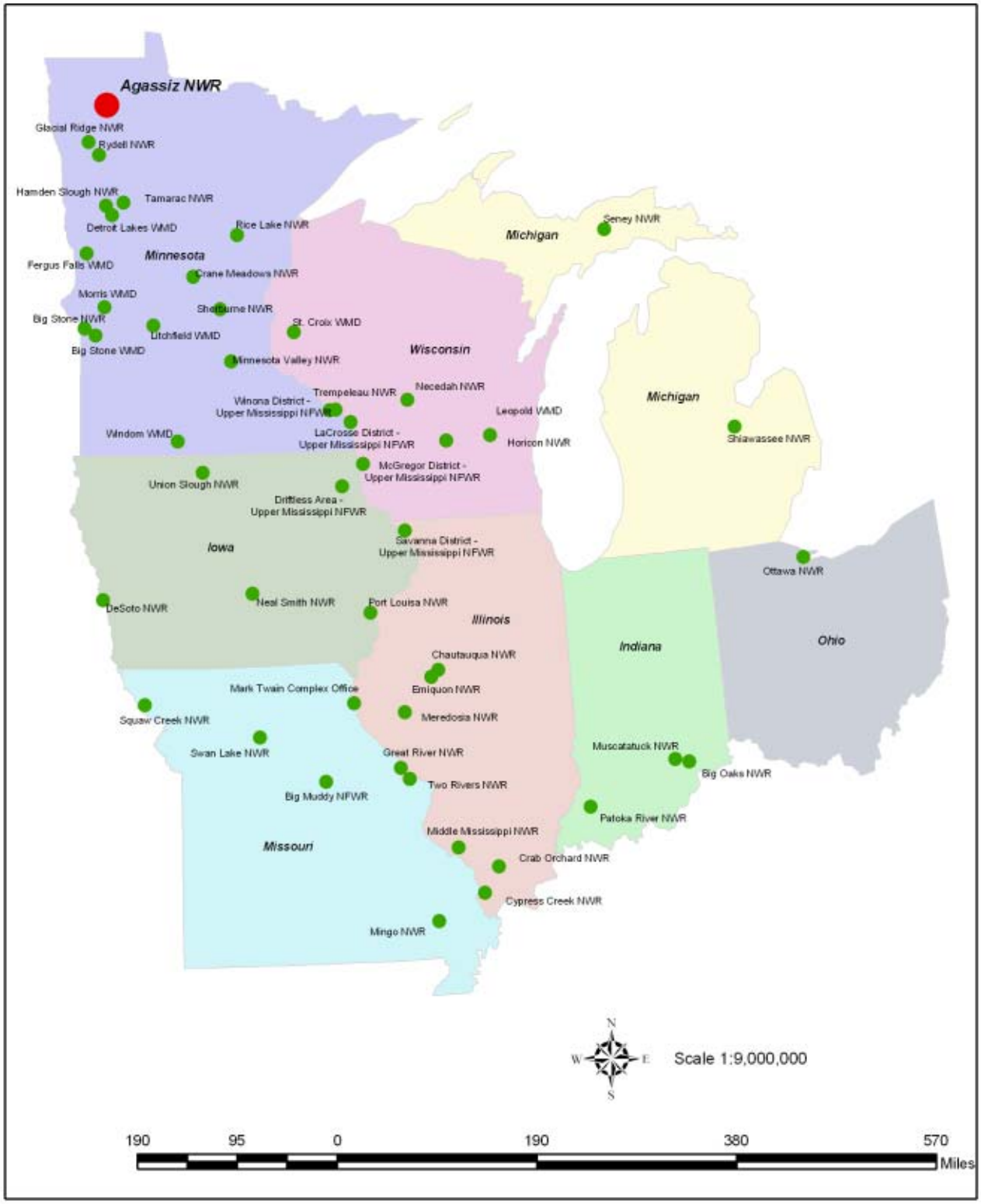
Agassiz National Wildlife Refuge (NWR), established in 1937 as Mud Lake Refuge, was renamed in 1961 for this vast, ancient body of water – Glacial Lake Agassiz – that produced the exceedingly flat terrain characterizing the area today. Located in northwestern Minnesota, the Refuge lies in the aspen parkland transitional zone between the coniferous or boreal forest to the north and east and the tallgrass prairie and prairie pothole provinces to the west and south (Figure 1). This diversity of habitats in turn supports a wide diversity of resident and migratory wildlife, including 287 species of birds, 49 species of mammals, 12 species of amphibians, and nine species of reptiles.

Agassiz NWR is a key breeding ground for 17 species of ducks and it is an important migration rest stop for waterfowl. It is also noted for two resident packs of gray wolves, moose, nesting Bald Eagles, and consistently hosting the largest Franklin's Gull colony in the United States.

Agassiz NWR is comprised of the following habitats, in the approximate acreages shown:

- 37,400 acres of wetland and shallow open water ("pools");
- 11,650 acres of shrubland;
- 9,900 acres of woodland;
- 1,710 acres of grassland;
- 670 acres of developed land (roads, parking lots, and buildings); and
- 170 acres of cropland managed for the benefit of wildlife

Figure 1: Location of Agassiz NWR and National Wildlife Refuges/Wetland Management Districts in Region 3 of the U.S. Fish & Wildlife Service



The Refuge area wasn't always this way. A century ago, settlers were lured by farming promoters into what was then a boggy wilderness, checkered with wetlands and ponds, hoping to convert it to farmland. It was called the Mud Lake area. In 1909, in an effort to make farming more feasible and productive, state, local and private interests, supported by loans from the federal government, undertook a large, expensive drainage project. This drainage system eventually became one of the largest public drainage project ever undertaken in the United States.

> "*There was at first the land and the people who lived there: a land of wonderful, fertile game-producing bogs and oak and aspen forests. The bogs produced food for waterfowl which darkened the skies in flight; rivers that fish swam in; and a marvelous abundance of game just waiting to be caught: muskrat, beaver, mink, raccoon, and squirrel. In addition, there were the caribou, deer, moose and other wildlife.*"
>
> Betty Rantanen, 1976
> Marshall County resident

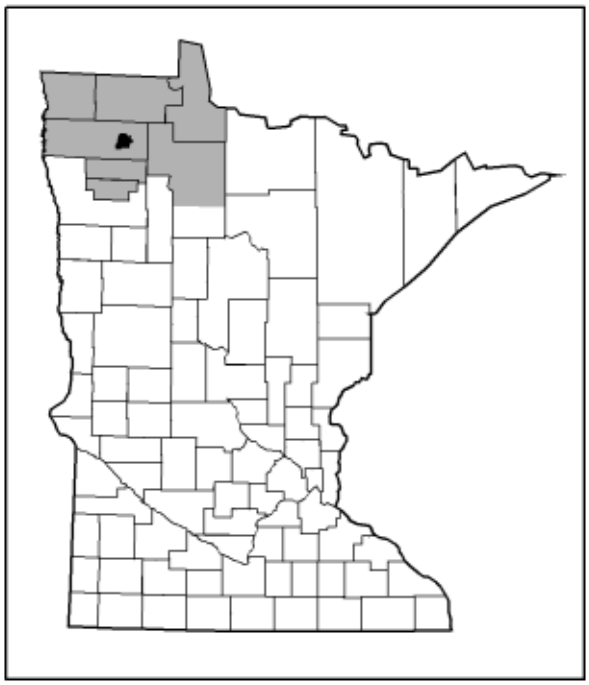
By 1933, a million dollars had been spent on the drainage system without the anticipated farming success. High tax assessments on drainage costs were a major financial burden on affected landowners, and ultimately the financial condition of Marshall County. To rescue the county from bankruptcy, the Minnesota Legislature passed a statute to absorb the drainage taxes and authorized the lands to be purchased for the development of the Mud Lake Migratory Waterfowl Refuge. President Franklin D. Roosevelt established the new refuge by Executive Order 7583 on March 23, 1937.

Once established as a unit of the National Wildlife Refuge System, the Refuge's wildlife benefited greatly from active habitat management conducted by Refuge staff. Wetlands were restored through an extensive system of dikes and water control structures. Twenty-six pools/impoundments were developed ranging in size from 30 to 9,000 acres. Today water levels and flows are manipulated to create a variety of wetland types with a mix of emergent and submerged vegetation communities. This management of water is a vital tool used to benefit waterfowl and other water-dependent bird species at Agassiz NWR. In addition, prescribed fire and mowing are widely employed to manage habitats such as grasslands, shrublands, and sedge meadows to benefit nesting waterfowl, deer, moose, songbirds, and other native wildlife. Farming has been used to attract migrating waterfowl and to benefit resident wildlife. A variety of small grains have been planted including barley, oats, and wheat.

As a result of the 1985 Food Security Act-Farm Bill, Agassiz NWR became a Refuge Management District (RMD) in 1989. Staff duties expanded to include working with the National Resources Conservation Service (NRCS) and Farm Service Agency (FSA) on wetland determinations, Swampbuster responsibility, and the Conservation Reserve Program (CRP) across portions of seven counties in northwestern Minnesota. The RMD includes Red Lake, Pennington, Marshall, Kittson, Roseau, and Lake of the Woods counties in their entirety, and a part of Beltrami County (Figure 2). Currently, about 7,000 acres are managed under permanent easements.

Located in Mud Lake, East Valley, Eckvoll, Whiteford, Cedar and Agder townships of Marshall County, Agassiz NWR is about 25 miles northeast of Thief River Falls. Although off the beaten track, it offers wildlife-related experiences to thousands of visitors every year, including wildlife viewing, photography, hunting, environmental education, and interpretation.

Figure 2: Location of Agassiz NWR Management District



History and Establishment

Prior to the settlement of northwestern Minnesota by Euro-Americans and the vast ecological changes these pioneers wrought, what is now Agassiz NWR consisted largely of marshes, wetlands, and the Mud Lake basin. American Indians of the Eastern Dakota and Anishinaabe tribes inhabited the greater region. Like many natural areas, the Mud Lake basin was subject to considerable climatic variation and corresponding ecological changes on the ground. During dry years, the surface flow of the Thief River would dwindle to almost nothing, or stop altogether, while Mud Lake would shrink in area. Wildland fires swept periodically through vegetation communities, altering plant structure and composition and sometimes causing peat fires, which could create potholes. Flooding from the Thief River also occurred regularly. The swamps and marshes surrounding Mud Lake provided habitat for a rich array of wildlife, including ducks, geese, songbirds, black bear, elk, moose, wolves, muskrats, minks, bobcats, coyotes, weasels, and fish.

The Mud Lake area was the last part of Marshall County to be settled by Euro-Americans, who began homesteading there in the 1890s. Initially, the area's abundant wildlife was a crucial food source for these newcomers. By 1915, approximately 150-200 homesteads had sprung up in the area. In 1909, the massive, federally-supported land drainage project described earlier began, with the goal of converting the soggy swamps and marshes into productive, well-drained farmland. However, agricultural productivity never met expectations, and both drainage and drought continued to plague agriculture in the area. Thus, most of the farmers in the basin were unable to make payments on their drainage assessments, forcing Marshall County's bond payment into default. The county was reportedly on the verge of bankruptcy. The deteriorating financial circumstances of the county and the farmers were no doubt aggravated by the regional drought and nationwide economic

depression of the late 1920s and early 1930s. By 1933, approximately $1 million had been spent on Judicial Ditch 11. The State Legislature appropriated $750,000 to pay for delinquent drainage taxes on 90 percent of the area.

In the meantime, the Izaak Walton League (a national conservation organization) and other sport hunters had begun to urge the creation of a national migratory bird sanctuary in the vicinity. As a result of the State Legislature's rescue of Marshall County from bankruptcy, the Minnesota Conservation Department had the right to use lands in the drainage district for conservation purposes. Eventually, this agency, with funds provided by the U.S. Resettlement Administration, acquired properties totaling 55,170 acres by condemnation, and in 1937 transferred them to the federal Bureau of Sport Fisheries and Wildlife (now known as the U.S. Fish & Wildlife Service) for the establishment of Mud Lake NWR. In the six and a half decades since, Agassiz NWR has expanded to 61,500 acres.

Legal Context

In addition to the executive order establishing the Refuge, and the National Wildlife Refuge System Improvement Act of 1997, several federal laws, executive orders, and regulations govern administration of Agassiz 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.

The U.S. Fish and Wildlife Service

> *Working with others to conserve, protect, and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.* Mission of the U.S. Fish and Wildlife Service

Agassiz NWR and the seven-county Refuge Management District are administered by the U.S. Fish and Wildlife Service. The Service is the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife populations and their habitats. It oversees the enforcement of federal wildlife laws, management and protection of migratory bird populations, restoration of nationally significant fisheries, administration of the Endangered Species Act, and the restoration of wildlife habitat such as wetlands. The Service also manages the National Wildlife Refuge System.

The National Wildlife Refuge System

> *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

Agassiz NWR is part of the National Wildlife Refuge System, which was founded in 1903 when President Theodore Roosevelt designated Pelican Island in Florida as a sanctuary for Brown Pelicans. Today, the system is a network of about 545 refuges and wetland management districts covering about 95 million acres of public lands and waters. Most of these lands (82 percent) are in Alaska, with approximately 16 million acres located in the lower 48 states and several island territories.

The National Wildlife Refuge System is the world's largest collection of lands specifically managed for fish and wildlife. Overall, it provides habitat for more than 5,000 species of birds, mammals, fish, amphibians, reptiles, and insects. As a result of international treaties for migratory bird conservation and other legislation, such as the Migratory Bird Conservation Act of 1929, many refuges have been established to protect migratory waterfowl and their migratory flyways, from their northern nesting grounds to southern wintering areas. Agassiz NWR serves a dual purpose both as a critical nesting ground and as an important link in the Mississippi Flyway network of refuges that serve as rest stops and feeding stations for migrating ducks and geese.

Refuges also play a crucial role in preserving endangered and threatened species. Among the most notable are Aransas National Wildlife Refuge in Texas, which provides winter habitat for the highly endangered Whooping Crane. Likewise, the Florida Panther Refuge protects one of the nation's most endangered predators. Refuges also provide unique recreational and educational opportunities for people. They are places where people can enjoy wildlife-dependent recreation such as hunting, fishing, wildlife observation, photography, environmental education, and environmental interpretation. Many refuges have visitor centers, wildlife trails, automobile tours, and environmental education programs. Nationwide, approximately 30 million people visited national wildlife refuges in 1997.

The National Wildlife Refuge System Improvement Act of 1997 established several important mandates aimed at making the management of national wildlife refuges more cohesive. The preparation of CCPs is one of those mandates. The legislation directs the Secretary of the Interior to ensure that the mission of the National Wildlife Refuge System and purposes of the individual refuges are carried out. It also requires the Secretary to maintain the biological integrity, diversity, and environmental health of the National Wildlife Refuge System.

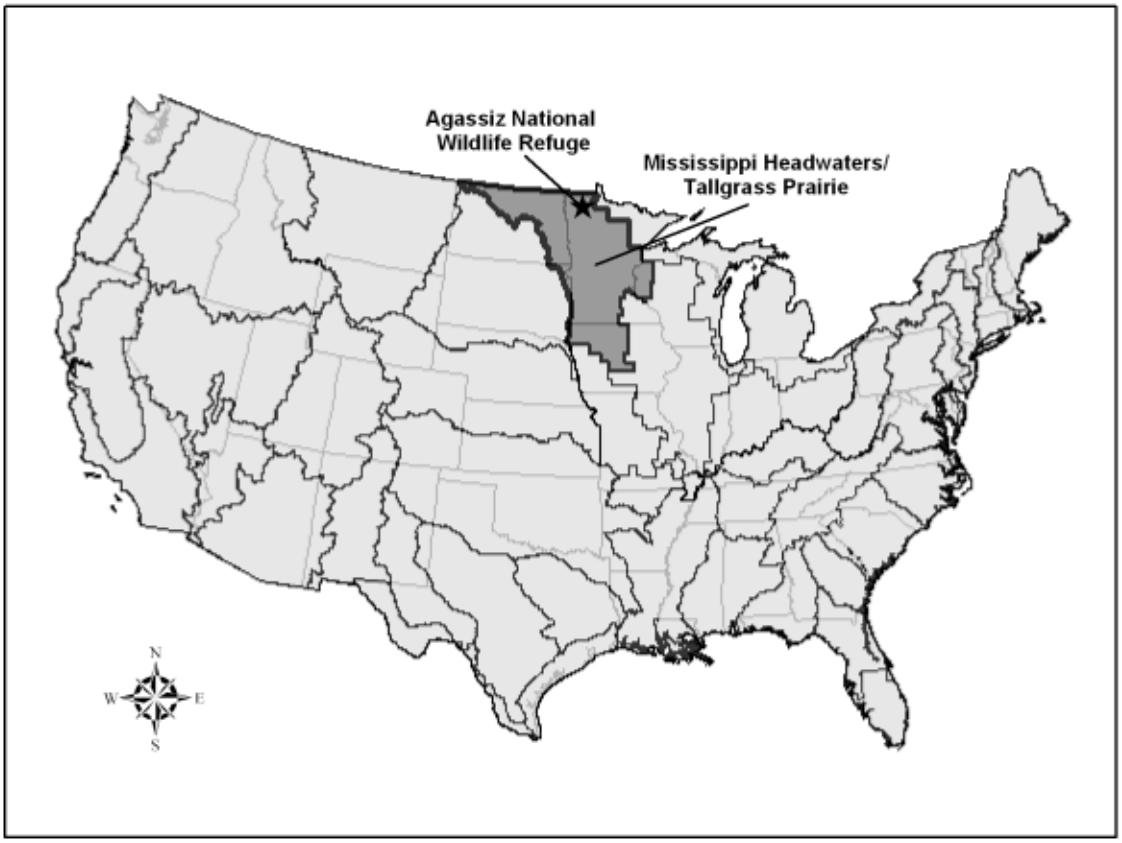
The goals of the National Wildlife Refuge System are to:

- Fulfill our statutory duty to achieve refuge purpose(s) and further the System mission.
- Conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered.
- Perpetuate migratory bird, inter-jurisdictional fish, and marine mammal populations.
- Conserve a diversity of fish, wildlife, and plants.
- Conserve and restore, where appropriate, representative ecosystems of the United States, including ecological processes characteristic of those ecosystems.
- Foster understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public use. Such use includes hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

The Mississippi Headwaters/Tallgrass Prairie Ecosystem

The Service has adopted an ecosystem approach to conservation because we cannot look just at an individual animal, species, or fragment of land in isolation from all that surrounds it. We recognize that we are not going to achieve conservation within the boundaries of a national wildlife refuge, or restore aquatic resources with a national fish hatchery, and that listing an endangered species is not going to conserve the system on which it depends. The ecosystem approach thus strives to be comprehensive. It is based on all of the biological resources within a watershed (the total land area from which water drains into a single stream, lake, or ocean) and it considers the economic health of communities within that watershed landscape. An ecosystem approach to fish and wildlife

Figure 3: Mississippi Headwaters/Tallgrass Prairie Ecosystem



conservation means protecting or restoring the function, structure, and species composition of an ecosystem while providing for its sustainable socioeconomic use.

Agassiz NWR and its Management District are located in the Mississippi Headwaters/Tallgrass Prairie Ecosystem as currently defined by the U.S. Fish and Wildlife Service (Figure 3). This ecosystem is primarily located in Minnesota and North Dakota with small portions extending into Wisconsin and Iowa. It falls within the Prairie Pothole Region of North America. The Prairie Pothole Region produces 20 percent of the continental waterfowl populations annually. This portion of North America was subject to periodic glaciation and consequently, glacial meltwaters were instrumental in forming the five major river systems located or partly located within this ecosystem. These river systems are the Mississippi River, St. Croix River, Red River of the North, Missouri River, and the Minnesota River. Likewise, glacial moraines and other deposits resulted in a myriad of lakes and wetlands that are common throughout this area. Significant variation in the topography and soils of the area attests to its dynamic glacial history.

The three major ecological communities within this ecosystem are the tallgrass prairie (which includes oak savanna and barrens), the northern boreal forest, and the eastern deciduous forest. Grasses common to the tallgrass prairie include big bluestem, little bluestem, Indian grass, sideoats grama, and switch grass. Native prairie also supports numerous ecologically important forbs such as prairie coneflower, purple prairie clover, and blazing star. The northern boreal forest is dominated by a variety of coniferous species such as jack pine, balsam fir, and spruce. Common tree species in

the eastern deciduous forest include maple, basswood, red oak, white oak, and ash. Current land uses range from tourism, timber harvest and mineral extraction in the northern forests to intensive agriculture in the tallgrass prairie. Of the three major ecological communities, the tallgrass prairie is by far the most threatened, with more than 99 percent of it having been converted to agricultural uses.

Due to its ecological and vegetative diversity, the Mississippi Headwaters/Tallgrass Prairie Ecosystem supports at least 121 species of neotropical migrants and other migratory birds. It provides breeding and migration habitat for significant populations of waterfowl plus a variety of other waterbirds. The ecosystem supports several species of candidate and federally-listed threatened and endangered species including the Bald Eagle, Piping Plover, Higgins eye pearly mussel, Karner blue butterfly, prairie bush clover, Leedy's roseroot, dwarf trout lily, and the western prairie fringed orchid. The increasingly rare paddlefish and lake sturgeon are also found in portions of this ecosystem.

Like all parts of the nation, the Mississippi Headwaters/Tallgrass Prairie Ecosystem is confronted with an invasion of non-native and nuisance species. Most of these "exotic" species are plants, but animals are counted among the invaders as well. Some were brought to the region or country deliberately, and then escaped their confines or intended environment. Others arrived by accident. They can cause extensive and expensive ecological and economic damage throughout the region and the nation as their infestations spread. The primary nuisance species the Service has identified in the Mississippi Headwaters/Tallgrass Prairie Ecosystem are purple loosestrife, Eurasian watermilfoil, spotted knapweed, leafy spurge and the zebra mussel. Reed canary grass, Canada thistle, and hybrid cattail are particularly invasive at Agassiz NWR.

Refuge Purpose

President Franklin D. Roosevelt established Mud Lake Migratory Waterfowl Refuge by Executive Order 7583 on March 23, 1937. Its primary purpose was to be "a refuge and breeding ground for migratory birds and other wildlife." While the Refuge was renamed Agassiz NWR in 1961, its fundamental purpose remained unchanged. Although its original focus was on waterfowl (ducks and geese), over the years, other water-dependent birds, other migratory birds such as neo-tropical migrants, and "other wildlife" – including mammals such as moose, deer, and wolves – have received increasing emphasis on the part of Refuge managers.

Franklin's Gull. Jim Mattsson, USFWS

In 1976, Congress designated 4,000 acres in the north-central portion of the Refuge as Wilderness (Public Law 94-557). Section 6 of P.L. 94-557 directs that the Agassiz Wilderness Area be administered in accordance with the provisions of the Wilderness Act. The purposes of the Wilderness Act are to secure an enduring resource of wilderness; to protect and preserve the wilderness character of areas within the National Wilderness Preservation System (NWPS); and to administer the NWPS for the use of enjoyment of the American people in a way that will leave these areas unimpaired for future use and enjoyment as wilderness. Wilderness purposes are "within and supplemental" to refuge establishing purposes. They become additional purposes of the area within the Refuge designated as wilderness.

Refuge Management District

As a result of the 1985 Food Security Act, Agassiz NWR assumed additional responsibilities for a seven-county management district. To date nearly 7,000 acres of permanent easement have been acquired on 40 properties through the Farmers Home Administration (FmHA) and Farm Service Agency (FSA) review process. Refuge staff provide leadership and technical assistance in wetland delineation, preservation, and restoration. The Refuge is involved in habitat restoration projects for both uplands and wetlands on private and CRP lands throughout its Refuge Management District.

Beltrami Island Land Utilization Project Lands

Beltrami Island Land Utilization Project Lands consist of 81,695.5 acres owned by the federal government in scattered parcels throughout the Beltrami Island State Forest and Red Lake Wildlife Management Area in Lake of the Woods, Roseau, and Beltrami counties. The purpose of the Land Utilization Project lands as stated in Executive Order 9091, is that: "such lands be reserved as a refuge and breeding ground for native birds and other wildlife." The U.S. Fish and Wildlife Service administers these lands, which have been managed by the Minnesota Department of Natural Resources Division of Wildlife under a lease agreement since 1940. Agassiz NWR is the first point of contact for all Land Utilization Project management issues.

Refuge Vision

Agassiz NWR lies within the shallow depressional lake plains formed by the pre-historic Glacial Lake Agassiz. The refuge is located within the aspen parkland transitional zone between the tallgrass prairie to the west and northern forest to the east. Agassiz NWR comprises a diversity of plant and animal species, typical of ecotonal communities. Since the beginning of the 20th century, the lands within this area have been manipulated for agricultural purposes, which highly modified natural landscapes and ecosystem functions. Since its establishment, the refuge has been intensively managed for the benefit of migratory birds and other wildlife through the construction of dikes and water control structures.

Agassiz NWR and the surrounding area will be the premier natural resource of Marshall County and northwestern Minnesota. The Refuge and its seven-county management district, working with partners, will take a landscape approach to promote functional watersheds and connect natural areas. Refuge management programs and activities will emulate natural functions and processes of the different native habitats for optimal wildlife use. The resulting benefits will be showcased to demonstrate the compatibility of biological diversity, integrity, natural ecological processes and sustainable agriculture.

People will be attracted to the Refuge and northwestern Minnesota to view and enjoy the wonders of natural ecosystems. Visitors will have quality, wildlife-dependent experiences that provide personal and societal benefits, such as a sense of peace and tranquility and support of a strong conservation ethic. Refuge staff, visitors and the community will understand and appreciate a well-functioning landscape and the cultural history of the area. This vision will be the catalyst to further strengthen a positive community-refuge relationship.

Purpose and Need for Plan

This draft CCP articulates the management direction for Agassiz NWR and its Management District for the next 15 years. It does not address Land Utilization Project lands. Through the development of goals, objectives, and strategies, this draft CCP describes how the Refuge and District also contribute to the overall mission of the National Wildlife Refuge System. Several legislative mandates within the National Wildlife Refuge System Improvement Act of 1997, and principles identified in "Fulfilling the Promise" (a strategic vision document for the Refuge System) have guided the development of this plan. These mandates and principles include:

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

The plan will guide the management of Agassiz NWR and the RMD by:

- Providing a clear statement of direction for the future management of the Refuge and the District.
- Making a strong connection between Refuge activities and those activities that occur off-Refuge in the District.
- Providing Refuge and District neighbors, users, and the general public with an understanding of the Service's land acquisition and management actions on and around the Refuge.
- Ensuring the Refuge and District management actions and programs are consistent with the mandates of the National Wildlife Refuge System.
- Ensuring that Refuge and District management considers federal, state, and county plans.
- Establishing long-term continuity in Refuge and District management.
- Providing a basis for the development of budget requests on the Refuge's and District's operational, maintenance, and capital improvement needs.

Chapter 2: The Planning Process

Least Bittern chick. Brad Dokken

The CCP for Agassiz NWR has been written with input and assistance from citizens, non-governmental conservation organizations (NGOs), and employees of tribal, state, and local agencies. The participation of these stakeholders is vital and all of their ideas have been valuable in determining the future direction of the Refuge and its Management District. Refuge and regional staff – indeed, the entire U.S. Fish and Wildlife Service – are grateful to all of those who have contributed time, expertise and ideas throughout the comprehensive conservation planning process. We appreciated the enthusiasm and commitment expressed by many for the lands and living resources administered by Agassiz NWR.

Internal Agency Scoping

Agassiz NWR's CCP planning process began in early October 2002 with a kickoff meeting involving Refuge staff, a regional planner from the USFWS Region 3 office in the Twin Cities, and a consultant under contract to assist in preparation of the CCP. The 12 participants in this "internal scoping" exercise reviewed the Agassiz NWR vision statement and goals, existing baseline resource data, planning documents and other Refuge information. In addition, the group identified a preliminary list of issues, concerns and opportunities facing the Refuge and RMD that would need to be addressed in the CCP.

A list of required CCP elements such as maps, photos, and GIS data layers was also developed at this meeting and during subsequent e-mail and telephone communications. Concurrently, the group studied federal and state mandates plus applicable local ordinances, regulations, and plans for their relevance to this planning effort. Finally, the group agreed to a process and sequence for obtaining public input and a tentative schedule for completion of the Agassiz NWR and Management District CCP. Public input was encouraged and obtained using several methods, including an open house, written comments during a public scoping period, a questionnaire, an issue-based focus group, and personal contacts. The local news media attended the open house, conducted interviews with study team members, and published articles about the CCP planning process in the local Thief River Falls, Minnesota, newspaper.

Internal scoping continued with a meeting at the Regional Office in Fort Snelling, Minnesota in early December 2002. Ten staffers from Region 3, including supervisors, planners, and biologists covering wildlife/habitat and migratory birds joined Agassiz NWR's Refuge Manager for a discussion on the open house held in Thief River Falls on December 5, 2002, and a number of considerations related to the CCP.

Open House

On the evening of December 5, 2002, Agassiz NWR staff and Service planners welcomed the public to an open house and CCP/EA scoping meeting at the Heritage Center in Thief River Falls. About 30 individuals attended the meeting, most of whom were from Marshall County and all of whom were Minnesota residents. Attendees heard an overview of the CCP and National Environmental Policy Act (NEPA) processes and then were given the chance to address the gathering. Many speakers shared information about the area, issues they wanted to see addressed in the CCP, concerns, and their ideas as to how Agassiz NWR should be managed in the future. The following comments were made during the open house:

Refuge should allow bow-hunting.
Refuge should give flood control higher priority.
Refuge should carry out better weed control (e.g., Canadian thistle).
Refuge allows for adequate public use – it's open to a sufficient extent to see and appreciate resources.
Refuge should open more areas to public visitation.
Refuge should strive for better appearance around headquarters; mow more acres.
Refuge should have more food plots for game like ducks, geese and deer.
Refuge should improve maintenance of legal drainage ditches, which are clogged with weeds and/or vegetation on banks.
Refuge should lower pool level elevations; there should be less water and more upland habitat to benefit upland game in general.
Refuge should seek better cooperation with neighbors and work with surrounding landowners (e.g., road maintenance, water release, infrastructure).
Refuge should seek better cooperation and coordination with local governments, including counties, townships, and ditching authorities, in such matters as repair and works in legal drainage ditches.
Refuge should construct more control structures on upper reaches of the Refuge and diversion ditches upstream of the Refuge to the south side in the WMA, so as to reduce summer flooding.
Refuge should manage wildlife using biology/science instead of politics, to the maximum extent feasible.
Refuge should allow for cross-country skiing trails.
Refuge should increase payment in lieu of taxes to local government(s).
Refuge should allow fishing.
Refuge should modify dams or other water control structures to facilitate fish migration.
Bookstore in visitor center is asset for the Refuge.
Refuge should conduct more prescribed burning to enhance wildlife habitat.

Meeting attendees were also provided with a comment form and encouraged to fill it out and submit it that evening or mail at a later date. The comment form contained the following questions:

What do you think are the most important issues facing the Refuge?
How do you think these issues can be resolved?
Should Refuge habitats be managed any differently than they are today?

Are the types of use and visitation permitted and encouraged by the Refuge appropriate?
Any other comments you would like to make?

Those interested in making comments had until January 18, 2003, to submit this form. Any member of the public who wished to comment in writing also had until that date to send a letter. Comments could be sent by U.S. mail, e-mail, or via the Agassiz NWR planning website on the Internet. Approximately 40 comment forms and other written comments were submitted to the Refuge during the scoping process. These comments, concerns, and suggestions are summarized in Appendix J of this document.

Focus Group Meeting

Aerial view of Agassiz NWR across its Wilderness Area. Gary Tischer, USFWS

On Saturday, January 18, 2003, a 1-day focus group or "technical working group" meeting was held at Northland Community and Technical College in Thief River Falls. The approximately 30 participants in this all-day event had the opportunity to discuss and explore in greater depth the various Refuge issues, goals, and opportunities in a relaxed, congenial setting. Refuge staff sent invitations to a number of stakeholders in the area. Individuals who signed up at the scoping meeting on their own, and all members of the public were welcome, provided they were willing to commit an entire Saturday to helping plan the future of the Refuge.

Some participants signed up at the December 2002 open house and others notified Refuge management afterwards of their desire to participate. Representatives of the Red Lake Band of the Chippewa Tribe and the Minnesota DNR – both of which own large tracts of adjacent and nearby land on which they manage wildlife and habitat – participated in the meeting. A contractor for the Service facilitated the discussion. The following list of issues generated by the open house session and internal refuge and regional office scoping was used as a point of departure for discussion:

Habitat Management:

Loss of sedge meadow to cattail marsh
Drawdown frequency to provide shorebird habitat
Prairie restoration on old cropfields
Invasive plant species (weed control)
Croplands (food plots)
Possible loss to wilderness habitat due to managed impoundments
Prescribed burning
Forest habitats
Commitment to wildlife/natural resources
Off-refuge involvement (e.g., corridor habitat along ditches and rivers, acquire easements/land acquisition related to flooding issues)

Water Management:

- For waterfowl vs. non-game water species (e.g., shorebirds, colonial nesting waterbirds)
- Flood control (inflows – outflows, pool levels, no flood control)
- Retention of spring and summer flood waters by the Refuge.
- Maintenance of drainage ditches

Wildlife Management:

- Nuisance wildlife control
- Non-game species
- Threatened and endangered species

Public Use:

- Deer hunting (e.g., bow, muzzle, take-a-kid)
- Waterfowl hunting
- Fishing
- More trapping opportunities
- Wildlife observation; fire tower and other viewing platforms
- Miscellaneous forms of motorized and non-motorized recreation (e.g., hiking, bicycling, cross country skiing, canoeing)
- Road network, auto tour route, parking
- Visitor Center
- Visitor access (increase, current level adequate, no access)
- Other facilities
- Appearance (well groomed vs. natural)
- Better outreach (e.g., biological benefits and eco-tourism benefits of Refuge)
- More environmental education with schools and local communities

Cultural Resources:

- Interpretation of Mud Lake homesteads and CCC buildings
- Tribal rights

At the outset of the meeting, there was a consensus within the group that due to the intractability of the political impasse over water management and water rights, which has lasted decades and which shows no sign of resolution in the foreseeable future, the focus group should not squander its limited time in debating this question extensively. Suggestions received by certain individuals during scoping that Agassiz NWR should be managed primarily as a flood control facility for the benefit of surrounding and downstream landowners contradicts the founding purpose of the Refuge and the spirit and mission of the National Wildlife Refuge System. For the interests of wildlife to be relegated to a secondary purpose of a national wildlife refuge or merely an incidental benefit of its presence would require Congressional or Presidential action.

Preparation, Publishing, Finalization and Implementation of the CCP

The Agassiz NWR CCP was prepared by a contractor with a great deal of input, review, and support from Refuge staff and the Service's Regional Office. The CCP was published in two phases and in accordance with the National Environmental Policy Act (NEPA). The Draft Environmental Assessment (Appendix A) presented a range of alternatives for future management and identified the preferred alternative, which is also the Draft CCP. The alternative that was selected has become the basis of the Final CCP. This document then, becomes the basis for guiding management on the Refuge and its Management District over the coming 15-year period. It will guide the development of more detailed step-down management plans for specific resource areas and it will underpin the annual budgeting process through Refuge Operating Needs System (RONS) and Maintenance Management System (MMS). Most importantly, it lays out the general approach to managing habitat, wildlife, and people at Agassiz NWR and its Management District that will direct day-to-day decision-making and actions.

The Draft CCP/EA was released for public review and comment on March 3, 2005. A Draft CCP/EA or a summary of the document was sent to more than 200 individuals, organizations, and local, state, and federal agencies and elected officials. An open house event was held on April 6 in Thief River Falls following release of the draft document. We received a total of 20 comment letters and e-mails during the 45-day review period. Appendix K of the CCP summarizes these comments and our responses. Several of the comments resulted in changes in the CCP.

Summary of Issues, Concerns and Opportunities

Habitat Management

We asked a wide range of people for their views on the issues, concerns and opportunities confronting Agassiz NWR. Citizens, non-governmental conservation organizations (NGOs), and employees of tribal, state, and local agencies all offered ideas. Refuge staff and staff from the Service's Regional Office in the Twin Cities were also asked to identify the issues and opportunities that they see for the Refuge. The following paragraphs summarize what we heard.

Loss of Sedge Meadow

Sedge meadow is a rare habitat type in Minnesota. Some people said that invasion by willow, reed canary grass, and cattail is a problem for the sustainability of this resource on the Refuge. Individuals noted that prolonged high water contributes to invasion of the sedge zone by cattails. Present management is to lower water levels prior to fall burning of sedge meadow, as well as cutting 200-300 acres of willows in the winter. Some individuals believe that these practices are proving insufficient and net losses will continue to mount under the present approach.

While some said that a solution might be to spray with chemicals, it was suggested that it would be difficult if not impossible to find an herbicide with specificity for just willows and cattails. It was suggested that a longer dry period for each pool might reduce invasive plant species. Some people said that further monitoring and research are needed to determine whether continuing to expend scarce staff and budgetary resources on efforts to curb cattail and willow encroachment is worthwhile or whether it is ultimately a costly and futile fight against natural succession.

Individuals said that the timing or frequency of prescribed burns is important. It was suggested that multiple burns over a short time period might improve success.

The focus group identified three possible alternatives for dealing with this phenomenon:

Let it go;
Continue with present control measures;
Intensify actions (consider private contracts for cutting willow).

Drawdown Frequency to Provide Shorebird Habitat

Some people said that the Refuge is on the right track with its recent effort to experiment with the timing of the drawdowns as a way to provide shorebird habitat. On the other hand, some people said that the Refuge is already providing enough shorebird habitat. Others said that wet years assure that surrounding agricultural land is also providing habitat.

Prairie Restoration on Old Cropfields

In some cases, comments about prairie restoration on old cropfields took the form of questions. For example, some people wonder about the lack of naturally occurring big bluestem on Agassiz NWR and question whether it is related to soil pH or a high water table. Others question whether the area once included oak savanna habitat.

It was suggested that Refuge management prepare a cost/benefit analysis of prairie restoration on wet sites. While some people said that grasslands are beneficial for wildlife observation, particularly birding, others noted that native plant restoration on a wet site is more costly than restoration on upland prairie.

The kinds of prairie plants used in restoration also generated comments. Some people said that waterfowl nesting on cool-season grass fields could result in low nesting success because of higher predation rates.

Some people said that restoration should be “hands-off, gradual, and intense”. One strategy suggested was to leave old fields in crops for a few years and then plant in prairie, especially if the seed source is limited.

Invasive Plant Species

People cited leafy spurge and Canada thistle as invasive plants that are causing problems on the Refuge. It was noted that the Refuge is currently combatting both leafy spurge and Canada thistle with chemical and biological control agents. In the case of leafy spurge, the use of beetles is having limited success.

Other invasive, exotic or weedy species that were noted as concerns for the Refuge and that are not being controlled are hybrid cattail, reed canary grass, quackgrass, and cocklebur. Eurasian buckthorn has not been observed on the Refuge to date, but could become a problem in aspen uplands in the future. Some people said that purple loosestrife and spotted knotweed prevention is important for the Refuge. Other said that reed canary grass is expanding within the region.

The focus group suggested two alternatives for approaching the problem of invasive plants:

The present strategy, which is only partially stemming the tide of encroachment by invasive plant species;
A combination of intensified control, prevention, monitoring and education.

Croplands (Food Plots)

Agassiz NWR farms 170 acres (winter wheat, barley, oats, etc.) as lure crops and for wildlife observation. Six farm units provide two to three fields each. Some people said that these food plots are good bear and deer viewing areas. Others noted that farm units also serve as rendezvous areas for wolf pups. While the original justification for establishing food plots was to help control crop

depredations by wildlife (especially waterfowl) on surrounding farmland, some people said that the effectiveness of food plots is unknown. Other people said that Refuge croplands do hold some local birds, especially prior to migrant birds arriving in the fall.

Some alternatives for croplands were suggested:

- Maintain the existing configuration and acreage of croplands;
- Discontinue croplands;
- Expand the acreage of croplands;
- Use cooperative farming.

Alteration of Wilderness Habitat Due to Managed Impoundments

Some people expressed concern that a die-off of spruce in the designated Wilderness area may be related to high-water conditions. Others suggested that the die-off could also be due to a rise in pH (salts). People suggested that ongoing research into the cause or causes of this die-off and monitoring throughout future high water periods needs to continue.

Prescribed Fire

Concern was expressed about some degree of controversy in the region about the appropriateness of using prescribed fire on the Refuge. Others said that in general, the surrounding community seems to understand the value of burning. Up to 25 percent of the Refuge has been burned annually, split between seasons in the spring and fall. Some people said that a higher burn frequency may not set back succession due to lower fuel loads. Alternatives suggested included:

- Burn more acres;
- Increase fall burns
- Summer burn cattails;
- Higher frequency of prescribed burning;
- Less frequency of prescribed burning.

Forest Habitats

Agassiz NWR now has approximately 9,900 acres in aspen, spruce, oak, and ash. Some people suggested that, in general, the region had a more open landscape in the 1940-50s. Others question whether brushlands should be recognized as a desirable habitat type. Some people questioned whether wildlife and habitat diversity would benefit from more woodland or less woodland. Some people said that open grasslands and old fields would be lost if woodland acreage were to expand. It was suggested that Agassiz NWR designate some old-growth aspen for cavity-nesting birds and nesting Bald Eagles. It was noted that harvesting aspens during the early years of the Refuge virtually eliminated habitat for cavity-nesting birds.

Some people questioned whether the Refuge should reduce the area in water impoundments. It was noted that abandoning water impoundments in favor of forest would actually necessitate dike removal.

Some people said that one of the forest management issues facing Agassiz NWR is how much emphasis should be placed on restoring oak savanna at the expense of aspen woodlands.

Commitment to Wildlife/Natural Resources

Some individuals noted that the Refuge should not forget the wildlife-first mandate of the National Wildlife Refuge System.

Off-Refuge Involvement in Providing Habitat

Some people said that Agassiz NWR should coordinate efforts and communicate with local governments. Others said that potential road upgrades on the Refuge involve right-of-way issues. People said that the Refuge needs to continue dialog with county road authorities.

Water Management

Waterfowl Versus Non-game Water Species

Recent high water has had an impact on furbearers. However, some people suggested that there is no need to change water management on behalf of non-game water species.

Flood Control

Some people said that farmers on the west side of Agassiz NWR could benefit from small changes in water management. In the opinion of some people, a diversion ditch or a better (or repaired) outlet for the Refuge could prove to be a positive move. Analysis by flood control engineers has shown there would be little impact on downstream flooding from a diversion ditch or improved outlet. Some people said that Agassiz NWR staff should continue to participate in a comprehensive watershed management plan that brings together many diverse and sometimes conflicting parties and interests.

Maintenance of Drainage Ditches

Some individuals said that communication among Refuge management, local officials and neighbors is vital. Others suggested that the Refuge send a letter to local townships when the Refuge approves its annual water management plan. People also suggested that the Refuge work with Marshall County and Red Lake Watershed District.

Wildlife Management

Nuisance Wildlife Control

People noted that beaver do cause problems at culverts or ditches and that response time for beaver removal could be improved. The current procedure is for the Refuge to call upon trapping permit holders to concentrate in certain areas. Off-refuge, a bounty is paid by the county in problem ditches (which goes to half-price during trapping season) throughout the Refuge Management District.

Bald Eagle chicks. USFWS

Trapping Program

Currently the Refuge is divided into eight trapping units. Targeted species include beaver and muskrat that damage infrastructure, and predatory species like skunk and mink. Some people expressed a desire for more trapping opportunities, saying that trapping could possibly be expanded to include fisher and bobcat. Some people also suggested that extra incentives could be provided for trappers to bid on trapping units.

Threatened and Endangered Species

People enjoy seeing Bald Eagles, which are the most conspicuous and spectacular listed species that occurs at Agassiz NWR. Many expressed a desire for the continued protection of nesting eagles. Gray wolves, a controversial species for some people, appear to match their deer prey base. Two packs use the Refuge and adjacent lands. Some people encouraged the Refuge to continue monitoring the wolves.

Wildlife Diseases

Some people said that the CCP should address how Agassiz NWR will approach Chronic Wasting Disease (CWD) and West Nile Virus, two new, foreign wildlife diseases with implications for

humans. It was noted that Agassiz NWR will work with an interagency team on a foreign wildlife disease outbreak contingency plan.

Hunter on Agassiz NWR. USFWS

Wildlife-dependent Recreation

Deer Hunting

The Refuge has one disabled-hunter blind. It received good use the first year but less use more recently. Some people said that a potential problem with hunting is that non-hunting visitors may not feel safe during hunting season, and thus stay away from the Refuge. People suggested alternative for deer hunting such as:

#Expansion beyond the 9-day deer season to include archery and muzzleloader hunts

#No deer hunting at all.

Upland Game

Some people suggested that a ruffed grouse season and a rabbit season could also be held. While the Refuge does not contain large populations of upland game species, some people also suggested opening hunting to all upland game.

Waterfowl Hunting

At present, no waterfowl hunting is allowed on the Refuge. Some people said that if certain areas are opened for hunting, a "no motors allowed" policy would limit the number of hunters. People also said that a majority of the Refuge should remain closed because there are plenty of waterfowl hunting opportunities nearby. Others suggested that some areas could be opened on the Refuge perimeter, noting the Farmes pool as a possibility. People also said that a retrieval zone around the Farmes "firing line" could be expanded. On the other hand, others felt strongly that the Refuge should not be open to waterfowl hunting because it currently holds waterfowl and promotes waterfowl hunting in the surrounding area.

Fishing

Everyone agreed that the Refuge contains little or no gamefish habitat. One individual described Ditch 200 as an opportunity for fishing on the Refuge because it has a run of northern pike once in awhile. Others suggested that the Refuge consider allowing white sucker spearing during high water events.

Wildlife Observation: Fire Tower and Other Viewing Platforms

At present, the wildlife observation tower is closed due to liability concerns. The Refuge will try to keep the tower open, although safety rules may restrict access. Some people said that the Refuge should consider placing a new platform on the auto tour route. Others suggested building a marsh boardwalk. On the other hand, some people said that prescribed burning and flooding complicate placement of such a facility because it would be vulnerable to damage or destruction by fire and flood. Some people suggested that a dike or peninsula may be a better, more damage-resistant option. Some people questioned whether or not the Refuge should limit new visitor facilities to one region of the Refuge.

Miscellaneous Forms of Motorized and Non-motorized Recreation

People questioned whether or not the Refuge should allow visitors to canoe and camp at the Wilderness area. It was noted that no substantial changes are proposed for the existing Agassiz NWR road network, auto tour route, and parking locations.

Some people suggested that the Refuge consider allowing cross-country skiing and snowshoeing as recreational uses on the Refuge.

Visitor Access

Some people suggested that the Refuge keep its northern boundary road open throughout the year. It is currently closed during hunting seasons.

Facilities, Appearance of Facilities

Some people said that the outdoor toilet facility near the visitor center should be made more visible. Others questioned whether landscaping around the visitor center should be natural on manicured.

Outreach, Environmental Education with Schools, etc.

Individuals said that outreach could be increased with the addition of a new staff member.

Environmental Education

It was suggested that the Refuge could improve on-site environmental education by updating the field lab to incorporate a wet lab and environmental education classroom.

Chapter 3: Refuge Environment

Aerial view of Agassiz NWR Pool 8 bordering agricultural lands. USFWS

Introduction

All lands administered by Agassiz NWR are located in northwestern Minnesota. The northern boundary of the Refuge is within 40 miles of the Canadian province of Manitoba and Lake of the Woods, which straddles the U.S.-Canadian border. The nearest city is Grand Forks, North Dakota, 75 highway miles to the southwest.

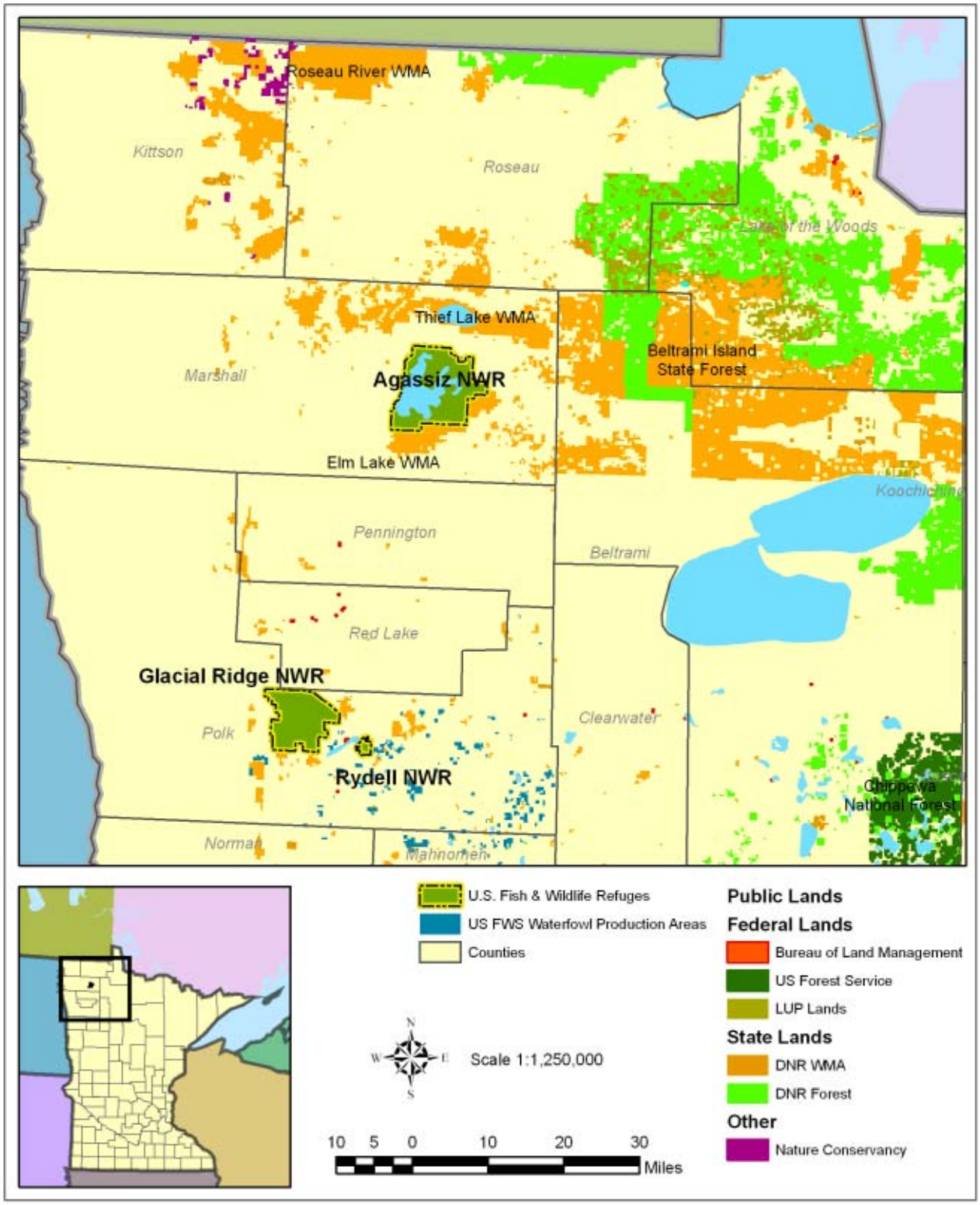
This rural corner of Minnesota, which is 260 air miles or six hours by car north-northwest of Minneapolis and St. Paul, consists of thinly populated agricultural and forestland, with a number of farming villages and towns scattered across the mostly flat countryside. The region includes several large American Indian reservations, including the Red Lake Indian Reservation, which cooperates with Agassiz NWR on matters related to wildlife and resource management. Natural lakes and artificial reservoirs are also much in evidence, although these are not as abundant as they are to the south and east. Drainage around the Refuge is into the Thief River, which joins the Red Lake River to the south of the Refuge at the town of Thief River Falls. The Red Lake River in turn is a tributary of the Red River of the North, which flows by Grand Forks on its way north past Winnipeg, Manitoba and ultimately, Hudson Bay.

Agassiz NWR is an integral part of a sizeable complex of lands managed for wildlife. The Minnesota Department of Natural Resources (Minnesota DNR) has acquired and manages over 50,000 acres in three large and several smaller nearby Wildlife Management Areas (WMAs): Elm Lake WMA is contiguous with the Refuge's southern boundary, Eckvoll WMA is contiguous with the southeastern boundary, and Thief Lake WMA sits several miles to the north (Figure 4). The Minnesota DNR works closely with Refuge staff on issues of mutual concern.

Climate

Northern Minnesota possesses a continental climate, with long, cold winters and relatively short, hot summers. The Refuge's mean annual temperature is 38 degrees Fahrenheit, but this average hides wide and rapid variations in temperature. The Refuge's 30-year mean January maximum is 13 degrees F, and mean minimum -8 degrees F, while its mean July maximum is 80 degrees F, and minimum 55 degrees F.

Figure 4: Conservation Lands in Northwestern Minnesota



Annual mean precipitation at Agassiz is 22 inches, which includes an average 39 inches of snowfall a year. Winter is relatively dry, and the wettest months of the year are June, July, and August. Seventy-five percent of annual precipitation falls in the 6 months from April through September. Thunderstorms are the main source of rain in the area, these occur some 25 to 30 times a year on average (Agassiz NWR, 1978).

The major threat of flooding at Agassiz is the result of spring runoff of snowmelt following wet winters. Flood peaks are affected by the amount of moisture in the soil at freeze-up, amount of accumulated moisture at the start of the spring melt, and weather conditions during the spring melt. Spring and summer thunderstorms that drop more than 5 inches of rainfall on a single day occur occasionally and can cause severe flooding. From June 9-11, 2002, more than 8 inches of rain fell throughout northwest Minnesota, raising Refuge pool levels from 1 to 4 feet, and causing flooding that impacted wildlife habitat, waterfowl nesting, and Marshall County Road 7 (the main Refuge road, which traverses east-west in the southern part of Agassiz NWR).

Geography, Topography, and Hydrology

Agassiz NWR is located in the eastern Red River Valley in what was once the lakebed of ancient Glacial Lake Agassiz. The terrain is relatively flat, with a gentle gradient averaging 1.5 feet per mile, sloping from east to west across the Refuge. Underlying rocks in the area are Precambrian in origin, overlain by sedimentary rock – sandstones, limestones, and shales – dating to the Paleozoic and Mesozoic eras. Overlying all of these strata are thick deposits of glacial till and lake sediments from the Pleistocene Epoch. The layer of till and lake sediments on Agassiz NWR is estimated to exceed 200 feet in depth (Agassiz NWR, 1978).

The Refuge's surface soils are typical of lakebed deposits, consisting of mostly peat or silty loams and clays (Figure 5). Peat occurs at depths of 1-2 feet but is thicker in some areas. Clay-dominated glacial drifts with pockets and lenses of sand are found beneath the surface soils. Except for the peat, these soils have generally lent themselves well to dike construction. However, they are vulnerable to erosion because fine-grained silts and clays predominate. Also, dike slopes need to be protected from wave action by encouraging heavy vegetative cover. Peat soils may be used to dress the dike slopes (U.S. Department of the Interior, 1967).

The glacial lake sediments and drift deposits of sand and gravel contain ground water in quantities sufficient for domestic and stock use. Local ground water is of good quality but is relatively hard and high in iron. Over much of the Refuge the depth to the water table is only 1-4 feet. This proximity to the surface has been favorable for pothole development, but conversely, makes building construction difficult and subsurface waste disposal impractical. The relative impermeability of the Refuge's surface soils impedes recharge of even its more permeable aquifers.

As previously described, the Refuge lies within the Red Lake River watershed, which drains into the northward-flowing Red River of the North. Approximately 610 square miles of drainage basin are upstream of Agassiz NWR's outlet. The largest contributing watershed is the Thief River basin, which drains about 350 square miles above the northern boundary of the Refuge (Figure 6). Mud River drains 160 square miles to the confluence of the Mud River diversion and Judicial Ditch 11, 2 miles east of the Refuge. Impermeable soils and subsurface rock layers in combination with flat topography and minimal stream gradient favor the ponding of surface waters in and around the Refuge, as well as overtopping of banks and flooding.

The Thief River drains Thief Lake, a large marsh managed by the Minnesota DNR and located 4 miles north of the Refuge. This lake, in turn, is fed by the Moose River. The Mud River Judicial Ditch 11 system drains from the east into the Refuge. The channel capacity of Thief River is

Figure 5: Soils Types on Agassiz NWR

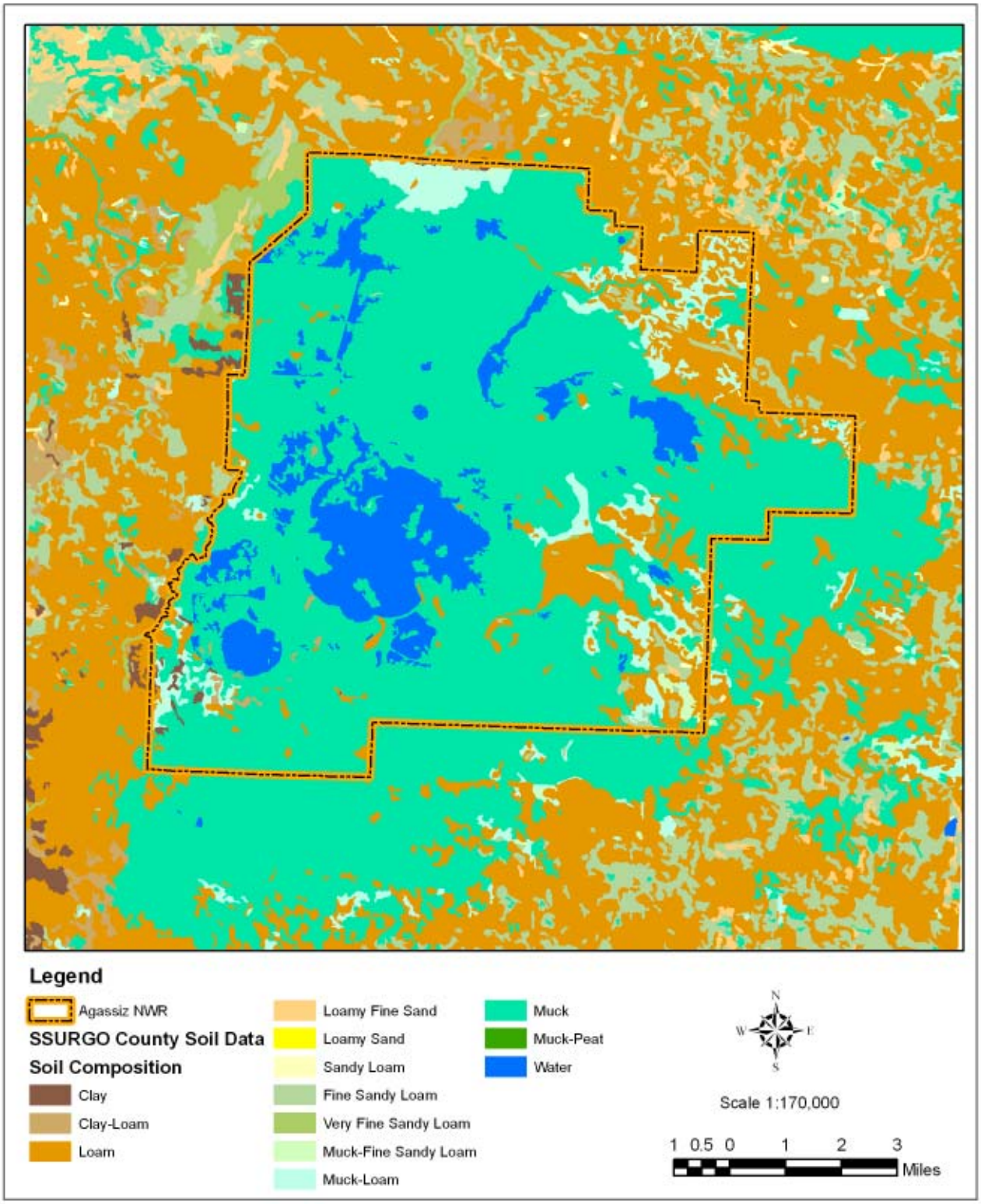
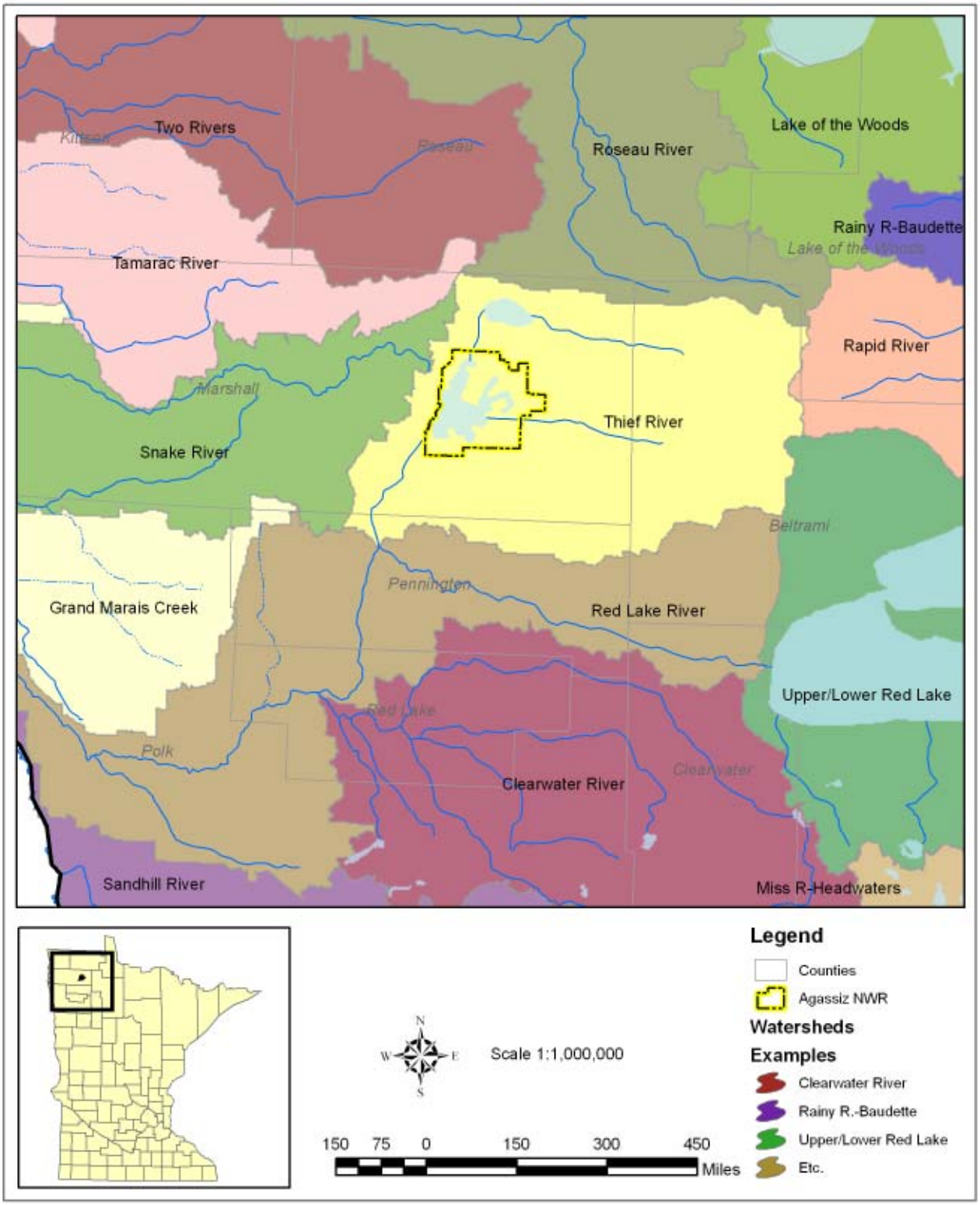


Figure 6: Watersheds of Northwestern Minnesota



approximately 1,500 cubic feet per second (cfs), while that of Ditch 11 is about 900 cfs at the Mud River diversion. Despite the smaller size of its drainage area and channel, Mud River usually contributes more water to Agassiz NWR than the Thief River does due to the storage effect of Thief Lake and its controlled outlet. The Refuge's many pools furnish water storage capacity. In April and May of 1996, two flood events occurred back to back. The first was caused by snowmelt and the second by rainfall. The Refuge stored a total of 102,071 acre-feet during these two events.

Flooding is one of the key issues affecting the Refuge – both its habitat and its facilities – as well as the neighboring region. Not only does flooding affect the Refuge and surrounding private lands, roads, and infrastructure directly, but it also has a big impact on relations between the Refuge and property-owners and officials in the surrounding community. Floods occur most often during March, April and May, when spring rains may combine with snowmelt to exceed channel capacity. The largest flood discharge ever recorded at the Thief River Falls gauge 15 miles downstream of the Refuge was 5,610 cfs in May 1950. During that flood an estimated 108,000 acre-feet of water was stored in the Refuge's various pools. During the 1997 flood event, inflows to the Refuge averaged 5,985 cfs for six consecutive days (April 15 to April 21, 1997). The average outflow at the Refuge was 808 cfs during the same time period, resulting in over 10,350 acre-feet of water put into storage on the Refuge per day, making a dramatic difference in reducing the level of flooding in downstream communities.

Thief Bay Pool. USFWS

Agassiz NWR includes 26 impoundments (known variously as lakes, ponds, pools, or moist soil units) and three natural lakes. Whiskey Lake and Kuriko Lake are located in the Wilderness Area and Webster Lake is located in the northeast area of the Refuge. The artificial impoundments vary widely in size, ranging from 30 acres to the approximately 9,000 acres that comprise the Agassiz Pool. Water is contained within the impoundments by an extensive network of dikes, and water levels can be raised or lowered in any given impoundment by adjusting water control structures at pool outlets. Agassiz's impoundments with their marshes, mudflats, and open water are the dominant geographic features of the Refuge. They are also the focus of the Refuge's aquatic habitat management efforts on behalf of migratory birds.

Natural History

Eleven thousand years ago, during the waning days of the Pleistocene Epoch or Ice Age, meltwaters from the retreating eastern edge of the Des Moines Lobe of the Laurentide Ice Sheet formed a sprawling inland sea named Glacial Lake Agassiz (Bluemle, 2002). Lasting some 4,000 years, this lake was the largest in all of North America at the time – 700 feet deep and covering more than 100,000 square miles in what are now Minnesota, North Dakota, and Manitoba. Dammed to the north by the immense continental glacier, Glacial Lake Agassiz's waters drained southward, carving the Minnesota River Valley. As the last of the northern ice melted away, Lake Agassiz's outlet shifted to the north, and it emptied rapidly into Hudson Bay and the North Atlantic in such a surge of freshwater that it is believed to have altered ocean circulation patterns and the very climate of the earth for a while (Hu et al., 1997; Rosenberg, 2003).

As Glacial Lake Agassiz rose and ebbed over the eons, its dynamics formed and shaped many of the geologic features that still characterize the present-day Red River Valley. Strand lines (or beaches) of sand and gravel mark periods of stability in the lake level. Large alluvial fans mark the site of

ancient river deltas flowing into the lake. The continental glaciers themselves also left their own marks on the valley as they went through successive advances and retreats.

With the final disappearance of Glacial Lake Agassiz, terrestrial plants gradually returned to sites from which they had been absent for thousands of years. In northern Minnesota, pollen studies have documented ceaseless shifts in the region's vegetation communities over the millennia of the Holocene Epoch. Today Agassiz NWR finds itself within a dynamic zone of ecological transition, between the boreal forest to the north and east, the prairie pothole province to the west, and the northern temperate forest to the south. Over time spans of thousands of years, this area's vegetation communities or habitat have undergone perpetual change. This change may not be obvious from year to year, but over centuries or millennia it is strikingly evident. With the arrival of Native Americans, the pace of change accelerated as tools like fire were used to manipulate the landscape. With the later appearance of Euro-American settlers, and the wholesale clearing of forests and draining of swamps and lakes they effected, impacts on plant communities and wildlife habitats and populations were abrupt, drastic, and in some ways irreversible. Figure 7 is a depiction of the land cover and habitats at the time of European settlement in the late 19th century.

Archeological and Cultural Values

Responding to the requirement that CCPs consider the archaeological and cultural values of the planning unit, the Service contracted for a cultural resources overview and management direction study. This section of the CCP derives mostly from the September 2002 "*Cultural Resources Management Plan for Agassiz NWR, Marshall County, Minnesota*."

The *Cultural Resources Management Plan* provided background information about the contextual zone, resources, previous research, and historical contexts that have been used in the preparation of this CCP. The Cultural Resources Management Plan also described the historical context of Judicial Ditch 11 and an overview of management goals and the legislative framework for cultural resources management on the Refuge.

The *Cultural Resources Management Plan* is incorporated into the CCP by reference. It identifies management measures for cultural resources on the Refuge that are necessary to comply with the National Wildlife Refuge System Improvement Act of 1997 and Section 106 of the National Historic Preservation Act of 1966. These measures include:

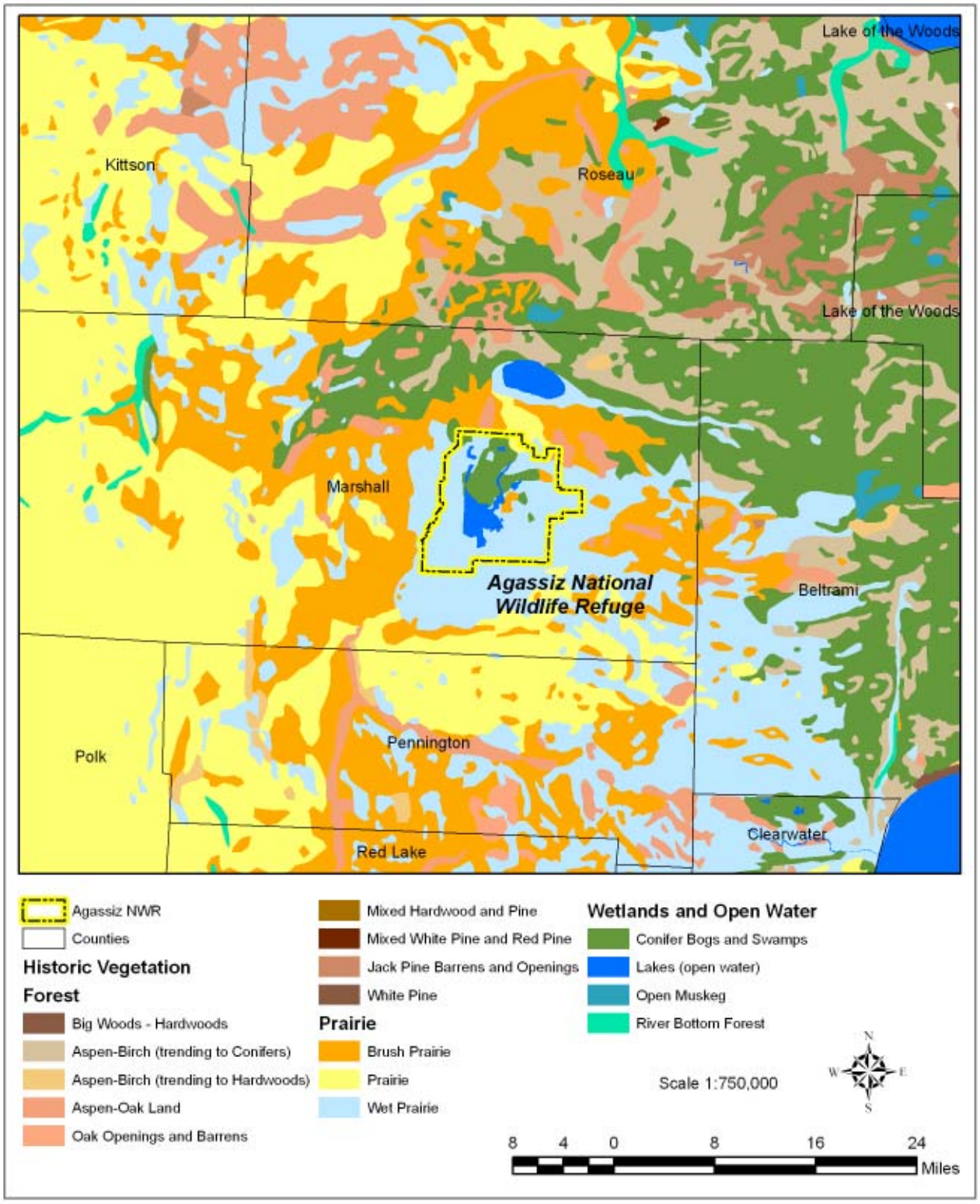
- Establishing internal procedures and identifying key personnel for archeology, architectural history, and traditional cultural properties.
- Developing a programmatic agreement if desirable.
- Identifying and consulting with interested parties.
- Responding to inadvertent discoveries.
- Establishing a system of records management.

Cultural resources are important parts of the nation's heritage. The Service is committed to protecting valuable evidence of human interactions with each other and the landscape. Protection is accomplished in conjunction with the Service's mandate to protect fish, wildlife, and plant resources.

Pre-Contact Period

This context resembles that of eastern North America and is divided into several stages based on material culture like projectile-points and ceramic types as well as subsistence adaptations like hunting, gathering, fishing, or agriculture/horticulture.

Figure 7: Historic Vegetation (1895) in the Vicinity of Agassiz NWR



The Paleoindian Stage

The Paleoindian Stage (c. 10,000 B.C. to 6000 B.C.) was characterized by small, nomadic bands of big-game hunters. Based on the paucity of Paleoindian sites in Minnesota as well as the presence of Glacial Lake Agassiz covering these lands for much of this time, sites from this stage are not expected to occur on Agassiz NWR and none have been found.

The Archaic Stage

The Archaic Stage (c. 6000 B.C. to 1000 B.C.) was characterized by adaptation to the warmer and drier post-glacial environment and the development of efficient hunting and gathering cultures and greater utilization of the local environment for food and tools. Technological innovations of this stage include notched projectile points, the use of copper for tools, and new flaked-stone tools like scrapers and drills. No archaic stage sites have been discovered on Agassiz NWR, but small settlements and seasonal base camps might be expected.

The Ceramic/Mound Stage

The Ceramic/Mound Stage (c. 1000 B.C. to A.D. 1100) was characterized by the initial appearance of pottery and the construction of earthen mounds. No ceramic/mound state sites have been identified on the Refuge, but seasonal habitations or campsites might be expected.

The Late Prehistoric Stage

The Late Prehistoric Stage (c. A.D. 800 to A.D. 1700) is characterized by a move from riverine to lakeshore and possibly by the utilization of wild rice. In northern Minnesota, it is divided into the Blackduck complex and the Sandy Lake ceramic series. Blackduck ceramics are typically globular, sand-tempered and cord marked, and associated features of the archeological culture include small, circular burial mounds that sometimes include grave goods such as small mortuary pots, beads and knives. Sandy Lake ceramics are typically globular, squat and cord marked, and either grit- or shell-tempered. It is generally agreed that their makers were Siouan-speaking peoples. No sites from the Late Prehistoric Stage have been identified on the Refuge but seasonal fishing stations and campsites might be expected.

Contact Period

The contact-period contexts for Agassiz NWR are based on those groups – both indigenous and Euro-American – that inhabited the northwestern part of the state from 1650 to 1837, the latter date being when treaties were signed with the Dakota, Ho-Chunk, and Anishinaabe peoples.

The Eastern Dakota (pre-1650 to 1837) may have left behind cultural landscapes and traditional cultural properties in unmodified portions of the Refuge that have not been obliterated by the large-scale drainage, diking, and pool-creation projects of the 20th century. There are no known Eastern Dakota properties on Agassiz NWR, but examples of what might be expected include village sites, summer residential/logistical bases, winter encampments, muskrat procurement sites, cranberry camps, deer hunting base camps, deer cache sites, deer kill sites, and scaffold burial sites.

The Anishinaabe (c. 1740 to 1837), like the Eastern Dakota, may be represented by cultural landscapes and traditional cultural properties that have not been destroyed by large-scale habitat modifications. There are no known Anishinaabe properties on the Refuge, but examples of what might be expected include seasonal villages, wintering camps, cemeteries, fishing stations, religious/ceremonial/sacred places or structures, sites of battles, and traditional cultural properties.

The French (1660 to 1760) were almost certainly the first Europeans to enter the region, especially explorers, Jesuits, and fur traders. French fur-trading posts also existed throughout Minnesota until the mid-19th century. No French context properties have been found on the Refuge, but expected

property types would include fortified entrepots, temporary outposts, accommodations at Indian villages, special activity areas, canoe accident sites and fur-trade posts.

The British (1760 to 1803) also had fur-trading posts throughout Minnesota. While no properties are been identified on the Refuge, expected property types would be wintering posts, small posts and central places.

The Initial United States Presence (1803 to 1837) in the region could be represented on Agassiz NWR by military campsites, forts, fur-trade posts, and Native American habitation sites, although none have yet been discovered on the Refuge.

Post-Contact Period

There are three general post-contact contexts on the Refuge:

Refuge headquarters was constructed by a CCC crew in 1938-39. USFW

Indian Communities and Reservations

The Indian Communities and Reservations (1837 to 1934) context includes nearly a century of settlement and use by the Anishinaabe people (Ojibwe and Chippewa tribes). By 1837, the Anishinaabe occupied the northern part of Minnesota, with the Dakota having been relegated to the southern part of the state. The Red Lake Reservation was one of eight reservations established for the Anishinaabe in northern Minnesota, and it encompassed most of Agassiz NWR lands until 1889. While no properties have been found on the Refuge, the potential for discovery of properties from this context is considered high, and would include habitation sites, trails, cultural landscapes, and traditional historic properties.

Railroads and Agricultural Development

The Railroads and Agricultural Development (1870 to 1940) context relates to the arrival of Euro-American homesteaders beginning in the 1890s and the subsequent construction of railroads and drainage ditches. The construction of the Great Northern Railroad into Holt, 6 miles west of what is now the Refuge, and the excavation of Judicial Ditch 11 both contributed to a local population boom, which peaked at 150-200 homesteaders around 1915. Known property types that occur on the Refuge include Judicial Ditch 11 itself, former homesteads and farmsteads, schools, and other public institutions.

Federal Relief Construction in Minnesota

The Federal Relief Construction in Minnesota (1933 to 1941) context includes establishment of a national wildlife refuge and the contribution of the Civilian Conservation Corps (CCC). As a result of poor farming productivity from a debilitating combination of droughts and floods, farmers were unable to make their payments on drainage assessments and Marshall County's bond payment went into default. The Midwestern drought and the national economic depression of the late 1920s and early 1930s aggravated local financial duress. Eventually, the State of Minnesota intervened. Using funds provided by the U.S. Resettlement Administration, it purchased the lands through condemnation, and ultimately transferred ownership and maintenance responsibilities to the Bureau of Sport Fisheries and Wildlife (predecessor to the U.S. Fish and Wildlife Service) for the establishment of Mud Lake NWR. These actions led to protests and civil disobedience on the part of local farmers in 1938, including the breaching of an earthen dam on Judicial Ditch 11. Also in 1938, the CCC arrived at Agassiz NWR. Their extensive efforts on the Refuge – the results of which are

still much in evidence more than 60 years later – included surveying and delineating boundaries, construction of miles of dikes, clearing of drainage ditches, gravelling truck roads, and construction of many buildings, of which only a few remain.

It should be emphasized that while a century of extensive and intensive landscape modification on Agassiz NWR may have destroyed or compromised historic properties from pre-contact, contact, and post-contact contexts, there is still potential for undiscovered cultural resources at the Refuge, especially in those portions that have not been heavily subjected to such modification.

Social and Economic Context

Wheat combine in Marshall County. USFWS

Agassiz NWR is located in Marshall County while its Refuge Management District (RMD) spans six additional counties in northwestern Minnesota: Red Lake, Pennington, Kittson, Roseau, Lake of the Woods, and part of Beltrami County. These seven counties occupy the northwestern corner of Minnesota, a rural region with a generally low population density whose economic mainstay is agriculture. Within its 1,675 square miles, Marshall County had an estimated 10,025 residents in 2001, for an average population density of six per square mile, compared to the state's average population density of 57 per square mile. The county population declined by about 8 percent since 1990. Overall, about half of the counties in the seven-county Management District are experiencing modest population growth, and the other half population declines. The percentage of minorities as a share of the overall population tends to be lower in these counties than in Minnesota as a whole, with the exception of Beltrami County. Because of the Red Lake Reservation, Beltrami County's population is 20 percent American Indian compared to 1 percent for the state.

The thick, rich glacial drift soils of the Red River Valley are very productive, and are used to cultivate wheat and a variety of other crops, including soybeans, sugarbeets, barley, dry beans, alfalfa, potatoes, corn, sunflowers and canola. Specialty crops grown locally include rhubarb and asparagus. Livestock numbers are generally low in Marshall County but beef cattle, dairy cows, horses and some sheep can be found.

Like most rural regions of the United States, the seven counties in the RMD are not as affluent as Minnesota's more urban regions. In Marshall County, for example, the median household income in 1999 was approximately $16,300 compared to $23,200 for the state as a whole. Ten percent of Marshall County's population lived below the poverty level in the same year, versus 8 percent for Minnesota (U.S. Census Bureau, 2003). To some extent however, lower incomes are offset by a lower cost of living at least in some aspects, such as housing costs.

The nearest communities to Agassiz NWR are Holt, Middle River, Gatzke, Grygla, Goodridge, and Thief River Falls, the latter two of which are located in Pennington County just to the south of Marshall County. Thief River Falls has about 8,400 residents and the other communities are much smaller. Thief River Falls touts itself as the "birthplace of snowmobiling" and as one of the top wildlife and birding areas in the country. Indeed, Arctic Cat snowmobiles have been manufactured in town for more than 30 years while the Pine to Prairie Birding Trail, which passes through Thief River Falls, is Minnesota's first such trail. Further to the northeast within the RMD, Lake of the Woods is a major tourist, fishing, and boating destination.

Natural Resources

Plant Communities

Agassiz NWR is situated within an ecological transition zone or ecotone, specifically, the aspen parkland transitional zone between the coniferous or boreal forest to the north and east and the tallgrass prairie and prairie pothole zone to the west and south. Figure 8 illustrates the major habitat types at the Refuge, which are described in the following paragraphs. Habitat acreages are based on the 1997 vegetation classification and digitized map. There are:

- 37,400 acres of wetland and shallow open water ("pools");
- 11,650 acres of shrubland;
- 9,900 acres of woodland;
- 1,710 acres of grassland;
- 670 acres of developed land (roads, parking lots, and buildings); and
- 170 acres of cropland managed for the benefit of wildlife.

Wetlands and Open Water

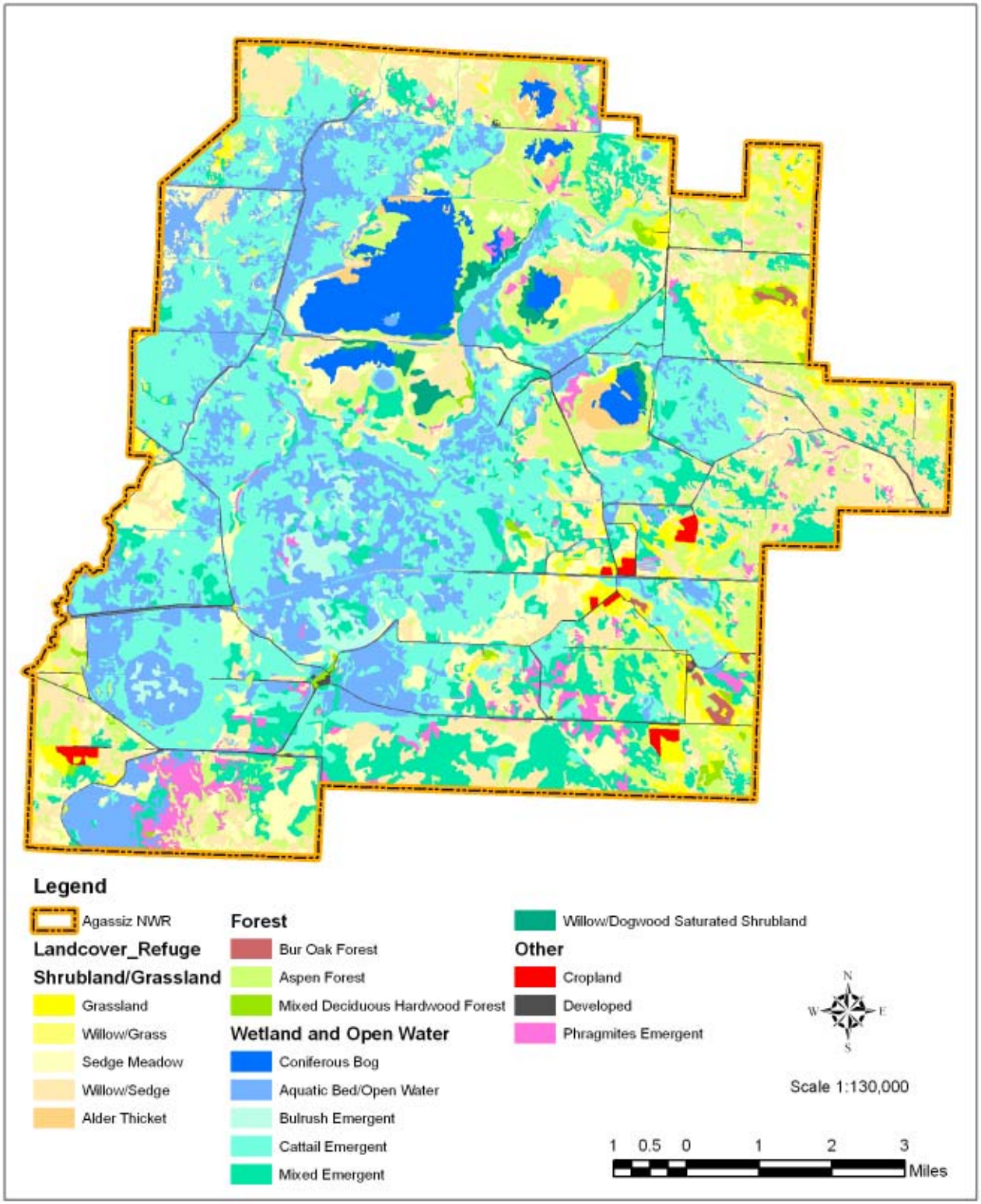
Wetlands and open water comprise approximately 37,400 acres or 61 percent (almost two-thirds) of Agassiz's 61,500 acres. Included are cattail/mixed emergent marsh, bulrush emergent, open water/mudflats, sedge meadow, and common reed (Figure 8). Wetlands and open water are important or indispensable to many of the migratory birds found on the Refuge, either during nesting season or in transit during migration. Ducks, geese, shorebirds, wading birds and certain songbirds and raptors are all heavily dependent on various kinds of wetland, open water and mudflat habitat. A number of mammals, especially the furbearers, utilize or depend on these habitats as well.

Marsh habitat on Agassiz NWR. USFWS

These habitats are to some extent amenable to management (that is, controlling viability, vigor, composition, distribution, and extent) by adjusting water levels in the Refuge's various impoundments. The Refuge has a Marsh and Water Management Plan that provides overall guidance in these matters. Emergent vegetation consists of aquatically-adapted species that respond differently to various flooding regimes and water depths. Emergents have their lower stems and roots underwater and extend their upper stems, leaves, flowers and fruits above the water surface. The seeds of most species of emergents require moist mudflats or very shallow water to germinate. At Agassiz NWR, hybrid cattail (*Typha glauca*) and hardstem bulrush (*Scirpus acutus*) can tolerate water depths greater than 2 feet for more than 2 or 3 years. Under stable water regimes, cattail can increase to undesirable densities and must be controlled through drawdown, prescribed fire, and mechanical or chemical control. Emergent marsh habitat is important to Franklin's Gulls, Red-winged Blackbirds, Yellow-headed Blackbirds, Long-billed Marsh Wrens, Black-crowned Night Herons, and Least Bitterns.

Submerged aquatic vegetation and associated invertebrates provide essential food for waterbirds. Submergents are present throughout the marsh but reach their greatest densities in open bays free of emergents. They also provide some nesting material for the five grebe species.

Figure 8: Current Land Cover, Agassiz NWR (1997 Classification)



Mudflats in seasonally flooded wetlands promote the growth of moist soil plants, which germinate on exposed mudflats during drawdown. In general, early drawdown in May favors seed production in annual plants like smartweed, whereas later drawdown favors perennial plants such as cattail and bulrush. When mudflats are shallowly flooded during the winter, moist soil vegetation furnishes outstanding habitat for invertebrates which are then available to spring migrants.

Sedge meadow is dominated by several species of sedges (*Carex* spp.) but also includes cattail (*Typha* sp.), bluejoint reedgrass (*Calamagrostis canadensis*), manna grass (*Glyceria grandis*), and dark-green bulrush (*Scirpus atrovirens*). Important forbs in this community include marsh cinquefoil (*Potentilla palustris*), marsh milkweed (*Asclepias incarnata*), purple-stem aster (*Symphyotrichum puniceum*), marsh bellflower (*Campanula aparinoides*), spotted joe-pye weed (*Eupatorium maculatum*), meadowsweet (*Spiraea alba*), and small bedstraw (*Galium trifidum*). Sedge meadow typically does not support the diversity or abundance of breeding birds usually associated with other wetland types, but it is a rare and declining habitat type in Minnesota, and several species do prefer to breed or nest in this community. These include the American Bittern, Mallard, Northern Harrier, Sandhill Crane, Sora, Common Snipe, Yellow Rail, Sedge Wren, LeConte's Sparrow and Swamp Sparrow. Each of these has been recorded nesting at Agassiz NWR.

Lowland Shrub

Lowland shrub extends across approximately 11,650 acres of the Refuge, or about 19 percent. This plant community is dominated by willows (*Salix* spp.), speckled alder (*Alnus* sp.) and dogwoods (*Cornus* spp.).

Alder swamps typically have canopies of tall shrubs dominated by speckled alder, frequently in association with other shrub species such as willows and bog birch (*Betula glandulifera*). Common understory species are tussock sedge (*Carex stricta*), prairie sedge (*Carex prairea*), lake-bank sedge (*Carex lacustris*), broad-leaved cattail (*Typha latifolia*), bluejoint reedgrass, northern marsh fern (*Thelypteris palustris*), jewel-weed (*Impatiens capensis*), and Sphagnum squarrosum. The ground layer tends to be sparse because of the dense shrub canopy. Alder lowlands are found in water discharge areas of the bogs.

Willow lowland shrub on Agassiz NWR. USFWS

Willow swamp typically has a canopy of medium to tall shrubs dominated by willows and red-osier dogwood (*Cornus stolonifera*). Other shrubs, such as speckled alder and bog birch are common in the tall shrub layer. The most common herbs are tussock sedge (*Carex stricta*), prairie sedge (*C. prairea*), lake-bank sedge (*C. lacustris*), broad-leaved cattail (*Typha latifolia*), bluejoint reedgrass, northern marsh fern, and jewel-weed.

Among the species that commonly utilize lowland shrub habitat are the moose, white-tailed deer, Le-Conte's Sparrow, Yellow Warbler, Common Yellowthroat, and Black-billed Cuckoo. The use of this habitat by moose and deer means that it indirectly benefits the gray wolf, which preys on these two ungulates. Other migratory birds and waterfowl also use this habitat for nesting and cover.

Woodland

Upland woodlands on the Refuge consist of about 9,900 acres (16 percent of the Refuge) of primarily aspen and mixed hardwood forest patches, bur oak savanna, and coniferous bog. Only the coniferous bog community is characterized by large expanses of closed-canopy forest; the other communities

tend to be open forests with abundant undergrowth. Fire has always been integral to the maintenance of the deciduous aspen forests.

Oak savanna and grasslands. USFWS

The aspen/mixed hardwood community is a broad category that includes several different forest types, but in general includes trees such as trembling aspen (*Populus tremuloides*), balsam poplar (*P. balsamifera*) paper birch (*Betula papyrifera*), bur oak (*Quercus macrocarpa*), basswood (*Tilia americana*), American elm (*Ulmus americana*), and green ash (*Fraxinus pennsylvanica*). The understory of aspen forests tends to be brushy with beaked hazelnut (*Corylus cornuta*), American hazelnut (*C. americana*) and red-osier dogwood. The groundlayer is composed mostly of forest herbs and grasses able to survive in the shade beneath the dense shrub layer. These species include wild sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), sedge (*Carex pensylvanica*), false melic grass (*Schizachne purpurascens*), and mountain rice-grass (*Oryzopsis asperifolia*). Aspen-dominated woodland is an early-successional or pioneering community. Individual aspen trees themselves are shade-intolerant and relatively short-lived. With extended absence of fire or other disturbances, aspen woodland will eventually succeed to mid-successional mixed hardwood forests with some of the other species listed above in the canopy. The Refuge's aspen and mixed hardwood forests benefit such wildlife species as the white-tailed deer, Bufflehead, Hooded Merganser, Ruffed Grouse, and deciduous forest warblers.

Prior to Euro-American settlement in Minnesota, oak savanna flourished in a long, narrow diagonal zone northwest to southeast across the state. This area represented the ecological transition zone or ecotone between prairie to the west and conifer-hardwood forest to the northeast. It was heavily influenced by fire and contained a mix of woodland, brushland and savanna. Oak savanna is now classified by the state as endangered.

Bur oak comprises at least 30 percent of the canopy in an oak forest at Agassiz NWR, with other species like aspen, paper birch, and green ash making up the remainder. The actual composition, however, varies significantly in response to variation in soil moisture, soil type, fire history, and climate. In addition to bur oak itself, bur oak savanna contains other species including some of those listed above. They have relatively open canopies, with less than 80 percent cover. Because of the open canopy, the shrub layer is often very dense. American hazelnut dominates the shrub layer, which also often contains grey bark dogwood and raspberries. Some of the more common groundlayer species are the sedge, wild geranium (*Geranium maculatum*), Virginia creeper (*Parthenocissus inserta*), wild sarsaparilla (*Aralia nudicaulis*), Juneberries (*Amelanchier* spp.) and hog-peanut (*Amphicarpaea bracteata*).

In general, the Refuge's aspen/mixed hardwood and bur oak savanna habitats are utilized by a wide variety of bird species, including the Ovenbird, Whip-poor-will, Northern Flicker, Eastern Bluebird, Screech Owl and Great-horned Owl, Red-tailed Hawk and Cooper's Hawk, Goshawk, and various sparrows and warblers. Winter residents include Gray Jays, Ravens, Chickadees, Nuthatches, Finches, Ruffed Grouse, Downy, Hairy, Black-backed and Pileated Wood-peckers, and Great-horned Owls. A variety of mammals also utilize woodlands at Agassiz NWR, including shrews, bats, squirrels, voles, mice, red fox, porcupine, raccoon, fisher, weasels, black bear, skunk, bobcat, moose, deer, and wolf.

Coniferous bog occurs primarily within Agassiz NWR's designated Wilderness Area in the northern part of the Refuge. This vegetation community is dominated by trees such as black spruce (*Picea mariana*) and tamarack (*Larix laricina*), while abundant shrubs include willow (*Salix* sp.), bog birch (*Betula glandulosa*), alder (*Alnus* sp.), Labrador tea (*Ledum groenlandicum*), and leatherleaf (*Chamaedaphne calyculata*). A nearly continuous mat of sphagnum moss species forms the ground layer. The Refuge's coniferous bog habitat benefits plants like orchids and ferns and bird species such as the Olive-sided Flycatcher, Yellow-bellied Flycatcher, Yellow-rumped Warbler, Connecticut Warbler, Nashville Warbler, Palm Warbler, Hermit Thrush, Dark-eyed Junco, Chipping Sparrow, Lincoln's Sparrow and Winter Wren.

Grassland

Agassiz NWR has approximately 1,710 acres of prairie grasslands, comprising about 3 percent of the Refuge area. Most Refuge grasslands are dominated by introduced species such as smooth brome (*Bromus inermis*), red top (*Panicum rigidulum*) and aggressive invaders like reed canary grass (*Phalaris arundinacea*) and common reed (*Phragmites australis*). Restored native prairie sites with tall grasses like big bluestem (*Andropogon gerardii*) and Indiangrass (*Sorghastrum nutans*) tend to dominate on moist sites, while mid-height grasses such as little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), porcupine grass (*Stipa spartea*), and Junegrass (*Koeleria macrantha*) are important to dominant on drier sites. Prairie dropseed (*Sporobolus heterolepis*) may occur on both dry and moist sites. Grasslands typically contain forbs, which may be abundant and have high local diversity. Forb species composition varies with site moisture, although some forb species occur on almost all sites, moist or dry. Several low shrub or scrub-shrub species occur frequently on upland prairie grasslands. Taller brush and trees are absent or scattered, but at Agassiz NWR, brush or woodland areas can be interspersed with grasslands as part of the "aspen parkland" complex described in Chapter 1.

The Refuge's grasslands provide feeding, foraging, or breeding habitat for numerous species of birds and mammals. Among them are geese, nesting dabbling ducks, Marbled Godwit, Northern Harrier, Red-tailed and Rough-legged Hawks, American Kestrel, Sharp-tailed Grouse, Western Meadowlark, Killdeer, Short-eared and Great-horned Owls, and the Bobolink. Mammals that particularly utilize grasslands include the woodchuck, eastern cottontail rabbit, plains pocket gopher, meadow vole, meadow jumping mouse, red fox, white-tailed deer, and wolves.

Cropland

Approximately 170 acres, or about 0.3 percent of the Refuge, are cultivated for crops of value to wildlife. Winter wheat, barley, oats, and sunflowers are grown on seven units: Rodahl, John's Field, East 80, Goose Pen, Golden Valley, North Dahl, South Dahl. Cropland was originally established at Agassiz to offset depredation of privately-owned grainfields by waterfowl. These crop fields furnish excellent wildlife viewing areas for the public, especially for larger animals like white-tailed deer, bear, and Sandhill Crane. They also augment winter food sources for both resident and migratory wildlife.

Fish and Wildlife Communities

The assorted habitats described in this chapter support a diverse assemblage of wildlife species native to northwestern Minnesota. Many kinds of birds, mammals, fish, reptiles, and amphibians inhabit the lands administered by Agassiz NWR, for which the Refuge is recognized internationally. Wildlife experts have documented the presence of 287 species of birds, 49 species of mammals, 12 species of amphibians, and nine species of reptiles on the Refuge.

Mallard brood. USFWS

Birds

The Refuge has been designated a Globally Important Bird Area for its outstanding value to wild birds and their habitats, as well as its efforts to conserve these. The Refuge is especially important to migratory birds, both during nesting and migrating seasons. It supports 17 species of breeding ducks as well as giant Canada Geese. The following numbers are the maximum estimates during the past 10 years. Approximately 11,570 pairs of ducks and 600 pairs of geese nest on the Refuge. During migration, it hosts up to 50,000 ducks, 23,000 geese, and 2,000 Sandhill Cranes.

The Refuge also supports one of the world's largest colonies of Franklin's Gulls – between 25,000-40,000 breeding pairs – as well as 750 nesting pairs of Black Terns, 900 nesting pairs of Black-crowned Night Herons, 50-500 nesting pairs of Eared Grebes, and 3,000-5,000 non-breeding American White Pelicans.

Overall, more than 120 species of birds have been recorded breeding and nesting at Agassiz NWR, of which the federally threatened Bald Eagle is one of the most majestic. After a 30-year absence, Bald Eagles began nesting on the Refuge in 1992. Today there are four active nests.

Black bear cub. USFWS

Mammals

Forty-nine species of mammals have been documented on Agassiz NWR. Without question, the two most prominent mammals on the Refuge – though not the most frequently observed – are the moose and the federally listed threatened wolf. For a long time, the moose population on the Refuge and adjoining state wildlife management areas averaged approximately 275 animals. In 1993, the population plummeted for unknown reasons. From a low of 65 animals in 1999, the number of moose has slowly increased to an estimated 86 in the February 2002 big game transect survey. Two wolf packs inhabit Agassiz NWR and adjacent wildlife management areas, however they are rarely seen.

Two other large mammals found on Agassiz NWR are the black bear and the white-tailed deer. Black bears are observed infrequently but regularly on the Refuge, while deer are commonplace. In February 2002 the population was estimated at 1,600, for a density of approximately 12 per square mile. Deer are hunted at Agassiz NWR, with 93 harvested in 2002.

Most mammals, however, are far less conspicuous than moose, wolves, deer and bears. They include such hairy little creatures as shrews, bats, woodchucks, rabbits, hares, squirrels, chipmunks, muskrats, mice, and voles. There are many members of the Mustelid or weasel family, including fisher, ermine, least and long-tailed weasels, mink, badger, striped skunk, and river otter. Also present are beaver, porcupine, raccoon, coyote, and the red fox. The Refuge's diversity of habitats meets the needs of these mammals for food, cover, and water.

Amphibians

Twelve species of amphibians have been recorded on the Refuge, including the wood frog, western chorus frog, leopard frog, spring peeper, gray treefrog, Copes gray treefrog, American toad, Canadian toad, and tiger salamander. Marshall County Central High School has set pit fall traps every year since 1994, recording five species of amphibians over that period. Since 2000, Agassiz NWR has also participated in statewide amphibian surveys coordinated by Hamline University of St. Paul, Minnesota.

Reptiles

Nine species of reptiles are known to occur at Agassiz NWR, six of which are snakes. None are threatened or endangered, and none are the subject of management efforts.

Fish

Thirty species of fish have been documented in pools, ponds, and watercourses on the Refuge. Twenty of these species are small fish species like shiners, darters and daces. The most abundant species are the brook stickleback (*Culaea inconstans*) and the fathead minnow (*Pimephales promelas*). None are threatened or endangered. Fishing is not permitted on the Refuge due to the paucity of sportfish and disturbance to marsh nesting birds. Sufficient water depth to maintain the small fish species is critical to the food chain in supporting other birds and mammals.

Migratory Bird Conservation Initiatives

Several migratory bird conservation plans have been published over the last decade that can be used to help guide management decisions for the Refuge and its Management District. Bird conservation planning efforts have evolved from a largely local, site-based orientation to a more regional, even inter-continental, landscape-oriented perspective. Several transnational migratory bird conservation initiatives have emerged to help guide the planning and implementation process. The regional plans relevant to Agassiz NWR and the RMD are:

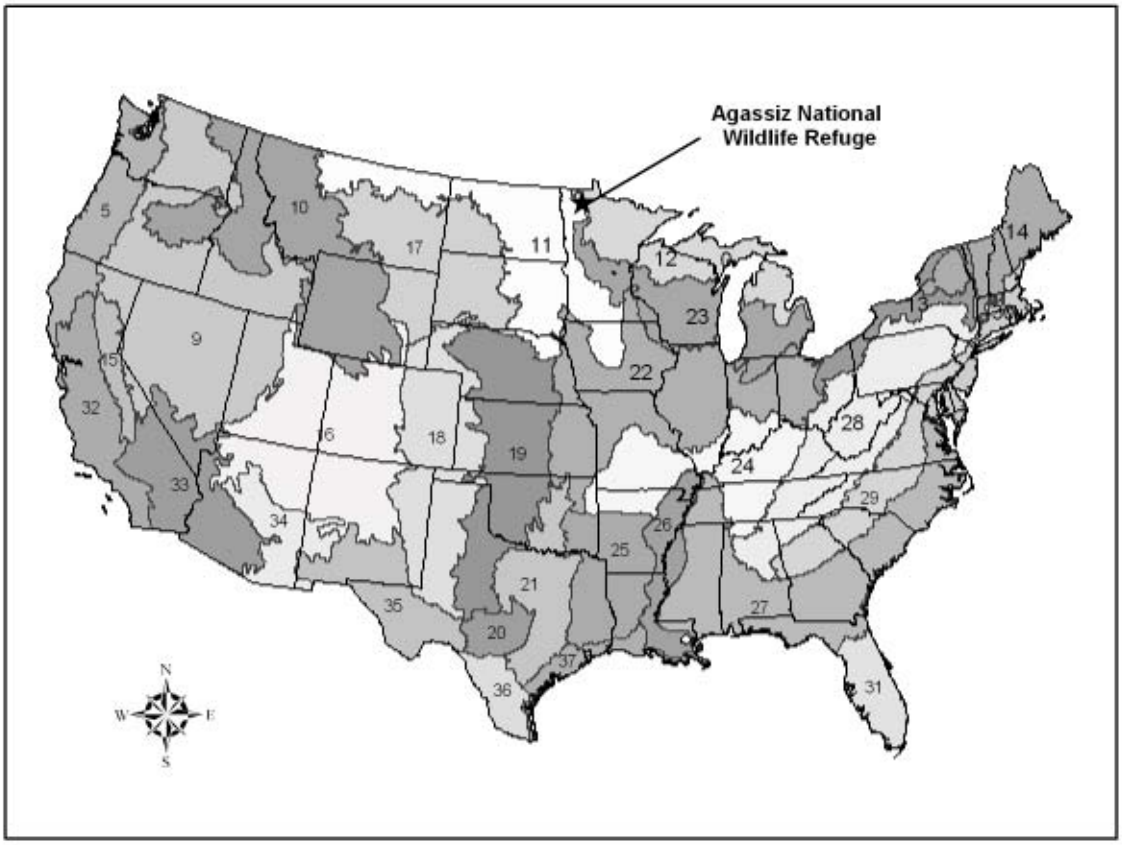
- The Upper Mississippi River/Great Lakes Joint Venture Implementation Plan of the North American Waterfowl Management Plan;
- The Partners in Flight Boreal Hardwood Transition [land] Bird Conservation Plan;
- The Upper Mississippi Valley/Great Lakes Regional Shorebird Conservation Plan; and
- The Upper Mississippi Valley/Great Lakes Regional Waterbird Conservation Plan.

All four conservation plans will be integrated under the umbrella of the North American Bird Conservation Initiative (NABCI) in the Prairie Potholes, Eastern Tallgrass and Prairie Hardwood Transition Bird Conservation Regions (BCR 11, 22 and 23) (Figure 9). Each of the bird conservation initiatives has a process for designating priority species, modeled to a large extent on the Partners in Flight method of computing scores based on independent assessments of global relative abundance, breeding and wintering distribution, vulnerability to threats, area importance, and population trend. These scores are often used by agencies in developing lists of priority bird species. The Service based its 2001 list of Non-game Birds of Conservation Concern primarily on the Partners in Flight, shorebird, and waterbird status assessment scores.

Recently, the Minnesota Bird Conservation Initiative (MBCI) has been established by federal and state agencies and statewide conservation organizations. The MBCI will integrate all bird conservation plans and step them down to a local level. This will allow Agassiz NWR to better refine population and habitat objectives and determine the role it should play in regional bird conservation.

USFWS

Figure 9: Bird Conservation Regions, Agassiz NWR



Wildlife Species of Management Concern

Figure 1 summarizes information on the status and current habitat use of important wildlife species found on lands administered by Agassiz NWR. Individual species, or species groups, were chosen because they are listed as Regional Resource Conservation Priorities or State-listed threatened or endangered species. Other species are listed due to their importance for economic or recreational reasons, because the Refuge or its partners monitor or survey them, or for their status as a nuisance or invasive species.

Table 1: Wildlife Species of Conservation Concern to Agassiz NWR and Refuge Management District

Species (* = Managing habitat for these species)	**Monitored on Refuge or RMD by staff or MnDNR?**	**Regional/State Status** R3-Conservation Priority in Region 3 E-Federal Endangered T-Federal Threatened SE-State Endangered ST-State Threatened SSC-State Special Concern	**Potential Benefit By Habitat Habitat used for Production (P) or Migration (M)**					
			Wetlands/ Mudflats/ Open water	Lowland shrub	Coniferous bog	Upland forest: Aspen &	Grasslands	Cropland
Mammals								
Short-tailed Shrew *Blarina brevicauda*	Yes		P	P	P	P	P	
Pygmy Shrew *Sorex hoyi*	Yes		P	P	P	P	P	
Masked Shrew *Sorex cinereus*	Yes		P	P	P	P	P	
Meadow Vole *Microtus pennsylvanicus*	Yes		P				P	
Deer Mouse *Peromyscus maniculatus*	Yes			P	P	P	P	
Red-Backed Vole *Clethrionomys gapperi*	Yes			P	P	P		
Meadow Jumping Mouse *Zapus hudsonius*	Yes		P	P			P	
Woodland Jumping Mouse *Napaeozapus insignis*	Yes			P	P	P		
Coyote *Canis latrans*	Yes			P	P	P	P	
*Gray Wolf *Canis lupus*	Yes	T ST		P	P	P	P	
Mink *Mustela vison*	Yes		P	P	P			
Least Weasel *Mustela nivalis*	No	SSC	P	P	P	P	P	
Fisher *Martes pennanti*	Yes			P	P	P		
River Otter *Lutra canadensis*	Yes		P					

Table 1: Wildlife Species of Conservation Concern to Agassiz NWR and Refuge Management District (Continued)

Species (* = Managing habitat for these species)	**Monitored on Refuge or RMD by staff or MnDNR?**	**Regional/State Status** R3-Conservation Priority in Region 3 E-Federal Endangered T-Federal Threatened SE-State Endangered ST-State Threatened SSC-State Special Concern	**Potential Benefit By Habitat Habitat used for Production (P) or Migration (M)**					
			Wetlands/ Mudflats/ Open water	Lowland shrub	Coniferous bog	Upland forest: Aspen &	Grasslands	Cropland
Raccoon *Procyon lotor*	Yes		P	P	P	P		
Red Fox *Vulpes vulpes*	Yes			P		P	P	
*Muskrat *Ondatra zibethica*	Yes		P					
Beaver *Castor canadensis*	Yes		P			P		
Black Bear *Ursus americanus*	Yes			P	P	P		P
Bobcat *Lynx rufus*	Yes			P	P	P		
*Moose *Alces alces*	Yes		P	P	P	P		
*White-tailed Deer *Odocoileus virginianus*	Yes			P	P	P	P	P
Birds								
Common Loon *Gavia immer*	Yes	R3	M					
Horned Grebe *Podiceps auritus*	Yes	ST	M, P					
American White Pelican Pelecanus erythrorhynchos	Yes	SSC	M					
Double-Crested Cormorant *Phalacrocorax auritus*	Yes	R3 (nuisance)	M, P					
*American Bittern *Botarus lentiginosus*	Yes	R3	M, P				P	
*Least Bittern *Ixobrychus exilis*	Yes	R3	M, P					

Table 1: Wildlife Species of Conservation Concern to Agassiz NWR and Refuge Management District (Continued)

Species (* = Managing habitat for these species)	**Monitored on Refuge or RMD by staff or MnDNR?**	**Regional/State Status** R3-Conservation Priority in Region 3 E-Federal Endangered T-Federal Threatened SE-State Endangered ST-State Threatened SSC-State Special Concern	**Potential Benefit By Habitat Habitat used for Production (P) or Migration (M)**					
			Wetlands/ Mudflats/ Open water	Lowland shrub	Coniferous bog	Upland forest: Aspen &	Grasslands	Cropland
Black-Crowned Night Heron *Nycticorax nycticorax*	Yes	R3	M, P					
*Franklin-s Gull *Larus pipixcan*	Yes		M, P					
Great Blue Heron *Ardea herodias*	Yes		P, M					
Great Egret *Casmerodius albus*	Yes		P, M					
Snow Goose *Chen caerulescens*	Yes	R3	M					M
*Canada Goose *Branta canadensis*	Yes		M, P					M
Trumpeter Swan *Cygnus buccinator*	Yes	R3, ST	M, P					
*Wood Duck *Aix sponsa*	Yes	R3	M, P		M, P	P		
*American Black Duck *Anas rubripes*	Yes	R3	M, P				P	
*Mallard *Anas platyrhynchos*	Yes	R3	M, P				P	M
*Blue-Winged Teal *Anas discors*	Yes	R3	M, P				P	
*Northern Pintail *Anas acuta*	Yes	R3	M, P				P	
*Canvasback *Aythya valisineria*	Yes	R3	M, P					
*Lesser Scaup *Aythya affinis*	Yes	R3	M, P					
*Bald Eagle *Haliaeetus leucocephalus*	Yes	T, R3, SSC (proposed for delisting from ESA)	M, P			M, P		
Northern Harrier *Circus cyaneus*	No	R3	M, P			M, P	M, P	

Table 1: Wildlife Species of Conservation Concern to Agassiz NWR and Refuge Management District (Continued)

Species (* = Managing habitat for these species)	**Monitored on Refuge or RMD by staff or MnDNR?**	**Regional/State Status** R3-Conservation Priority in Region 3 E-Federal Endangered T-Federal Threatened SE-State Endangered ST-State Threatened SSC-State Special Concern	**Potential Benefit By Habitat Habitat used for Production (P) or Migration (M)**					
			Wetlands/ Mudflats/ Open water	Lowland shrub	Coniferous bog	Upland forest: Aspen &	Grasslands	Cropland
Northern Goshawk *Accipiter gentilis*	No	R3			M, P			
Swainson's Hawk *Buteo swainsoni*	No	R3					M	
Peregrin Falcon *Falco peregrinus*	Yes	R3, ST	M				M	
*Yellow Rail *Coturnicops noveboracensis*	Yes	R3, SSC	M, P					
Sharp-tailed Grouse *Tympanuchus pallidicinctus*	Yes						P	
Ruffed Grouse *Bonasa umbellus*	Yes				P	P		
*Virginia Rail *Rallus limicola*	Yes		M, P					
*Sora *Porzana carolina*	Yes		M, P					
*Semipalmated Plover *Charadrius semipalmatus*	Yes		M					
*Killdeer *Charadrius vociferus*	Yes		M, P				M, P	
*Greater Yellowlegs *Tringa melanoleuca*	Yes	R3	M					
*Lesser Yellowlegs *Tringa flavipes*	Yes		M					
*Solitary Sandpiper *Tringa solitaria*	Yes		M					
*Spotted Sandpiper *Actitis malcularia*	Yes		M, P					
*Upland Sandpiper *Bartramia longicauda*	Yes	R3					M	

Table 1: Wildlife Species of Conservation Concern to Agassiz NWR and Refuge Management District (Continued)

Species (* = Managing habitat for these species)	**Monitored on Refuge or RMD by staff or MnDNR?**	**Regional/State Status** R3-Conservation Priority in Region 3 E-Federal Endangered T-Federal Threatened SE-State Endangered ST-State Threatened SSC-State Special Concern	**Potential Benefit By Habitat Habitat used for Production (P) or Migration (M)**					
			Wetlands/ Mudflats/ Open water	Lowland shrub	Coniferous bog	Upland forest: Aspen &	Grasslands	Cropland
*Marbled Godwit *Limosa fedoa*	Yes	R3, SSC	M, P				M, P	
*Hudsonian Godwit *Limosa haemastica*	Yes	R3	M					
*Stilt Sandpiper *Calidris himantopus*	Yes	R3	M				M	
*Buff-breasted Sandpiper *Tryngites subruficollis*	Yes	R3	M				M	
*Short-billed Dowitcher *Limnodromus griseus*	Yes		M					
*Semipalmated Sandpiper *Calidris pusilla*	Yes		M					
*Least Sandpiper *Calidris minutilla*	Yes		M					
*Bairds Sandpiper *Calidris bairdii*	Yes		M					
*Pectoral Sandpiper *Calidris melanotos*	Yes		M					
*Common Snipe *Gallinago gallinago*	Yes		M, P		M, P			
*Wilson's Phalarope *Phalaropus tricolor*	Yes	SE	M, P					
*Red-necked Phalarope *Phalaropus lobatus*	Yes		M					
*American Woodcock *Scolopax minor*	Yes (RMD only)			M, P	M, P	M, P	M, P	
Common Tern *Sterna hirundo*	No	R3, SE	M					
Black Tern *Chlidonias niger*	Yes	R3	P, M					

Table 1: Wildlife Species of Conservation Concern to Agassiz NWR and Refuge Management District (Continued)

Species (* = Managing habitat for these species)	**Monitored on Refuge or RMD by staff or MnDNR?**	**Regional/State Status** R3-Conservation Priority in Region 3 E-Federal Endangered T-Federal Threatened SE-State Endangered ST-State Threatened SSC-State Special Concern	**Potential Benefit By Habitat Habitat used for Production (P) or Migration (M)**					
			Wetlands/ Mudflats/ Open water	Lowland shrub	Coniferous bog	Upland forest: Aspen &	Grasslands	Cropland
*Forster's Tern *Sterna forsteri*	No	R3	M, P					
Black-billed Cuckoo *Coccyzus erythropthalmus*	No	R3		M, P		M, P	M, P	
Long-eared Owl *Asio otus*	No	R3			M	M		
Short-eared Owl *Asio flammeus*	Yes	R3	M, P				M, P	
Whip-poor-will *Caprimulgus vociferus*	No	R3			M, P	M, P		
Red-headed Woodpecker *Melanerpes erythrocephalus*	No	R3				P		
Northern Flicker *Colaptes auratus*	No	R3				M, P		
Olive-sided Flycatcher *Contopus cooperi*	No	R3			M			
Sedge Wren *Cistothorus platensis*	No	R3	M, P	M, P			M, P	
Golden-winged Warbler *Vermivora chrysoptera*	Yes	R3		M		M		
Cape May Warbler *Dendroica tigrina*	No	R3			M			
Connecticut Warbler *Oporornis agilis*	No	R3		M, P		M, P		
Canada Warbler *Wilsonia canadensis*					M, P	M, P		
Grasshopper Sparrow *Ammodramus savannarum*	No	R3					M	

Table 1: Wildlife Species of Conservation Concern to Agassiz NWR and Refuge Management District (Continued)

Species (* = Managing habitat for these species)	**Monitored on Refuge or RMD by staff or MnDNR?**	**Regional/State Status** R3-Conservation Priority in Region 3 E-Federal Endangered T-Federal Threatened SE-State Endangered ST-State Threatened SSC-State Special Concern	**Potential Benefit By Habitat Habitat used for Production (P) or Migration (M)**					
			Wetlands/ Mudflats/ Open water	Lowland shrub	Coniferous bog	Upland forest: Aspen &	Grasslands	Cropland
LeConte=s Sparrow *Ammodramus leconteii*	No	R3	M, P	M, P			M, P	
Nelson=s Sharp-tailed Sparrow *Ammodramus nelsoni*	No	R3	M, P				M, P	
Bobolink *Dolichonyx oryzivorus*	No	R3					M, P	
Western Meadowlark *Sturnella neglecta*	No	R3					M, P	
Rusty Blackbird *Euphagus carolinus*	No	R3			M			
Amphibians								
Wood Frog *Rana sylvatica*	Yes		P	P		P		
Western Chorus Frog *Pseudacris triseriata*	Yes		P	P		P	P	
Spring Peeper *Pseudacris crucifer*	Yes		P		P			
Northern Leopard Frog *Rana pipiens*	Yes		P					
American Toad *Bufo americanus*	Yes		P	P		P	P	
Gray Treefrog *Hyla versicolor*	Yes		P	P	P	P		
Copes Gray Treefrog *Hyla chrysoscelis*	Yes		P	P	P	P		
Canadian Toad *Bufo hemiophrys*	Yes		P	P		P	P	
Tiger salamander *Ambystoma tigrinum*	Yes	R3	P	P		P		
Mussels								
Giant Floater *Pyganodon grandis*	Yes		P					

Table 1: Wildlife Species of Conservation Concern to Agassiz NWR and Refuge Management District (Continued)

Species (* = Managing habitat for these species)	**Monitored on Refuge or RMD by staff or MnDNR?**	**Regional/State Status** R3-Conservation Priority in Region 3 E-Federal Endangered T-Federal Threatened SE-State Endangered ST-State Threatened SSC-State Special Concern	**Potential Benefit By Habitat Habitat used for Production (P) or Migration (M)**					
			Wetlands/ Mudflats/ Open water	Lowland shrub	Coniferous bog	Upland forest: Aspen &	Grasslands	Cropland
Cylindrical Papershell *Anodontoides ferussacianus*	Yes		P					
Fat Mucket *Lampsilis siliquodea*	Yes		P					
Pink Heel-Splitter *Potamilus alatus*	Yes		P					
White Heel-Splitter *Lasmigona complanata*	Yes		P					

Chapter 4: Refuge and District Management

Current Refuge and District Programs: Where We Are Today

Consistent with its authorizing legislation, Agassiz NWR conducts a broad array of wildlife management activities on the Refuge and its seven-county management district. Agassiz NWR's Master Plan, completed in 1978, developed a list of planned activities consistent with the purpose of the Refuge:

- Waterfowl Production – Diver and dabbler ducks, geese
- Waterfowl Maintenance – Diver and dabbler ducks, geese, swans
- Environmental Preservation
- Special Recognition Species – marsh birds and shorebirds, raptors
- Wildlife/Wildlands Observation
- Interpretive Foot Trails
- Wildlife Auto Tour Routes
- Visitor Center
- Visitor Contact Points
- Interpretive Exhibits/Demonstrations
- Environmental Education
- Hunting – Migratory waterfowl, big game, upland game

Black-crowned Night Heron. B. Silliker

In the quarter-century since publication of the Master Plan, Refuge management has made significant progress in implementing these planned activities and products. Refuge planning and management, however, are a continual work in process that evolves over time depending on feedback and monitoring as well as changing values, needs, and priorities in wildlife management at the Refuge, regional, and national scale. Hence the value of a new plan – this CCP – which updates and modifies Agassiz NWR's management emphasis.

This chapter summarizes current management programs, operations, and facilities at Agassiz NWR as well as off-Refuge habitat management and restoration on the Refuge Management District. It also describes the participation and cooperation of Refuge staff and management activities with our partnering agencies and

stakeholders in the wider community on efforts to balance competing demands for natural resources, wildlife, and protection from environmental hazards like flooding.

Habitat Restoration

Much of current management efforts on the Refuge and Management District focus on restoring valuable wildlife habitats that have declined regionally since the advent of intensive habitat modification and destruction wrought by Euro-American settlement, agricultural development and drainage projects. Agassiz NWR staff carry out wetland and upland habitat restoration projects both on and off the Refuge.

Refuge staff seeding with native prairie seeds. USFWS

Habitat Restoration on the Refuge

Habitat restoration efforts at Agassiz NWR focus on both upland and wetland habitats. There are minimal opportunities to restore degraded or former wetlands on the Refuge by means of dikes and water control structures. However, within managed impoundments there are opportunities to restore habitat to more desirable conditions.

In recent years, upland habitat restoration has focused on improving the quality and quantity of oak savanna and native prairie grasslands. Aspens have been supplanting limited oak savanna habitat. Several methods are used to remove the aspens and allow for the resurgence of oaks. The Refuge issues firewood-cutting permits to remove aspen and balsam poplar. Another technique is girdling aspen. Girdling trees involves cutting through the living cambium layer just beneath the bark, at about chest height. Girdling occurs in the spring, just after the sap has risen and before carbohydrate supplies are sent down to the roots. This is a short window of opportunity and the work is labor-intensive. Trees die slowly, taking at least 2 years to succumb. Firewood cutting is then permitted to remove dead trees. The advantage of this method is that it minimizes suckering and sprouting, unlike firewood cutting of live trees and various prescribed burning methods. Results continue to be evaluated. Staff is also experimenting with particularly hot prescribed burns as a means of restoring and maintaining oak savanna.

Efforts are also under way to restore native prairie grasslands on the Refuge. This typically involves treatment of degraded grasslands, those that have become dominated by non-native, invasive, or woody species like willows. A recent effort has involved two plots of 4 and 6 acres, respectively, in the John's Field area. These sites had been invaded and became dominated by reed canary grass. Although native to North America, this plant has hybridized with introduced European strains to create a highly aggressive and invasive strain that is spreading at the expense of other native species. Reed canary grass is flood-tolerant, it is resistant to burning, it is a prolific seed producer, it spreads rapidly through rhizomes, and it quickly forms virtual monocultures in wet meadows by shading out native grasses and forbs. Its control requires aggressive measures. The John's Field plots were plowed up in June 2001, summer fallowed, then planted to winter wheat, providing browse for migrating geese. An approved herbicide like Roundup®, prescribed fire or both would typically be used on this site and others prior to an early summer planting and the seeding of native grasses and local forbs in order to get ahead of reed canary grass. This is a form of adaptive management, and in the spirit of adaptive management, we are always experimenting with different methods to enhance native grasslands.

Habitat Restoration on the Management District

The federal Conservation Reserve Program (CRP), administered by the USDA Farm Services Agency, pays farmers to keep marginal croplands out of production. Often these are sites with poor natural drainage that were wetlands prior to conversion to agriculture fields. Such areas are plentiful in flat northwestern Minnesota and readily lend themselves to being restored into wetlands, simply by plugging drainage ditches. For a number of years, Agassiz NWR staff have been engaged with numerous wetland restoration projects within the RMD. The year 2000 was an exceptionally active year in this regard. The Mississippi Headwaters/Tallgrass Prairie Ecosystem and Regional Office Refuges and Private Lands Offices had recognized the need to make CRP sign-ups with wetland restorations a priority in Marshall County and other areas within 20 miles of Agassiz NWR. In a monumental undertaking that came to be known as "The Agassiz Adventure," 20 Service employees – including biological and engineering technicians, heavy equipment operators, biologists, Refuge operation specialists, and maintenance mechanics from 10 field stations – working over a period of 472 days, contacted 186 landowners, checked 1,031 wetlands, and restored 832 wetlands. This resulted in a total of 2,722 wetland acres restored. The following year, 45 Service employees assisted with the effort, surveying 924 basins on 548 properties and contributing to the restoration of 4,200 acres of wetlands.

Little upland habitat restoration is requested off-Refuge, since these private farmlands are generally being used for agricultural production.

Restored CRP wetland in Refuge District. USFWS

Habitat Management

As our knowledge and understanding of wildlife ecology evolve over time, and as circumstances and values "on the ground" change, the direction of wildlife management tends to change as well. Two examples of changing philosophies and approaches are evident at Agassiz NWR and many other national wildlife refuges, with regard to the "edge effect" and the value of croplands for wildlife. At the time of Agassiz NWR's Master Plan publication in 1978, the conventional wisdom among wildlife managers was that it was valuable to maximize edges between different vegetation communities. The justification was that since wildlife species that depend on both adjoining habitats could occur near the edge between the two habitats, these edges tend to have higher species diversity than locations set deep within any one habitat type. Thus, increasing the length of edges was deemed desirable.

Twenty-five years later, however, as more information became available from long-term studies, biologists now believe that the advance of civilization has whittled away large contiguous blocks of habitat, and the species that depend on them are in jeopardy. Biological diversity is best served by reducing fragmentation and increasing the areas of habitat blocks, as well as by increasing the connectivity between blocks of similar habitat, so that organisms may move along these corridors and maintain genetic fitness and population viability.

Similarly, for decades wildlife biologists (particularly waterfowl managers) encouraged the cultivation of crops, particularly grains, as a nutritious food source both for upland game and migrating ducks and geese. When national wildlife refuges were established, agricultural lands were acquired and often maintained to produce food for wildlife. However, by the 1980s, wildlife biologists generally and the U.S. Fish and Wildlife Service specifically were adopting more holistic approaches to wildlife management. They realized that artificial food production often had undesirable outcomes even among those species targeted to benefit, such as overpopulation or overcrowding and thus susceptibility to disease and other problems (e.g., outbreaks of botulism or avian cholerea).

At the same time, croplands often came at the expense of more robust, sustainable, and diverse natural communities and the non-game organisms that inhabit them. In recent years, the Service and wildlife biologists in other agencies have tended to discourage grain and crop cultivation. Yet croplands are still considered to have value in some places and under some circumstances. Agassiz NWR's 1978 Master Plan reflected the traditional approach of the past and indicated that "at least 1,200 acres of cropland will be needed to supplement the waterfowl foods available in the marsh during the spring and fall migrations," principally to reduce crop depredation on surrounding private farmlands. Management efforts over the last 15 years have reflected the current management philosophy resulting in only 170 acres of cropland, or one-seventh the amount recommended as a minimum in 1978. This acreage is performing a useful function, especially for wildlife viewing purposes, but staff do not believe more acreage is needed, and even this amount may be reduced.

In recent years, the management philosophy at Agassiz NWR, paralleling that of other refuges around the country, has become more oriented toward fostering or simulating natural processes (like wildland fire) to achieve desired landscapes and to restore scarce habitats that were prevalent prior to Euro-American settlement in the region. Given the highly manipulated environments in which Agassiz NWR and most other refuges occur, this often means actively intervening in natural plant community succession and hydrologic processes rather than passively allowing nature to "run its course." In order for the Refuge to effectively pursue its purpose and meet the expectations of the American public, we actively manage the various habitats through a variety of techniques and procedures discussed in the following paragraphs.

The following discussion is organized by management tool, rather than habitat type, since management tools are often used on more than one type of habitat. Mowing can be used in grasslands and forests, for example, and prescribed fire on forests, shrublands, grasslands, and marshes.

Managing Water Levels and Moist Soil Units

Drawdown of Lower CCC Pool in 2000. USFWS

Agassiz NWR's water management program is very complex and involves 26 impoundments. Pools are frozen for about 5 months of the year, November to April. During periods of "ice-out," May to October, water management not only must balance competing considerations of wildlife and habitats on the Refuge itself, but it must deal with the requests of off-Refuge neighbors upstream and downstream as well as other township, county, state, watershed, and flood control agencies. Regulating water levels – whether at maximum pool levels or in drawdown (emptying pools almost entirely of water) – is a vital management tool for waterfowl, shorebirds, and wading birds. Over the years, water management has been further complicated by increased land clearing, drainage and stream channelization on private lands upstream of the Refuge, which increase flood flows and sediment transport onto the Refuge. In addition, over the last 10 years the area has experienced an extremely wet cycle causing repeated severe flooding, which results in rapid pool level increase, or "bounce," of 2-3 feet. Bounces during the breeding season negatively affect nesting efforts of many species. For instance, the June 11, 2002, event essentially wiped out a production year for many species. Managers must be cognizant of conditions throughout the watershed, exercise good judgment, and at times be willing to deviate temporarily from Refuge objectives when downstream cities and towns are experiencing extreme flooding events.

Agassiz NWR's Marsh and Water Management Plan (1987) guides management of the Refuge's marshes, open water, water levels and discharges. The plan states that production and maintenance of waterfowl are the primary objectives at Agassiz NWR, and that to fully achieve these objectives, a diversity of habitats must be provided to meet the life history requirements of waterfowl for nesting, brood rearing, and migration. The presence or absence of water, its depth, and the seasonal timing of water depth fluctuations are all manipulated to produce various stages of marsh habitats on which different water-dependent birds rely.

An annual marsh and water management plan is written every winter. This plan summarizes operations during the previous year, describes major water management problems, and documents construction and rehabilitation projects. It also identifies proposed pool elevations for the upcoming years along with stated objectives for each management unit. Agassiz Pool, by far the largest on the Refuge, serves as an example. Its spillway elevation is 1,141 ft. above mean sea level (MSL), its drawdown elevation is 1,136, it was last drawn down in 2000, and the next planned drawdown is in 2010. Objectives in 2001 were to maintain and reestablish hardstem bulrush and limit the increase of cattails by flooding out new plants

Refuge management is continually adjusting scheduled water manipulation in response to the vagaries of the weather or maintenance of water control structures. For instance, in 2002, spring runoff was insufficient to recharge eight pools that were in drawdown in 2001. Therefore, it was decided to keep the same pools in drawdown and continue to hold water in the six pools originally scheduled for a 2002 drawdown. Continual maintenance and repair of aging water control facilities such as gates, pilings, gauges, dikes, bridges, riprap, and channels are necessary to keep facilities and controls operable, and thus to meet water and marsh habitat management objectives.

In the early 1980s, five impoundments were developed in the Golden Valley and Goose Pen farm fields as moist soil units, which are valuable habitat for both waterfowl and shorebirds. Difficulties with managing water in these units led to their neglect from the late 1980s to the late 1990s, but in 1998 staff began a concerted new effort to manage them with frequent drawdowns timed to coincide with shorebird migration. All water control structures were replaced in 1999 and 2000 and burning and discing can be used when the units are dry enough to run a tractor across them.

Annual outflows have a wide range of fluctuation at Agassiz NWR, depending on precipitation. Outflow can range from virtually zero discharge from the Refuge into the Thief River during dry years to over 300,000 acre-feet in wet years with one or more large storms. The largest annual outflow, since record keeping began in 1965, was 414,147 acre-feet in 1999.

There have been persistent flooding problems within the watershed, both upstream and downstream of the Refuge, and on the Refuge itself. Possible solutions have been investigated and explored for a number of years. One possibility, developed under the state-mandated flood reduction mitigation process, is construction of a diversion ditch leading from the southern boundary of the Refuge to the Thief River, along with upstream and off-channel storage. In conjunction with the diversion ditch located off Refuge, several water control structures would be enlarged or new ones installed on the Refuge from Agassiz to Headquarters pools, Headquarters to South pools, and South to Farmes pools. During flood events water from Refuge pools could theoretically be discharged faster after the flood peak, to the benefit of the Refuge and its marsh habitats and agricultural areas immediately downstream of the Refuge. It would also allow more flexibility in managing water on the southern half of the Refuge. At present, this proposal has not advanced beyond the concept stage, and it is not being considered in this CCP; however, the Refuge will participate in this process if it is reactivated.

Mowing

Mowing is used in grasslands and certain wetlands like sedge meadow to cut willows and prevent their encroachment. If left alone, hardy, aggressive willows would invade and dominate nearly all wetland areas on the Refuge except for the cattail marsh areas. Mowing maintains a mosaic of willow

age classes, ensuring winter browse for both moose and deer. It also reduces the willow canopy layer and improves the understory of sedges and grasses that foster deeper penetration of fire into willow stands. Increased willow control and better cover for nesting marsh and upland birds that use these areas are the ultimate result of this mowing. Several hundred acres a year are typically mowed on the Refuge.

Mowing is also used as a form of mechanical treatment within the Wildland Urban Interface. In 2002, for example, 185 acres on 34 sites were hydroaxed. Sites included dikes that had not been mowed for several years and that border private property.

Farming

The Refuge has a small farming program with three benefits:

- Help reduce depredation in neighboring farm fields, which improves relationships with nearby landowners when migratory birds feed on private crops.
- It provides food for both resident and migratory wildlife.
- It attracts large, visually impressive animals like deer, bear, Sandhill Cranes, and concentrations of waterfowl to areas where they can be observed by the public.

In a typical year, winter wheat, barley, oats, sunflowers, corn, and new seeded winter wheat are left in seven farm units in various locations around the Refuge.

Refuge staff use a "Terra Torch" in a prescribed fire. USFWS

Prescribed Fire

Fires are a natural ecosystem function in this part of the world. Fire is an agent of abrupt change and renewal in the composition and structure of vegetation communities that over the millennia many native plants and animals have not only adapted to but come to depend upon. Natural and human-caused peat fires created wetland depressions that dot the Refuge. The dynamic and shifting interface between prairie, aspen parkland, hardwood forest and boreal forest is maintained by fire.

Today, prescribed fire is one of the Refuge's most useful tools for maintaining wetlands, grasslands and shrublands for nesting birds as well as to provide habitat for moose and deer. This human intervention in natural succession at the landscape scale helps maintain a mosaic of grasslands, shrublands, forestlands and sedge meadows needed by native wildlife species.

Agassiz NWR has a Fire Management Plan that includes a very active prescribed fire program with burning seasons in the fall and spring. In Fiscal Year 2002, prescribed fire was used on 7,564 acres of habitat, including marshes and pools. Annual prescribed burning varies from 500 to 14,000 acres. Burns are scheduled on a 3- to 6-year rotation and coordinated with drawdown pools identified in the annual Marsh and Water Management Plan. Post-fire monitoring is done to measure whether prescribed burn objectives were met. With the National Fire Plan providing increased emphasis on fire planning, management, and suppression at the national level, Refuge fire staff expanded from one to four positions and new equipment has been added since 2001.

Controlling Invasive Plants

Every year, Agassiz NWR submits a Weed Inventory/ Survey Report to the Regional Office documenting the status of plant pests on the Refuge and efforts to control their spread. The report lists the top five weedy species and the extent of their infestation on the Refuge: Canada thistle (1,600 acres), common sowthistle (100 acres), leafy spurge (3 acres), quackgrass (1,000 acres) and hybrid cattail (10,000 acres).

Canada thistle (*Cirsium arvense*), originally from the temperate regions of Eurasia, is an herbaceous perennial in the aster family that threatens prairie grasslands by crowding out and replacing native plants. Highly invasive, it eliminates other plant species through shading, competition for soil nutrients, and possibly through producing toxins poisonous to other plants. In so doing, it changes the structure and species composition of natural plant communities and reduces plant and animal diversity. Agassiz NWR has tried chemical, mechanical, and biological methods to control Canada thistle. The approved herbicide mixture of 2-4-D and Banvil has been used successfully. Releases of the Canada thistle stem mining weevil (*Ceutorhynchus litura*), seed head weevil (*Larinus planus*), and stem gall fly (*Urophora cardui*) in two locations have shown promise.

Common sowthistle (*Sonchus oleraceus*), native to Europe, is a frequent invader of disturbed sites on grasslands and has spread throughout virtually the entire United States. Agassiz NWR uses a mixture of 2-4-D and Banvil to control common sowthistle.

Leafy spurge. USGS

Leafy spurge (*Euphorbia esula*) is an aggressive, exotic, perennial weed that is especially pernicious in western grasslands. It out-competes desirable native vegetation, growing in dense clumps with one or more shoots emerging from a woody root crown. This weed contains irritating chemicals that many animals avoid eating. Herbicides have been used on leafy spurge, but often, infested acreage is so extensive that chemical controls are prohibitively expensive and not practical. Furthermore, the weed is resistant to chemical control. It has a pervasive root system and appears able to block the downward movement of herbicides. Still another problem with chemicals is that herbicides sprayed to kill spurge also kill desirable broadleaved plants. Chemical control by spot application of Tordon 22K® has kept the leafy spurge infestation in check on the Refuge for the last 20 years. It should be noted that prescribed fire does not control leafy spurge. Biological control is being attempted at Agassiz NWR, but with disappointing results to date: of 120,000 leafy spurge beetles (*Aphthona nigriscutis* and *A. lacertosa*) released in June 2000 on 20 sites and 10,000 released in July 2001 on two sites, there was no survival of the beetles observed on five of the drier sites monitored in June 2002. Perhaps the stands of spurge are too small to support the beetles

Quackgrass (*Agropyron repens*) is a noxious weed from Europe that has spread quickly in North America, infesting grasslands, pastures, cultivated fields, waste areas and disturbed sites. It develops a dense mat of underground rhizomes, which form a heavy sod. Quackgrass reaches 1-3 feet in height with bright green leaves. The Refuge uses Roundup® and Rodeo® (Glyphosate) to control this weed with good to excellent results.

Hybrid cattail (*Typha X glauca*) is an invasive hybrid of two native cattails – broad-leafed cattail (*T. latifolia*) and narrow-leafed cattail (*T. angustifolia*) – that can grow up to 10 feet high with the familiar velvety brown spike of flowers at the tip. It flourishes in a variety of wetland and marshy

habitats, including disturbed sites, spreading by rhizomes and thick quantities of seed. Hybrid cattail out-competes other native plants and forms dense monocultures of limited value to waterfowl and other wildlife. It may also be allelopathic, that is, producing chemicals that inhibit the growth of other plant species. At Agassiz NWR, hybrid cattail dominates or infests some 10,000 acres of marsh habitat. The Refuge has used the approved herbicide Rodeo to create openings in solid stands of cattail to create access for nesting waterfowl. Prescribed fire and raising water levels are also used to suppress cattails.

Other species: There are several other plant species, both on and off the Refuge, that threaten the vegetative integrity of the Refuge. On the Refuge the spread of reed canary grass (*Phalaris arundinacea*) and common reed or phragmities (*Phragmites australis*) is of concern. The use of fire on both species and reclaiming reed canary stands to native plant species are methods of control being explored. Purple loosestrife (*Lythrum salicaria L.*), an extremely invasive species in wetlands, exists outside the western border of the Refuge. Sites are being monitored and biological control agents have been introduced by the state. Also, spotted knapweed (*Centaurea maculosa*), an aggressive, non-native invader of grasslands, grows on roadsides near the Refuge.

Habitat Monitoring

Aerial Infrared – GIS Technology: Agassiz NWR has had aerial infrared photography taken in 1982, 1983, 1985, 1986 and annually since 1991. The 1997 photos were digitized into a vegetation classification. The primary purpose of the photos is monitoring habitat changes that occur either naturally or due to management. In the past, visual comparisons of photos between years were done to make these evaluations. In 1999, Agassiz NWR began investigating the use of Geographic Information Systems (GIS) to make quantitative evaluations. GIS technology is used to compare infrared photos taken in different years to determine the changes in habitat that are taking place due to management activities such as water level manipulation and prescribed burning. Through a cooperative agreement with the Geography Department at Bemidji State University, three or four units have been compared each year since 2001.

Photo Stations: Forty photo stations were established in 1970 to provide a photographic record of changes in habitat. Photos were taken annually during the 1970s and early 1980s and less frequently since then. Recently the old photos have been digitized, making comparisons to recent photos easy to display, compare and store.

Wildlife Monitoring and Research

Two basics types of inventories and investigations are conducted at Agassiz NWR – 1) surveys and censuses of selected species or species groups, which are typically made on an annual basis, and 2) basic research into wildlife biology and ecology, which have no specific schedule. The surveys and censuses are generally made by staff and volunteers, and consist of organized surveys and/or censuses, or a compilation of observations and recorded sightings made over the course of the year. Research studies are usually undertaken in cooperation with university professors and their students or other agencies, often with the direct participation and cooperation of Refuge staff and assisted by volunteers.

Surveys and Censuses

Surveys and censuses at Agassiz NWR are guided by a 1989 Wildlife Inventory Plan revised in 1991. *Endangered and/or Threatened Species* – Two federally listed threatened species are found on the Refuge, the gray wolf and the Bald Eagle. Visual observations of wolves are recorded, as is other evidence of wolf presence, notably scat and tracks. Howling surveys are conducted every 5 years. The wolf population has been the subject of a recent radio-telemetry study. Two wolf packs utilize

portions of the Refuge and the wolf population has been more or less stable since the early 1990s. Bald Eagle nests are surveyed annually. In 2002, four nests were active; all were in tall aspens or cottonwoods.

Amphibians – Since 1994 Marshall County Central High School has conducted amphibian surveys on the Refuge as part of an Environmental Science class. Every September they set pit fall traps, check them and report results. Five species have been recorded: wood frog, western chorus frog, tiger salamander, leopard frog, and American toad. Agassiz NWR staff have also participated in the statewide Minnesota Frog and Toad Survey since 2000. This program is administered by Hamline University in St. Paul. Eight species of frogs and toads have been identified by their calls on the Refuge: wood frog, western chorus frog, spring peeper, northern leopard frog, American toad, Canadian toad, gray treefrog, and Copes gray treefrog. Off Refuge, two survey routes were established in Steiner and Old Mill, Marshall County, in 2001.

Raptors – Staff compile observations of rare and uncommon raptors at the Refuge, including the formerly listed Peregrine Falcon, the Prairie Falcon, and the Snowy Owl.

Waterfowl – Breeding waterfowl, including Trumpeter Swans, Canada Geese, and ducks are inventoried every spring and summer. Trumpeter Swans began appearing on the Refuge in 1997. The first record of them nesting on the Refuge was in 2003. Several types of data are obtained for geese, including the date of first return to the Refuge in early spring, the date of first brood observed, and a gosling count. Over the last 30 years, an estimated 700 goslings have been produced annually on the Refuge. Ducks and duck production are estimated at Agassiz NWR by using brood surveys conducted by aerial and ground surveys. Both dabbling and diving ducks are inventoried. Total, long-term duck production on the Refuge has averaged approximately 13,100 ducklings. Numbers of several species of waterfowl are also estimated during the fall migration, including Canada and Snow Geese, and Mallard, Scaup and Ring-necked Ducks.

Banding Mallards on Agassiz NWR. USFWS

Bird banding has been a tool of wildlife managers for decades. Banding enables biologists to identify and track movement and timing patterns of migratory bird populations. Metal bands or rings with identification information are affixed to the leg of the bird. The bird must be recaptured or killed and held in hand to record the information on the band. Agassiz NWR has an annual banding quota of 1,200 Mallard Ducks. In 2001 and 2002 the Refuge surpassed this with a total of 1,313 and 1,364 Mallards banded. Other ducks that are banded include Black Ducks, Blue-winged Teal, and Pintails. The record high for Pintails banded was 254 in 1996. Fifty-three were banded in 2002. The record of 74 for Blue-winged Teal was set in 2001. The American Bittern research project at Agassiz NWR has banded these birds on the Refuge in recent years.

Marsh Birds, Shorebirds, Gulls and other Migratory Birds – Agassiz NWR conducts censuses and observations of many water-dependent avian species. Estimates of nest numbers are obtained for the three predominant colonial nesting birds (i.e., birds that nest in colonies) on the Refuge: Franklin's Gull, Black-crowned Night-heron, and Eared Grebe. Over the years, averages of 25,000 pairs of Franklin's Gulls, 500 pairs of Black-crowned Night-herons, and 50 to 500 pairs of eared grebe have nested at Agassiz NWR. Five species of marsh birds – American Bittern, Least Bittern, Pied-billed Grebe, Sora and Virginia Rail – are typically surveyed several times a year using passive call and call playback techniques. Two survey routes are run in May for American Woodcock. Point counts are also made of migratory songbirds during the breeding season.

During years when management activities create extensive mudflats and moist soil units, Agassiz NWR is a popular stop over area for shorebirds. These are often counted in the spring and/or summer by volunteer birding enthusiasts. Fifteen to 20 species of shorebirds and thousands of individual birds have been counted in these surveys.

Surveys of waterfowl and marsh birds have been conducted on newly restored wetlands on private lands within the Refuge Management District since 2001. Staff is assisting and developing the North American Marsh Bird Monitoring Protocol. Most of these wetlands are seasonal and shallow. The most common waterfowl species recorded are Mallards, Blue-winged Teal, and Shoveler. The most abundant shorebirds are Killdeer, Least Sandpiper, and Lesser Yellowlegs.

Resident Wildlife – An aerial deer census is conducted every winter. The February 2002 deer population was estimated at 1,600, for a population density of approximately 12 per square mile. An early winter and mid-winter census for moose is carried out annually, using either the quadrat survey or aerial transect techniques. The lowest estimate for the quadrat count was 40 in 1998. As of 2002 both survey techniques show a population that continues to recover very slowly. Figure 10 graphs deer and moose population trends over the last three decades on the Refuge.

Since 2001, Marshall County Central High School ecology students have cooperated in surveys of small mammals along a survey route established in cooperation with Minnesota DNR and the 1854 Authority. The trap stations have yielded meadow voles, deer mice, red-backed voles, short-tailed shrews, and masked shrews. Black bears are not surveyed per se, but sightings are recorded and compiled. Observations indicate that the Agassiz NWR population has been increasing since 1980, paralleling an increase in Northern Minnesota's population. Scent post surveys for furbearers are conducted every fall. These reveal the relative abundance of red fox, coyote, wolf, skunk, raccoon, bobcat, mink, and fisher on the Refuge. In addition, Refuge staff record visual observations of infrequently observed furbearers like bobcats and fishers. Drumming surveys of Ruffed Grouse have been done for 35 years at Agassiz NWR. Dancing Sharp-tailed Grouse are also surveyed, but unfortunately dancing grounds have not been located on the Refuge in 9 years. Some monitoring of invertebrates takes place, including pest insects like tent caterpillars, gypsy moth and mosquitoes, and aquatic invertebrates like mussels by staff and various agencies.

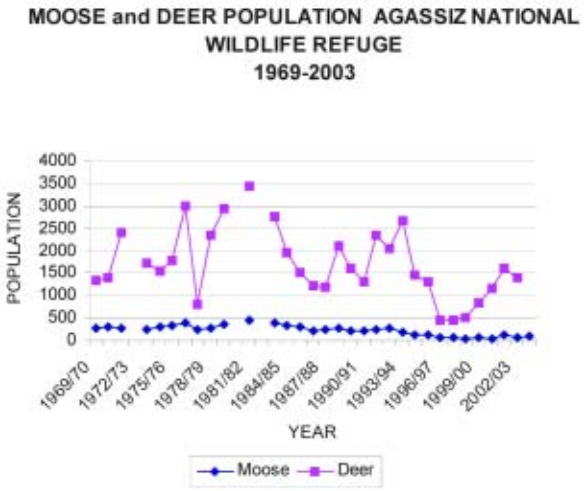
Wolf Research at Agassiz NWR. Andreas Chavez

Studies and Investigations

The Refuge is the site of a variety of wildlife research studies, ranging from life history studies to environmental contaminant effects. Agassiz NWR initiates, encourages and cooperates with these studies in a number of ways, including the use of housing, equipment and other facilities by guest researchers, by subsidizing volunteers, and by direct collaboration in the field. Recent and ongoing studies include the following:

A Study of the Life History and Ecology and Management of the American Bittern – Initiated in 1994, this ongoing three-phase study has involved cooperators from the Society Tympanuchus Cupido Pinnatus (Dr. John Toepfer), St. Cloud University (Wayne Brininger-MS), the University of North Dakota (Dave Azure-MS, Dr. Christopher Austin, Casey Armor), the Univeristy of Missouri-Columbia (Tammy Laney-MS, Soch Lor-PhD), the Red Lake Band of Chippewa and Agassiz and Big Stone national wildlife refuges, as well as numerous field volunteers. This species was selected for study due to declining populations nationwide, and especially in the Upper Midwest, contaminant concerns and little knowledge of basic life history. Capture techniques and radio collaring methods were developed to study the American

Figure 10: Moose and Deer Population 1969-2003, Agassiz NWR



Bittern on the breeding grounds. Satellite telemetry was used to track migration. Bitterns captured in Minnesota wintered in the Florida Everglades and coastal Louisiana using agricultural ditches, saw grass and cypress dome habitat in the former and coastal marshes and Phragmites in the latter.

Moose Reproduction and Survival in Northwestern Minnesota – Initiated in 1995 at a time of rapid decline in moose numbers, the field work for this study was undertaken by Eric Cox, PhD candidate, University of Idaho on behalf of Agassiz NWR and the Red Lake WMA (of Minnesota DNR) and was completed in 2000. This study included the use of radio marked moose to track their movements. The results are currently being written up and are not yet available.

Wolf-Livestock Relationships in Northwestern Minnesota – Initiated in 1996, the objective of this Masters Degree study by Andreas Chavez, Utah State University, was to obtain baseline information about the wolves on the Refuge prior to possible delisting of this species by determining the number of wolves and packs utilizing the Refuge and wolf interactions and impacts with nearby agricultural operations. This investigation made many interesting findings, including the diet of the local wolf population during a time when deer numbers were very low and frequency of wolf movements through pasturelands.

Nesting Ecology of Grebes at Agassiz NWR – Initiated in 1996, this study by Dr. Bruce Eichhorst, University of Nebraska-Kearney, is investigating grebe incubation data, nesting locations, and the effects water management may have on nesting grebes. Study continues as time and funds permit.

Exposure and Effects of Metal Accumulations by Wildlife on Agassiz NWR – Initiated in 1998 by the Twin Cities Ecological Services Field Office and the Upper Midwest Environmental Sciences Center (Drs. Tom and Christine Custer, USGS/BRD), this study is utilizing colonial water birds, tree swallows, and moose to determine the exposure to and effects of metals on these species at Agassiz NWR.

Diet of the Nesting Tree Swallow as Related to Insect Diversity and Abundance – This study was a subpart of the metal accumulation study. Jean Mengelkoch, MS, 2000, University of Minnesota, Duluth. Objectives were to determine the percentage of invertebrates in the diet of nestling

swallows, identify them taxonomically, chick age realtionship to diet and whether adults selected nest sites based on invertebrate species and abundance.

Least Bittern Ecology: Nest Success, Philopatry, and Habitat Selection on a Landscape Scale – Initiated in 2001 by Dr. Leigh Fredrickson, Gaylord Memorial Laboratory, Puxico, MO, this study aims to determine and compare nest timing, breeding behavior, nest sites, growth rates, spatial and temporal effects between breeding populations of Least Bitterns at Agassiz, Mingo, and Squaw Creek national wildlife refuges. MS student Karen Arnold, South Dakota State University, has one more field year left in this study. Heavy flooding in June 2002 wiped out virtually all nests and provided a dramatic example of the resilience of wildlife in adapting to extreme weather.

The Effects of Climate Variability and Geomorphic Setting on Shorebird Habitat Use in Northwest Minnesota – MS student Kari Odefey, South Dakota State University, finalized this 2-year study in 2003 to determine how climatic variability and geomorphic setting influence habitat conditions within wetland complexes both on the Refuge and off (restored wetlands located on private land) and to describe shorebird response to these varying habitat conditions. Results are being analyzed.

Habitat Monitoring Using GIS & Aerial Infra-red Photos for Agassiz NWR – Dr. Charles Parson, Department of Geography, Bemidji State University, is cooperating with Agassiz NWR in the application of GIS, specifically the Spatial Analyst and Image Analyst extensions of Arcview, to monitor changes in vegetative cover at the Refuge over time due to fire and water management or natural conditions such as drought and flood.

Relationship of Water Table Level to Peatland Tree Growth – Initiated in the fall of 2002 by MS candidate Rhett Johnson, University of Minnesota, Duluth, this research is examining the effects of high water levels in managed impoundments on black spruce and tamarack within the Refuge's Wilderness Area. The study is also looking into the possible effects a road/dike and associated ditches that cut the Wilderness Area in half may have on water flows, which in turn can effect vegetation.

Moose researchers at Agassiz NWR. USFWS

Nutrient Reserve Dynamics of Lesser Scaup During Spring Migration in the Mississippi Flyway – This MS study conducted by Michael Anteau, Louisiana State University, is investigating the hypothesis that declining Scaup populations in the Mississippi Flyway may be due to reduced reproductive success because females are arriving on breeding grounds in poorer physical condition than historically. The MS portion was completed and further study is ongoing.

Wetland Invertebrate Response to Three Different Wetland Management Treatments (drawdown, prescribed fire, and drawdown and prescribed fire) at Agassiz NWR – This study is being conducted by Ned (Chip) Euliss, USGS Northern Prairie Wildlife Research Center, Jamestown, ND; Leigh H. Fredrickson, Gaylord Memorial Laboratory, Puxico, MO; and Soch Lor, Agassiz NWR. Agassiz NWR is one of the largest and most important refuges in Region 3 for a wide range of breeding and migrant waterbirds, including several of concern. The most active management programs on the Refuge are water level management and prescribed fire. These programs are implemented to manage habitats for migratory birds and resident mammals (namely moose, deer and muskrat). Because invertebrates are the primary source of food for many wetland-dependent birds and are a crucial factor in wetlands dynamics,

knowledge about them is a critical link for effective management of Refuge wetlands. This study aims to evaluate the effects of drawdown and prescribed fire treatments on the invertebrate communities and to correlate these treatments and invertebrate information to shorebird and waterbird use of the wetlands.

Wildlife Management

Wildlife management activities at Agassiz NWR are directed by the Refuge's establishing purposes and general mandate to conserve trust resources. This is accomplished primarily through habitat manipulation rather than by direct manipulation of wildlife species and populations. See the sections on habitat restoration and management above. However, the following activities do pertain directly to increasing or decreasing wildlife numbers through management, conservation, and where necessary, control, of wildlife populations.

Disease Monitoring and Control

Staff is continually monitoring the health and condition of wildlife populations on the Refuge and staying abreast of the regional status of diseases that affect the health of wildlife, humans, or both. Through monitoring and preventive measures, it is possible to prevent isolated cases from triggering major outbreaks of disastrous epidemics. West Nile Virus appeared in northwestern Minnesota in 2002, reported first in horses. Spread by mosquitoes, this exotic virus infects mammals, including humans, and birds. Members of the Corvidae family (crows and jays) seem to be especially vulnerable.

In August 2002, an unusual number of dead birds were found on the Refuge. Several dead specimens were collected and sent to the Wildlife Health Lab in Madison, Wisconsin, including one white pelican, one double-crested cormorant, one mallard and two pied-billed grebes. The pelican and one of the grebes tested positive for West Nile Virus. The cormorant tested positive for botulism C and avian cholera. The mallard tested positive for botulism C. Fortunately, none of these diseases became a major outbreak. There have been no major botulism outbreaks in recent years.

Nest Structures

The Refuge has about 100 goose and duck nesting baskets that have been checked and maintained periodically. However, goose nesting structures are being removed gradually since the statewide recovery program has met its goals for the Giant Canada Goose. Seven nesting structures were provided for cormorant nesting on Agassiz Pool dating to the 1960s. They were not used, became severely rusted and were removed in 2001.

In the late 1990s, 250 swallow boxes were erected at water inflow, outflow, and interior sites of several pools and ditches for a contaminant study. With fieldwork for the study completed in 2001, students from the Wildlife Resources class at Lincoln High School in Thief River Falls removed the boxes in 2001-2002.

Predator and Exotic Wildlife Control

Agassiz NWR has a trapping program, the primary purpose of which is to control predators of ground-nesting birds. These predators include fox, mink, skunk, otter and raccoon. Trapping also helps control the numbers of muskrat and beaver, which cause damage to dikes and water control structures.

The Refuge is divided into eight units and special use permits for trapping are issued through a bid system. However, low fur prices in recent years have reduced interest in trapping on the Refuge.

The trapping season typically runs from late October through the end of February, with the season for beaver continuing through April. Leghold traps are used mostly for terrestrial mammals such as mink, raccoon, red fox, and striped skunk, but also for muskrat, while conibear traps are used

Table 2: Trapping Statistics, Agassiz NWR

Species	10-Year Average	Number Trapped in 2002
Mink	25	36
Raccoon	19	21
Red Fox	5	0
Striped Skunk	7	6
Muskrat	1,263	1,770
River Otter	4[1]	4
Beaver	47	41

1.This is a 9-year average due to trapping not allowed in 1993 and 1994 because of low population levels.

primarily for river otter and beaver. In the 2001-02 trapping season, there were 181 trapper visits totaling 566 trapper hours. Trap days for all species were 4,565 for leghold traps and 624 for conibear traps. Table 2 shows trapping data for a 10-year average and 2002.

Crop Depredation Relief

The Refuge maintains about 28 propane exploders that are loaned out to local farmers to prevent bird and deer depredation of their crops. The Minnesota DNR has also borrowed these exploders for use in the Park Rapids and Appleton areas. Exploders are loaned out at no cost, but people borrowing the equipment must purchase propane. We provide this service to assist neighbors.

Coordination Activities

Agassiz NWR staff invests a significant amount of energy and time representing the Refuge in its role as a partner with other government and resource agencies and as a neighbor and large landowner in the community. Staff participates as team members of various committees and groups ranging from watershed districts to northwestern Minnesota tourism promotion efforts.

Interagency Coordination

Refuge Staff work extensively with conservationists from the Natural Resources Conservation Service (NRCS) on the evaluation and implementation of habitat restoration projects on private lands within the seven-county Refuge Management District as part of the Wetland Reserve Program, Emergency Wetland Program and Conservation Reserve Program.

Refuge staff also participate in Red River mediation activities. In 2000, the Red River Watershed Management Board, which is the designated organization overseeing water management of the nine sub-watersheds that flow into the Red River of the North, initiated a mediation process to help solve flooding problems within the watershed. Agassiz NWR is involved with three of the sub-watershed mediation processes: Red Lake Watershed (Thief River portion), Snake River/Middle River Watershed; and Two River Watershed.

In 2002, there were seven meetings of the Red Lake Watershed group alone. The largest of the U.S. sub-watersheds of the Red River of the North, it contributes one-third of all waters that flow into the river from the United States. It has hundreds of miles of drainage ditches that carry floodwater to

downstream landowners. Refuge management has in the past, and will continue to, participate in interagency coordination to accommodate floodwaters during extreme flooding events. These decisions are made by refuge managers on a case by case basis, weighing several factors, as listed below:

- Biological parameters: time of year in relation to nesting season, quality of nesting cover after flooding, and anticipated length of inundation of cover.
- Inflows and length of inundation.
- Infrastructure integrity.
- Downstream implications.
- Daily communications and coordination with the MnDNR and Red Lake Watershed District

With regard to solutions, the preference of many local landowners is to store floodwaters on state and federal lands like the Refuge. Of course, this would enact an unacceptable price on Refuge habitat and wildlife. Another possible solution advanced by the flood reduction mediation team is to construct a diversion ditch that would bypass a major bottleneck in the Thief River and provide some upstream storage.

Refuge staff frequently furnish technical assistance to other agencies and organizations on wildlife matters. For example, in 2001 Agassiz NWR assisted members from a number of agencies, including the Minnesota Waterfowl Association, Ducks Unlimited, Minnesota DNR Section of Wildlife and Section of Fisheries, Bureau of Indian Affairs, Minnesota Deer Hunters Association, National Wild Turkey Federation, Minnesota Land Trust, U.S. Forest Service, NRCS, Minnesota Board of Water & Soil Resources and The Nature Conservancy on a grant proposal to the Legislative Commission on Minnesota Resources by identifying important habitat corridors in northwestern Minnesota at a gathering in Detroit Lakes. This led to approved funding of more than $20 million for wildlife corridor projects.

The Beltrami Island State Forest and Red Lake Wildlife Management Area include approximately 81,700 acres of Land Utilization Project lands owned by the Service. These lands are managed by the Minnesota DNR Division of Wildlife under a Lease Agreement with the Service. Trespass, right-of-ways, access for in-holdings, and forestry management practices on these Land Utilization Project lands necessitate Agassiz NWR staff involvement. In addition, equipment and staff are shared on management projects.

Refuge staff also coordinate a wide variety of surveys and studies on the Refuge by outside parties including the U.S. Forest Service, Minnesota DNR, and USGS. One of the more unusual recent examples was providing housing and support for 5 months in 2002 to a Japanese graduate student conducting an anthropological study on conservation and management of wolves in agricultural communities in a number of countries.

Tribal Coordination

Agassiz NWR works cooperatively with the Red Lake Band of the Chippewa Indians on various projects, including habitat and water level management, as well as research studies. The band's wildlife biologist is participating in the Refuge's long-term study on the American Bittern. Another study assesses the population status for non-waterfowl marsh birds by implementing a monitoring program at the Good Lake impoundment, a 4,000-acre facility owned and managed by the Red Lake Band of the Chippewa to benefit wildlife and provide flood control. Good Lake is located within 50 miles of Agassiz NWR.

In 2001 the Red Lake Band of the Chippewa hosted a meeting of the Service's Region 3 Headwaters/ Tallgrass Ecosystem team at the Seven Clans Casino in Thief River Falls. In 2003 the Band hosted a Russian delegation of wildlife biologists sponsored by the Service highlighting prescribed fire, walleye fishery recovery and cooperative research programs on tribal lands.

Private Land Activities

Agassiz NWR has been actively engaged for several years in habitat restoration activities on private lands within the Refuge Management District, mostly related to CRP sign-ups. In cooperation with county NRCS offices, Agassiz NWR and Service teams surveyed hundreds of properties, checked thousands of acres, and restored thousands of acres of wetlands.

Partners, Volunteers and Cooperating Organizations

Agassiz NWR partners with several organizations on efforts of mutual interest. The Refuge Manager has participated in the Northwest Regional Agricultural and Natural Resources Sustainable Development Partnership, a joint effort between the University of Minnesota and citizens of the state. Funded by the State Legislature, the partnership looks to sustain Minnesota's natural resource based industries by addressing community-identified issues on an ongoing and long-term basis. The Northwest Region includes 11 counties and the partnership's board is diverse, with representatives from the White Earth Tribe, Hispanic community, Chambers of Commerce, University of Minnesota, County Extension, farmers, and the Minnesota Department of Natural Resources (Minnesota DNR).

Agassiz NWR staff were involved with Minnesota DNR and the Minnesota Office of Tourism, other refuges, and several Convention and Visitors Bureaus within northwest Minnesota on promotion of the Pine to Prairie Birding Trail. Several staff members have served on the Minnesota Chapter of the Wildlife Society board. We cooperate with the Tamarac Interpretive Association in managing the Agassiz NWR Bookshop, located in the visitor center. The bookshop opened in 1997 and annually sells several thousand dollars worth of T-shirts, caps, wildlife and nature-themed books including guidebooks, and miscellaneous wildlife items. The bookshop was opened not to earn a profit but to provide visitors with souvenirs of the Refuge and educational materials.

An increasing number of volunteers have contributed an enormous amount of time to Agassiz NWR's research and operations. In 1995, 20 volunteers contributed approximately 2,000 hours to the Refuge. By 1999, this had grown to 26 volunteers contributing some 20,000 hours. Agassiz NWR's volunteers hail from a number of states – including Minnesota, Kentucky, New York, Wisconsin, Indiana, Arizona, New Hampshire, North Dakota, and Michigan in recent years – as well as from Canada. Volunteers have worked on wolf, moose, and grebe research projects, on airboat engine maintenance and a variety of other assignments. There is a modest amount of funding to cover expenses associated with the volunteer program.

Temporary lodging is available on the Refuge for out-of-state volunteers, researchers staying for short or extended periods, and for natural resources classes. Training is also provided in some instances. For example, volunteers on the wolf and moose projects several years ago were on station year round. Because of the training time involved in teaching radio telemetry, research volunteers were required to stay a minimum of 3 months. Research volunteers have been required to contribute 1 day every 2 weeks to Refuge operations in order to introduce them to all Refuge operations and programs.

Refuge staff members coordinate, cooperate and partner on a regular basis with other federal, tribal, state, and local agencies. We work with FSA, Minnesota DNR, and Soil and Water Conservation District staff on inventories, easement reviews and recommendations related to wetlands and the CRP. Agassiz NWR also cooperates on wildlife studies and wildlife management with the Red Lake Band of the Chippewa. In addition, staff members participate in local, regional and state water management efforts, attend meetings of the Marshall County Water Board, Fish, Wildlife, and Outdoor Recreation Subcommittee of the Red River Basin Board, the Red Lake River Watershed District, and serve as team members on several Flood Reduction Mediation workgroups. The Refuge currently has three categories of museum property. These include a collection of 104 zoological specimens, an undetermined number of historical photographs (especially from the CCC),

and an archeological collection of 184 artifacts. This museum property is managed under the Region-wide Scope of Collections Statement dated October 31, 1994. The zoology and photography collections are housed at the Refuge headquarters. In 2001 the Refuge contracted to have the historic photographs, slides, records, and annual narratives scanned into a database that includes an index and cross-reference. The archeological collection is accessioned, cataloged, and stored at the Minnesota Historical Society under terms of cooperative agreement 14-16-003-91-991 dated May 13, 1992.

Law Enforcement

Agassiz NWR is dedicated to safeguarding the resources under its jurisdiction, including its facilities, National Wilderness Area and cultural resources. Resource management on the Refuge includes both protective and preventive functions. Protection is safeguarding the visiting public, staff, facilities and natural and cultural resources from criminal action, accidents, negligence and acts of nature such as wildfires. Preventing incidents from occurring is the best form of protection and requires a known and visible law enforcement presence as well as other proactive steps to address potential threats and natural hazards.

A full-time Law Enforcement officer from Detroit Lakes WMD has also been assigned to cover Agassiz NWR and Rydell NWR. Fortunately, the Refuge is in an area of relatively low criminal activity. Still, violations and investigations of those violations do occur, and notices of violations are written. Recent examples of violations include the killing of a Tundra Swan and a Bald Eagle in 2002, the killing of radio-marked wolves in 2000 and 2001, and incidents of trespassing and dumping. Waterfowl hunting takes place on adjoining state-run wildlife management areas (mainly Elm Lake and Eckvoll) and requires the presence and participation of Refuge law enforcement officers.

Wildfire Preparedness

There have been several wildfires in the last few years and all were deemed to be arson. The Refuge is prepared both in terms of staff training and equipment for wildfire activity.

Most summers, the Refuge dispatches qualified personnel to western wildfire assignments, to assist other federal firefighters in national parks and forests. These assignments can last days or weeks.

Archeological and Cultural Values

Cultural resources management in the Service is the responsibility of the Regional Director and is not delegated for the Section 106 process when historic properties could be affected by Service undertakings, for issuing archeological permits, and for Indian tribal involvement. The Regional Historic Preservation Officer (RHPO) advises the Regional Director about procedures, compliance, and implementation of cultural resources laws. The Refuge Manager assists the RHPO by informing the RHPO about Service undertakings, by protecting archeological sites and historic properties on Service managed and administered lands, by monitoring archeological investigations by contractors and permittees, and by reporting violations.

In September 2002, a *Cultural Resources Management Plan* for Agassiz NWR, prepared under contract, was completed. It provided background information on the contextual zone, resources, previous research and historical contexts that have been used in the preparation of this CCP. The *Cultural Resources Management Plan* also described the historical context of Judicial Ditch 11 and an provided overview of management goals and the legislative framework (both federal and state mandates) for cultural resources on the Refuge.

The *Cultural Resources Management Plan* is incorporated into this CCP by reference. It identifies management measures for cultural resources on Agassiz NWR that are needed to comply with the

National Wildlife Refuge System Improvement Act of 1997 and Section 106 of the National Historic Preservation Act of 1966. These measures include the establishment of internal processes and the identification of key personnel for the coordination and implementation of the measures, archeology, architectural history, and Traditional Cultural Properties, and the associated processes of setting up a Programmatic Agreement, identifying interested parties, consulting with interested parties, dealing with inadvertent discoveries, and establishing systems of records management.

A Traditional Cultural Property is generally defined as a property that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining its historical identity. Locations, landscapes, buildings, and neighborhoods with unique attributes may all qualify as Traditional Cultural Properties.

Wilderness Area and Wilderness Review

In 1976, Congress designated 4,000 acres in the north-central portion of Agassiz NWR as Wilderness. The 4,000 acres include one of the most northwesterly communities of black spruce-tamarack bog in Minnesota, as well as two lakes, Whiskey and Kuriko, that may have been formed by deep peat fires prior to settlement of the area. The Wilderness Area is managed under the provisions of the 1964 Wilderness Act as a unit of the National Wilderness Preservation System. That is, it is "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain" (The Wilderness Act, September 3, 1964; (16 U.S.C. 1121 (note), 1131-1136)). Staff carries out no active management in the Agassiz NWR Wilderness Area. Only the minimum amount of activity would be allowed if management actions are proposed in the future. Exploration on foot and hunting by the public are permitted, but due to the area's limited access and boggy condition, these pursuits are undertaken only by hardier souls.

Since 1994 both spruce and tamarack along the western boundary of the northern half of the Wilderness Area have been dying. While the exact cause is unknown, higher water levels in Thief Bay Pool have been suggested as possibilities. This hypothesis is now being investigated in a study initiated in 2002. Also, water flow effects of the road and associated ditches that bisects the Wilderness Area into a north and south half are being studied. This road was excluded from Wilderness Area designation for water management purposes.

As part of the CCP process, we reviewed other lands within the legislative boundaries of Agassiz NWR for wilderness suitability. No lands were found suitable for designation as defined by the Wilderness Act of 1964. The Refuge does not contain 5,000 contiguous roadless acres nor does it have any units of sufficient size to make their preservation practicable as Wilderness. Lands acquired for the Refuge have been substantially altered by humans, both before and after the Refuge's establishment, particularly from agriculture, roads, and flood control and hydrological infrastructure. Manmade facilities like dikes, ditches, water control structures, roads, and other facilities are spread throughout the Refuge, while artificial impoundments and manipulated wetlands dominate the landscape.

Public Education and Recreation

The 1997 National Wildlife Refuge System Improvement Act emphasizes wildlife management and that all prospective public uses on any given refuge must be found to be compatible with the wildlife-related refuge purposes before they can be allowed. The Refuge System Improvement Act also identifies six priority uses of national wildlife refuges that in most cases will be considered compatible uses:

Table 3: Visitation and Off-site Environmental Education, 2001 and 2002, Agassiz NWR

Activity	2001	2002
Interpretation and Nature Observation	17,300	20,780
Environmental Education (On Refuge)	470	235
Recreation (deer hunting)	165	250
Wilderness Area (deer hunting)	35[1]	30[2]
Environmental Education (off Refuge)	1,010	170
Environmental Outreach (Off Refuge)	10,610	14,210

1.This number is part of the deer hunting figures.
2.This number is part of deer hunting figures.

- Wildlife observation
- Wildlife photography
- Hunting
- Fishing
- Environmental education
- Environmental interpretation.

Agassiz NWR supports all but one of these uses. Fishing is not available on the Refuge due to unsuitable conditions, primarily shallow waters and the virtual absence of sport fish.

The Refuge has an Interpretation and Recreation Plan, prepared in 1980, that provides general guidance for Refuge management and staff on matters related to public use of Agassiz NWR. The plan provides interpretive methods and concepts, specifies permissible recreational pursuits, and identifies existing and proposed recreational facilities.

The use of Off Road Vehicles such as snowmobiles, ATVs, motorized boats, etc. by the public for recreational purposes has never been permitted on Agassiz NWR's lands and waters. The CCP maintains this policy over the next 15 years.

In 2002, Region 3 of the U.S. Fish & Wildlife Service prepared a Visitor Services Review Report on Agassiz NWR. The report lists 10 general minimum visitor service requirements that apply to all national wildlife refuges and discusses their relevance to Agassiz NWR's circumstances. The report also makes a number of recommendations on how to improve visitor services on the Refuge.

Provide Visitor Services

Agassiz NWR furnishes various facilities and opportunities for visitors:

- Wildlife displays in the Headquarters Visitor Center
- Maakstad Hiking Trail – a one-quarter mile, non-interpreted trail
- Headquarters Hiking Trail – one-half mile, accessible, interpreted
- Lost Bay Habitat Drive – 4-mile gravel road, interpreted auto drive
- Deer Hunting
- Environmental Education
- Wildlife Interpretation

Open Houses
Three Visitor Kiosks
Two Overlooks

Total estimated visits to the Refuge were 17,935 in 2001 and 21,265 in 2002. Table 3 shows the breakdown of this visitation by activity and the additional off-Refuge Environmental Education and Outreach.

Wildlife Observation/Photography

One of the most popular visitor activities at Agassiz NWR is observing wildlife. The Refuge is nationally recognized by bird watchers. The Minnesota Pine to Prairie Birding Trail brochure and the Detroit Lakes Birding Festival also attract bird enthusiasts to the Refuge. The best viewing times vary by species and group: for Franklin's Gulls, it is May 1-July 14; for warblers, May 15-25; for Sandhill Cranes, April 25-May 5 and September 25-October 10; for sparrows, May 15-25; and for shorebirds, May 20-30 and August 15-September 15.

The Parker Observation Deck overlooks Lansing Park Pool. G. Tischer

In spite of the recent declines in the moose population, this majestic animal is still one of the most popular species of wildlife for viewing. They are best observed in willow thickets during September and October. Gray wolves are seen infrequently, but most visitors are thrilled with the possibility of seeing one.

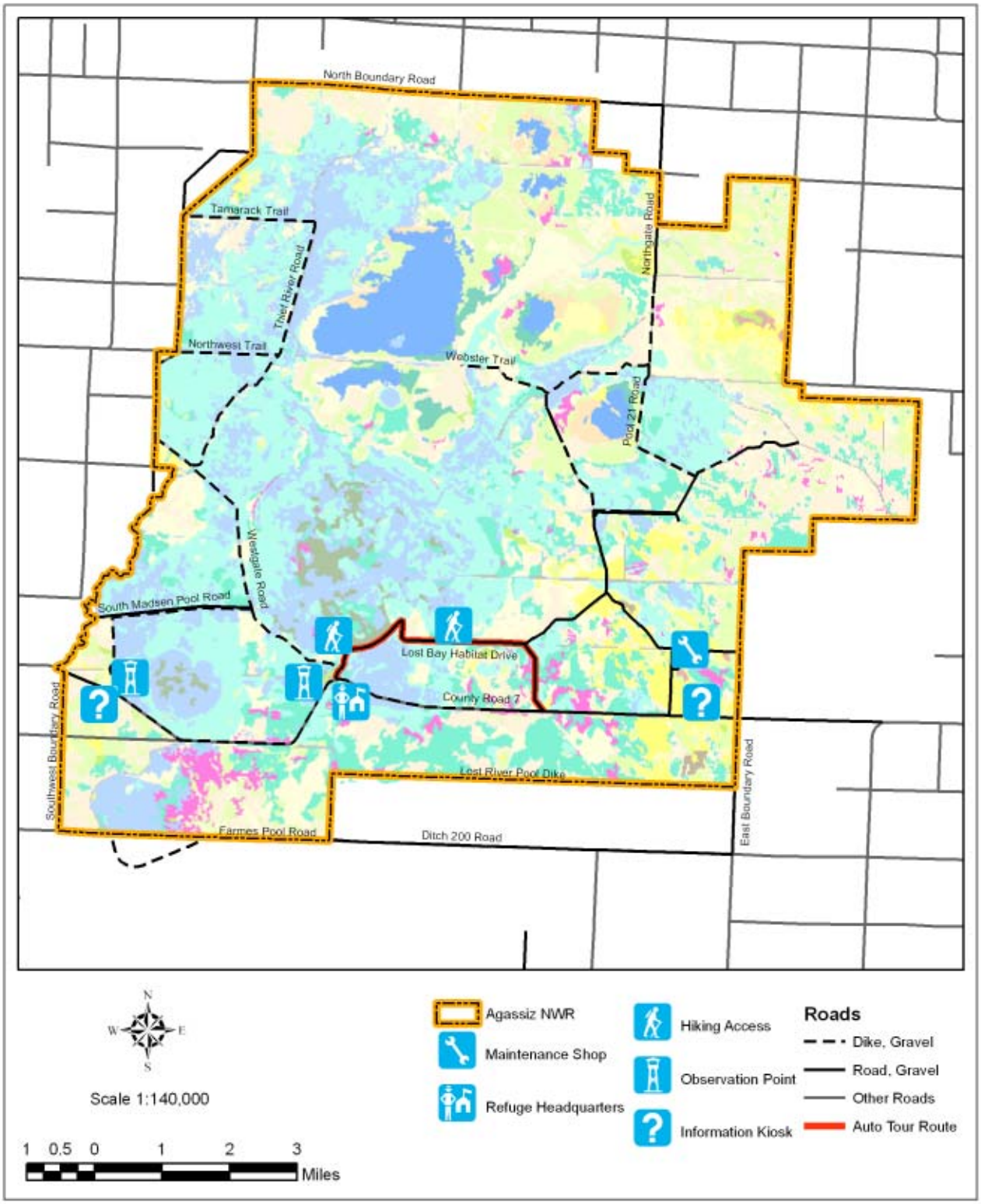
The habitat auto drive and foot trails provide opportunities for nature study, wildlife photography and observation, which are among the six priority uses of national wildlife refuges (Figure 11). The drive and trails are open from May through October during daylight hours. Hiking is permitted only on the drive and designated trails. A 100-foot observation tower near the visitor center and a 14-foot observation platform along County Rd. 7 are available to view the landscape and its wildlife from an elevated perspective. The 100-foot tower is closed at present and for the indefinite future because of liability concerns.

Hunting

Deer and moose hunting are the only hunts authorized on the Refuge. Seasons are held in conjunction with state hunting seasons and regulations. The Refuge and adjoining State-owned Wildlife Management Areas are designated as one management unit for hunting regulations. Refuge staff confers with local Minnesota DNR managers to set harvest goals each year. Deer hunting is used as management tool to keep the population from exceeding the carrying capacity. This maintains a healthy herd with adequate food supplies during most winters and provides the base food supply for the two wolf packs that occupy this area. The record harvest was 755 deer in 1992. During low population levels harvest is restricted to bucks only. During high population levels harvest of does and fawns is encouraged with extra antlerless tags available to hunters.

Moose harvest has been conservative to maintain the population at high levels to increase public viewing opportunities and yet maintain a check on population growth. During times when the population exceeded the goal of approximately 300, less than 25 moose tags were issued on an every-other-year basis. The season has been closed since 1993 due to the decrease in population.

Figure 11: Visitor Service Facilities, Agassiz NWR



Environmental Education/Interpretation

Beginning in 2000, Agassiz NWR's visitor center has been open on Sunday afternoons from 1 to 5 p.m. during the summer months. The purpose of this opening is to encourage local visitation for the working population, as opposed to out-of-town visitation. The Thief River Falls Convention and Visitor's Bureau ran local cable television coverage promoting the Refuge among local residents. This opportunity is currently being evaluated as to whether or not to continue.

The Refuge hosts various special events every year. During the past few years, we have held two Open Houses, one in the spring to celebrate Migratory Bird Day and one in the fall for National Wildlife Refuge Week. Attendance ranges from 60 to 400 depending on the event and the weather. Past events have included the following activities: a local citizen role-playing Theodore Roosevelt, local artists displaying arts and crafts, firefighting equipment demonstrations, birding, Refuge and fire tower tours, waterfowl capture and banding techniques, presentations by wildlife experts and students conducting research, hunting skills demonstrations, and games for adults and children. During the September 22, 2001, celebration of National Wildlife Refuge Week, we dedicated the new Headquarters Hiking Trail, which is accessible and was constructed with the assistance of local Girl and Boy Scouts.

Children and adults turn out on Public Banding Night to assist with banding ducks at Agassiz NWR. USFWS

Local businesses are very generous at these events and donate prizes, food and refreshments. Prior to these events staff and volunteers advertise in a variety of ways – fliers and posters may be distributed to schools in nine counties, staff air information on local radio and TV stations, and news releases are distributed widely.

Public Banding Night is a very popular annual event that typically takes place in mid-September with about 100 people attending. Adults and children can help band ducks. The "Mud Lakers" used to live on the Refuge prior to Refuge establishment or are descendants of these homesteaders. In 1999, the annual Mud Laker Reunion was held on the Refuge for the first time in the new headquarters, with 25 people attending. This was a watershed event, because for decades many Mud Lakers resented the Refuge, since they were moved off their land and out of their homes by the state government to make way for the establishment of a waterfowl sanctuary in the 1930s. It was fascinating for staff to listen to these folks describe life on their frontier homesteads and look at photo albums and maps. It was also an outstanding opportunity for the Refuge to improve its historical files and contribute to cultural resources management at Agassiz NWR. During the 2002 Mud Laker Reunion at the Refuge office, descendent Warren Sagstuen donated a beautiful, polished granite memorial bench to Agassiz NWR, inscribed with the dedication "In Honor of the Mud Lake Pioneers." The bench sits beside the headquarters and visitor center, at the start of the Headquarters Trail with a peaceful view of Headquarters Pool.

The Refuge has also cooperated with the Goodridge Area Historical Society in developing and conducting a historical tour of state and federal wildlife areas in the region that had settlement pioneers, CCC camps, and other structures representing local history. Tours in 2001 and 2002 were not well attended, but attendees all enjoyed them, and the whole venture may still have a future.

Agassiz NWR has an agreement with the Northwest Service Cooperative to distribute Refuge and special events posters to 52 schools in nine counties at no cost. The cooperative now includes the Service's Wetland and Prairie Educational Trunks available for teachers to check out in a nine-

county area in northwest Minnesota. In September 2002 staff gave a 3-hour workshop to 10 teachers on the use of the exhibits and materials in these two trunks.

Agassiz NWR has made several visitor service improvements in the last few years that are worth noting. Since 2000, we upgraded and produced new Refuge, bird, mammal, and hunting brochures to Service standards. New wildlife display cabinets were added in the office visitor contact area and two 20-power telescopes were installed on the Parker Observation Deck and Headquarters deck. Also, the Refuge headquarters and visitor center were landscaped with native shrubs, trees and grasses and major rehabilitation was completed on the 100-foot observation tower.

Outreach

Agassiz NWR has an active outreach program that disseminates information on Refuge activities, the Refuge System, and wildlife conservation far beyond the Refuge boundaries. Our efforts include involvement in the Northwest Gateway Birding Festival, Minnesota Moose Mystery/Adopt-a-Moose website, two bulk mailings to several neighboring towns on the moose research project, slide talks, lectures, classroom visits, radio and newspaper interviews, field trips, media contacts, and even participation in town parades and county fairs. The National Wildlife Refuge System mascot "Puddles" (a Service employee wearning a big blue goose costume) visits the Refuge often and was a hit with children when he rode the new airboat in the Middle River Goose Fest Parade. The Agassiz NWR float won the Mayor's Choice Award in 2002. In 2001 staff attended bi-monthly meetings on the Minnesota Pine to Prairie Birding Trail with five Convention & Visitors Bureaus, Minnesota DNR, Service, and the Audubon Society.

From 1994 to 1997 Agassiz NWR sent out a newsletter, A Wild Note, to 35 Refuge neighbors. The newsletter informed them about activities on the Refuge and about wetland restoration projects on private lands in the RMD. The newsletter was greatly appreciated by the neighbors. Refuge staff realizes the value of this important communication, however, since the floods of 1996-97 and subsequent recovery years, this practice has been discontinued in favor of other priorities.

Other recent outreach activities include organizing, writing grants, and assisting in developing a prairie and wetland learning area on 10 acres at Challenger Elementary School Outdoor Nature Center, assisting the City of Badger in enhancing an area for wildlife and public use facilities, participation in the Timber Wolf Alliance, providing information on Agassiz NWR to the author of a new guidebook on America's national wildlife Refuges being published to honor the Centennial of the Refuge System, newspaper interviews, displays in Pennington and Marshall county fairs, presentations and instruction in firearms safety for hunters, teaching fire courses to students at the University of Minnesota/Crookston, and providing information and photographs on the Refuge to various businesses, surveys, websites, and guidebooks.

Future Management Direction: Tomorrow's Vision

Refuge Vision

Agassiz NWR lies within the shallow depressional lake plains formed by the pre-historic Glacial Lake Agassiz. The Refuge is located within the aspen parkland transitional zone between the tallgrass prairie to the west and northern forest to the east. Agassiz NWR comprises a diversity of plant and animal species, typical of ecotonal communities. Since the beginning of the 20th century, the lands within this area have been manipulated for agricultural purposes, which highly modified natural landscapes and ecosystem functions. Since its establishment, the Refuge has been intensively managed for the benefit of migratory birds and other wildlife through the construction of dikes and water control structures.

Agassiz NWR and the surrounding area will be the premier natural resource of Marshall County and northwestern Minnesota. The Refuge and its seven-county management district, working with partners, will take a landscape approach to promote functional watersheds and connect to natural areas. Refuge management programs and activities will emulate natural functions and processes, of the different native habitats for optimal wildlife use. The resulting benefits will be showcased to demonstrate the compatibility of biological diversity, integrity, natural ecological processes and sustainable agriculture.

People will be attracted to the Refuge and northwestern Minnesota to view and enjoy the wonders of natural ecosystems. Visitors will have quality, wildlife-dependent experiences that provide personal and societal benefits, such as a sense of peace and tranquility and support of a strong conservation ethic. Refuge staff, visitors, and the community will understand and appreciate a well-functioning landscape and the cultural history of the area. This vision will be the catalyst to further strengthen a positive community-Refuge relationship.

Goals, Objectives and Strategies

The planning team developed goals and objectives for three management alternatives at Agassiz NWR and its Refuge Management District. Private citizens, cooperating agencies, conservation organizations, and Refuge staff all participated in this endeavor. Alternative A is the Current Management Direction or No Action Alternative. Alternative B is Minimal Upland Habitat Management Alternative, and Alternative C is the Open Landscape/ Natural Watercourses Alternative. The Environmental Assessment, published with the Draft CCP, describes and evaluates each alternative. The preferred alternative is C (Open Landscape/Natural Watercourses), and this forms the basis for the Agassiz NWR CCP and the goals, objectives and strategies presented on the following pages. The planning team established goals for major management areas, objectives for achieving those goals, and the specific strategies that will be employed by Refuge staff. The goals are organized into the broad categories of wildlife, habitat, and people.

Goal 1: Wildlife

Protect, restore and maintain a natural diversity of wildlife native to northwestern Minnesota, with an emphasis on Service Resource Conservation Priority Species.

Discussion: This goal exemplifies the Refuge staff's commitment to "thinking globally and acting locally." On the local and regional scales, it implements the broad mission of the National Wildlife Refuge System to conserve America's wildlife and enhance biodiversity. Agassiz NWR can most effectively do its share as part of the national conservation strategy by focusing on those migratory and resident species indigenous to the particular habitat types found in northwestern Minnesota. In emphasizing Conservation Priority Species in Region 3 of the Refuge System, Agassiz NWR is contributing to wildlife conservation at an appropriate regional scale by trying to assist those species in greatest need of attention. This goal expands the Refuge's original specific focus on waterfowl and symbolizes its commitment to a more holistic view of wildlife. In general, at Agassiz NWR, direct wildlife outcomes are effected primarily through habitat management.

Objective 1.1: **Breeding Ducks:** Maintain an annual average of 7,000 breeding pairs of ducks over a 5-year period by providing optimal breeding habitats via the Habitat and Marsh & Water Management Plans.

Rationale: Diving and dabbling duck breeding pairs are combined in this objective because ideal nesting conditions for either group fluctuate with water management activities and natural environmental events such as drought or flooding. In general,

diving ducks nest above water in emergent vegetation and dabbling ducks nest in upland vegetation. In most impoundments, high water increases available over-water nesting sites for diving ducks and decreases available upland nesting sites for dabbling ducks. Conversely, lower water, including drawdowns or drought, increase upland sites and decreases over-water nesting sites. Therefore, a dewatered pool is never actually taken out of production, but merely utilized by different species with more terrestrial nest site preferences. The total number of breeding pairs of all ducks varies widely from year to year, having ranged from below 5,000 to about 13,000 since 1970, with a 30-year average of approximately 7,000.

In addition to availability of nesting habitats, we must also provide for brood rearing, post-breeding/molting, and migration. Optimal duck brood habitat offers abundant food and shelter from adverse weather and predators, all within close proximity. During molting season, ducks are flightless and vulnerable to both avian and mammalian predation. During this time they seek medium-density cover.

Strategies:

Conduct breeding bird pair surveys every spring to monitor the number of breeding pair of dabbling and diving ducks and monitor success in reaching the objective.

By means of the Annual Marsh & Water Plan, adjust water levels and carry out drawdowns in the Refuge's 26 managed impoundments or wetland units in such a manner that a variety of nesting habitats are available in any given year.

Maintain water control structures and dikes in good operating condition so that they can be relied upon to manipulate water levels according to the management plan.

Utilize prescribed fire, herbicides and drawdowns to maintain and improve marsh and adjacent upland shrub and grassland habitat for nesting waterfowl.

To encourage brood rearing of dabblers, seek to create emergent cover with numerous scattered openings that contain dense food-producing submergents.

To encourage brood rearing of divers, seek to create large open aquatic bed habitat that allows for escape from predators by diving and promote an abundant invertebrate food source.

For molting birds, promote medium-density cover that has a dense canopy but allows for unrestricted movement for feeding and escape from predators.

Develop a step-down Habitat Management Plan by 2006.

Objective 1.2: **Duck Production on Agassiz NWR:** Based on a 5-year average, maintain annual brood production above the long-term average of over 13,000 ducklings.

Rationale: A variety of habitats must be provided to produce ducks. Habitat for pairing, nesting and brood rearing must be available in close proximity. Fledged ducklings are the best measure of the suitability of waterfowl breeding habitat. Climatic factors that are beyond the control of management can influence habitat suitability so long-term averages are a better measurement of management effectiveness than just one year alone. Brood counts have been conducted on the Refuge for 45 years and the average production since 1981 has been between 13,000 and 14,000 ducklings.

Strategies:

Conduct the annual brood counts according to the Refuge Wildlife Inventory Plan. The annual brood counts include all classes of ducklings and are an index to the number of ducklings actually fledged.

Manage impoundments to provide a variety of breeding habitats in close proximity to each other.

Objective 1.3: **Duck Production on the Refuge Management District:** Maintain a recruitment rate (fledged ducklings per hen) of greater than 0.5 for five of the most abundant species (Mallard, Gadwall, Blue-winged Teal, Northern Shoveler and Northern Pintail) of dabbling ducks combined on the private lands in the District based on the 4-square-mile survey analysis.

Rationale: Recruitment rate analysis is a reflection of the number of pairs, wet ponds and available nesting cover. Management options for private lands in the Refuge Management District are different than for Agassiz NWR and duck production objectives should be separated. Staff workloads currently limit the amount of contact and management agreements the Refuge has with private landowners in the RMD. Changes in federal and state farm programs and the expiration of Conservation Reserve Program contracts will increase the need for the Service to develop agreements to maintain wildlife benefits in the Management District.

Strategies:

Fill the Refuge Operations Specialist GS-485-9 RMD position at Agassiz NWR to meet the potential for management and cooperative agreements on private lands in the Refuge Management District.

Assist landowners to work with existing state and federal programs to restore wetlands and increase grasslands on private land. These efforts will be concentrated in designated corridors, large grassland blocks, or flood prone areas.

Develop cooperative agreements between the Service and private landowners to assist with management of upland and wetland habitats to keep them in optimum condition for waterfowl nesting and brood rearing. Agreements can include the use of prescribed fire, mechanical treatments, chemical application and water level manipulation.

Objective 1.4: **Nesting Franklin's Gulls:** Maintain an annual average of 20,000 nesting Franklin's Gull pairs over a 5-year period by providing ideal nesting conditions in Agassiz Pool.

Rationale: Agassiz NWR supports the largest Franklin's Gull nesting colony in the United States. There are about eight nesting sites in the lower 48 states, but none as consistently large as the Refuge site. Since 1993, when aerial census of the nesting colony was initiated, the colony size has varied from 7,000 to 40,000 pairs; with the exception of the year 2000 when there were no nesting pairs because the pool was in drawdown.

Strategies:

Conduct breeding gull surveys annually with aerial photography and mapping acreage on the water to determine density.

Manipulate water levels to maintain bulrush and low-density cattail for nesting habitat.

Coordinate 10 to 15 year interval drawdown schedule of Agassiz Pool with Thief Lake WMA (Minnesota), Sand Lake NWR (South Dakota), and Lake Alice NWR (North Dakota), to ensure some nesting habitat is available regionally.

Objective 1.5: **Marsh and Grassland Bird Monitoring:** Annually, determine population trends and relative abundance of inconspicuous marsh birds and birds occupying grassland and oak savanna habitats.

Rationale: In 2000, annual monitoring of secretive marsh birds was initiated on the Refuge to test the national Marsh Bird Monitoring Protocol. This methodology is still being evaluated and may be modified. The Refuge started an inventory of non-game birds using the point count technique in 1994, covering all of the major habitats on the Refuge. The points delineated for this survey have been inventoried once and a second survey was initiated in 2003. Knowledge about the birds and the data from either of these techniques is not sufficient at this time to set Refuge population goals. However, relative abundance and trends may be determined and can be evaluated for sensitivity to population changes due to management practices.

Strategies:

Annually conduct the secretive marsh bird survey three times during the breeding season at the established survey points.

Increase the frequency of conducting point counts on grassland, sedge meadow and wetland birds to at least bi-annually.

Submit data to the respective national coordinators/data bases and make changes to protocol as determined by the national evaluation.

Analyze Refuge data to determine breeding bird response to management practices.

Objective 1.6: **Gray Wolves:** Maintain two gray wolf packs on the Refuge based on howling surveys.

Rationale: Agassiz NWR has supported two gray wolf packs for 12 years, and this number is considered viable and sustainable. Gray wolves prey on both large and small mammals, including moose, deer, muskrat, beaver, rabbit, and snowshoe hare. They also depredate and scavenge livestock in the area (off the Refuge), especially when natural prey is scarce. This reality has led to attitudes ranging from disregard to persecution by some in the agricultural community, which is passed on from generation to generation. It is not uncommon to find wolves shot or run down by snowmobiles in Minnesota. The Refuge can manage for wolves only indirectly, by fostering habitat conditions that are favorable to prey populations, and by maintaining populations of the wolves' preferred prey.

Strategies:

Manage for a Refuge deer herd at a density of 15-20 per square mile.

Continue to conduct howling surveys every 5 years.

Manage water levels in a manner consistent with maintaining beaver and muskrat populations.

Regulate trapping to maintain beaver and muskrat populations for wolf prey base.

Maintain a mix of wetland, brush, forest, and grassland habitats that is conducive to healthy deer populations.

Objective 1.7: **Deer Population:** Annually, maintain deer population for State Management Unit 203 at densities between 15-20 deer per square mile based on annual winter surveys for a wolf prey base and public hunting opportunities.

Rationale: Based on studies and long-term experience with deer herd management by Minnesota DNR, this is the optimal population density or carrying capacity of white-tailed deer in habitat characteristic of this region. At present, the Refuge's deer herd is healthy and increasing, at a density of approximately 12 per square mile.

Strategies:

Continue to utilize regulated firearms hunting every fall during the regular state deer-hunting season and in compliance with Refuge rules as a means of controlling the Refuge deer herd at a level commensurate with the population density objective.

Monitor the size and population density of the deer herd through an aerial census every winter.

Monitor for signs of habitat damage such as browse lines and crop depredation on adjoining private farmland that would indicate that carrying capacity has been surpassed.

Evaluate the health of individual animals and herds using standard techniques, as needed, and by cooperating with the Minnesota DNR.

Utilize mowing and prescribed burning techniques to create and maintain browse and cover.

Prepare a step-down management Refuge Hunting Plan to guide hunt decisions.

Objective 1.8: **Moose Population:** Maintain moose population for State Management Unit 2 at 200 to 350 individuals (if population recovers) based on annual winter surveys and carrying capacity for wildlife viewing and hunting opportunities.

Rationale: As with the white-tail deer population density objective, the target population for moose reflects what biologists believe local habitats can support. Beginning in 1993, the Agassiz NWR moose population crashed for unknown reasons, declining to a low of approximately 40 individuals in 1998 as determined by the quadrat census method. This sharp decline in numbers paralleled a wider collapse throughout northwest Minnesota, the causes for which are under investigation and still being determined. Since 1998, the Refuge's moose herd has been increasing slowly, but is still less than half the population objective.

Strategies:

Continue to monitor moose numbers by means of annual mid-winter aerial surveys using both the quadrat and transect survey techniques.

Re-open the moose hunting season when recovery of the moose herd exceeds the minimum objective of 200 individuals.

Utilize winter mowing and prescribed fire to maintain shrub/scrub habitats.

Prepare a step-down management Refuge Hunting Plan to guide hunt decisions.

Objective 1.9: **Outdoor Laboratory:** Continue serving as an outdoor laboratory for natural resource research.

Rationale: The large size of the Refuge makes it an ideal site to investigate habitat and population questions for even large mammals. The Refuge has a long history of supporting quality ecological research on a wide array of habitat, management practices and species from invertebrates to moose. Research has been aimed at applied management questions and natural history investigations.

Strategies:

Promote strong relationships with universities and USGS to conduct sound scientific investigations to answer natural resource questions.

Maintain bunk house availability for research technicians and volunteers working on projects.

Build a laboratory/environmental education center to accommodate lab work associated with field investigations and provide educational opportunities to local school groups that will stimulate and motivate students to enter the wildlife management and research fields.

Seek partners and funding for research projects.

Goal 2: Habitat

Restore and enhance a natural landscape within the Refuge and its seven-county Management District to emulate naturally functioning watersheds and habitats within the tallgrass prairie, prairie pothole, aspen parkland, and northern coniferous forest, including habitat corridors for wildlife.

Pitcher plants on Agassiz NWR. USFWS

Discussion: The Refuge has both inherited and further constructed a radically altered landscape and vegetation communities from those that existed during the pre-settlement era. The habitat goal seeks to restore natural landscapes and processes, to the extent feasible, within the constraints imposed by Agassiz NWR's establishing purposes, the altered landscape outside the Refuge, responsibility to the surrounding community, and wildlife aims.

Figure 12, Figure 13 and Figure 14 illustrate proposed habitat changes under the CCP.)

Objective 2: **Lowland Shrub and Grasslands Conversion:** Achieve an increase in grasslands by a net decrease of lowland shrub (alder, willow, dogwood) within the Focus Area by 115 acres over the next 10-15 years through conversion to grasslands to benefit wildlife species like the Bobolink, Sharp-tailed Grouse, Marbled Godwit, Western Meadowlark, and nesting dabbling ducks. (Figure 12, Figure 13 and Figure 14.)

Figure 12: Future Habitat Conditions, Agassiz NWR

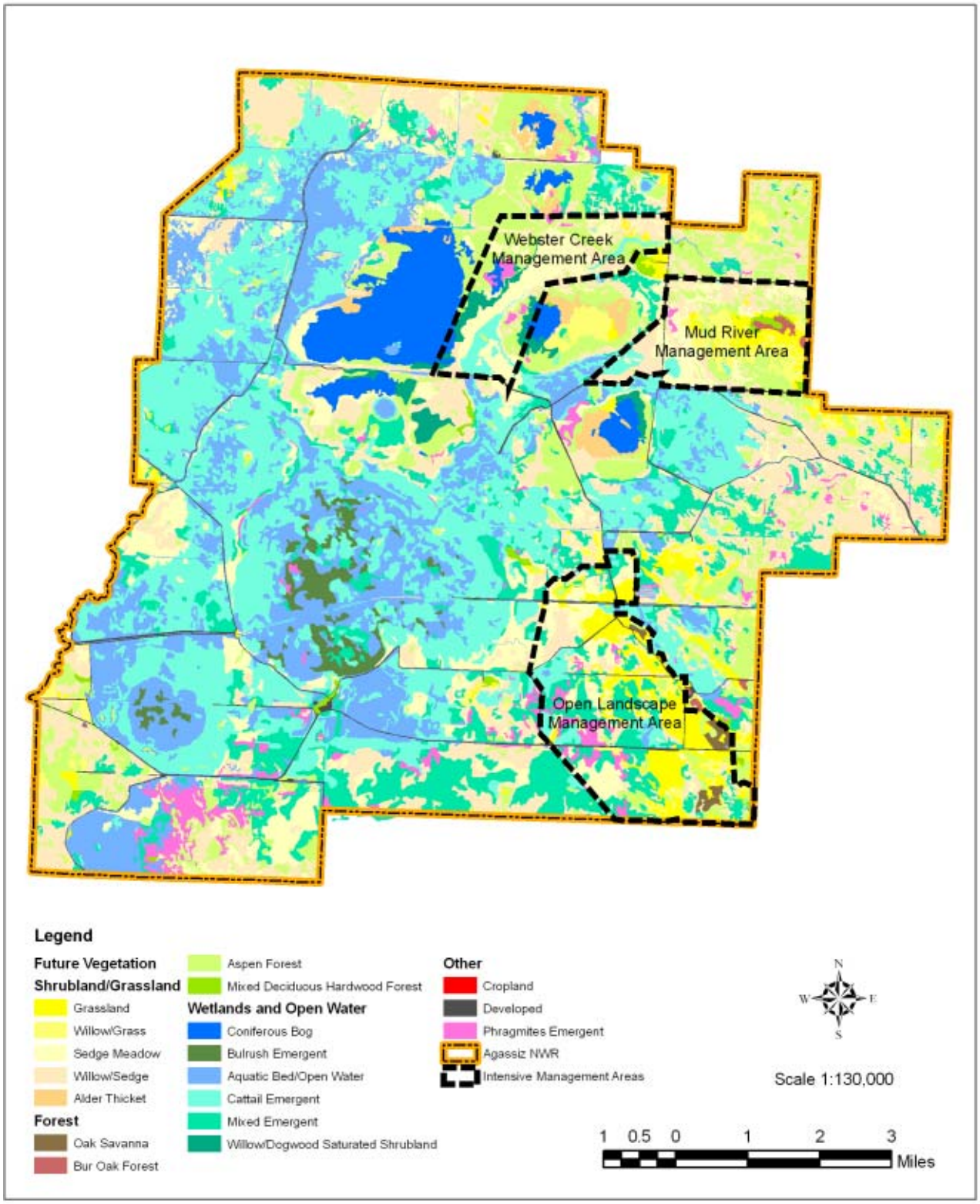


Figure 13: Current and Future Landcover on the Open Landscape Management Area, Agassiz NWR

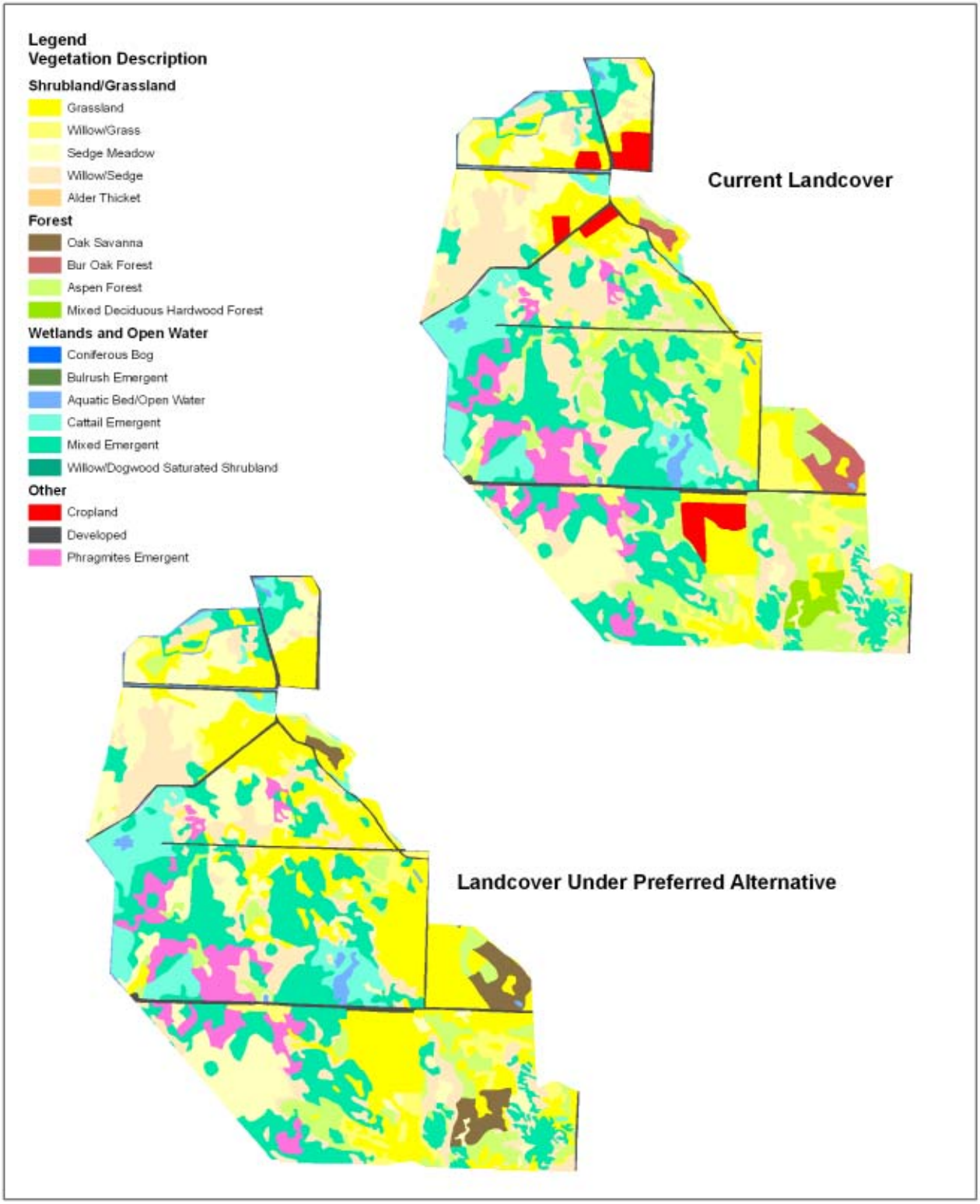
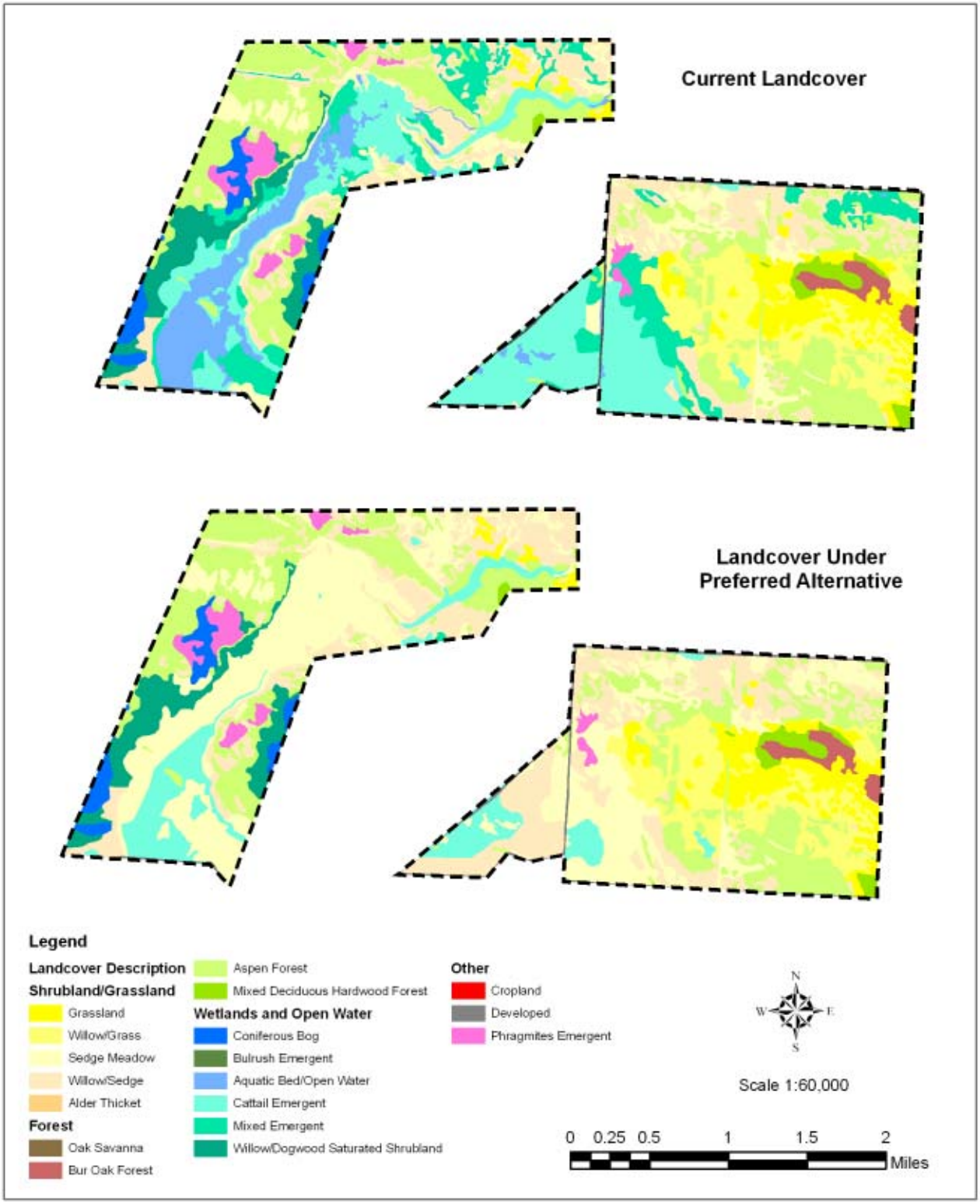


Figure 14: Current and Future Landcover on Webster Creek and Mud River Natural Watercourse Management Areas, Agassiz NWR



Rationale: Much of the Refuge's low-lying sites are succeeding to lowland shrub, which although it has value, is not a habitat that is regionally scarce like grasslands are becoming. This is an aggressive expanding plant community, which since the mid-1960s has contributed to reducing grasslands from 4,000 acres to 1,710 acres in 1997 under current management intensity. We hope to maintain an open landscape in a small portion of the Refuge by focusing our management activities. Once conversion to grasslands is achieved, continual maintenance and intervention using mowing and/or prescribed fire will be necessary to maintain many of the sites in grasslands. Each of the beneficiary species cited in Objective 2.1 are Regional Conservation Priority species, species of State Special Concern, species of management concern on the Refuge, or all three.

Strategies:

Use prescribed fires, mowing, discing, or various combinations of these treatments to prepare a given site for conversion to grassland.

Use seed mixes from sources of prairie grasses, forbs, and herbs within 50 miles of the Refuge to reseed these sites.

Judicious use of herbicides may be necessary to help in the establishment of a grassland.

Use geo-referenced aerial photography and GIS spatial analyses to monitor long-term changes in this habitat and measure pursuit of the objective for grasslands.

Objective 2.2: **Aspen and Mixed Hardwood, Grasslands and Lowland Shrub Conversion:** Attain an increase in grasslands and shrublands by a net decrease of aspen and mixed hardwood forest within the Open Landscape Management Area by 300 acres, converting it to brushland and grassland for the benefit of wildlife species like Sharp-tailed Grouse, Marbled Godwits, and Bobolinks by 2009. (Figure 13)

Rationale: Although patches of aspen and mixed hardwood forests are valuable constituents of aspen parklands, they are not in short supply locally and regionally as are prairie grasslands. These forests have been aggressively expanding plant communities on the Refuge and have contributed to the reduction of grasslands. Hence, the emphasis is to increase open landscape grasslands at the expense of aspen/mixed hardwood acreage in a small focus on the Refuge.

Strategies:

Commercially harvest 647 acres of aspen/mixed hardwood forest within the management area within 5 years.

Maintain harvested areas through mowing and prescribed burning.

Continue using prescribed fire on a regular basis in stands of aspen and mixed hardwood and around their edges to consume seedlings and saplings and prevent restocking and recruitment by young trees while encouraging grasses.

Expand the use of girdling to kill trees in stands planned for conversion to grassland. Encourage the public to collect firewood in these sites.

Coordinate with the Minnesota DNR to manage the appropriate composition of brush and grasslands on adjoining WMAs.

Objective 2.3: **Open Water / Mudflat Conversion:** Beginning in 2005, experiment with decreasing open water / mudflat habitat by 400 acres in Webster, Kelly and Upper Mud River

Pools by converting portions to sedge habitats and restoring streams to a more natural watercourse for species such as LeConte's Sparrow, Sedge Wren, Nelson's Sharp-tailed Sparrow and the Yellow Rail. (Figure 14)

Rationale: Open water and mudflat habitats are much more abundant on the Refuge than sedge meadow, hence the intent to augment sedge acreage. Sedge meadows constituted more than three-quarters of Minnesota's original wetlands and were indispensable habitat for plants like lilies, irises and native orchids. Moreover, LeConte's Sparrow, Sedge Wren and Nelson's Sharp-tailed Sparrow are all Regional Conservation Priority species and the Yellow Rail is both a Regional Conservation Priority species as well as a species of State Special Concern.

Strategies:

Place Webster Creek, Kelly, and Upper Mud River Pools in drawdown to create conditions appropriate for sedge growth.

Monitor extent of sedge habitat annually by visual inspection, aerial overflights and GPS mapping. Use digitized geo-referenced aerial photography and GIS spatial analyses to track long-term trends.

Monitor for invasion by reed canary grass and Phragmities.

Stay abreast of research developments, experimental efforts, and pilot projects elsewhere in the state with regard to restoration of sedge meadow habitat.

Evaluate results after 5 years for success. If successful, explore removing water control structures and portions of dikes where feasible. If sedge establishment fails, management should return the pools to deep marsh habitat.

Objective 2.4: **Increasing Sedge Meadow:** Beginning in 2005, experiment with increasing sedge meadow by 1,250 acres to benefit wildlife species like the Yellow Rail, Sedge Wren, Nelson's Sharp-tailed Sparrow, and LeConte's Sparrow. (Figure 12, Figure 13 and Figure 14)

Rationale: See discussions above as to the value of sedge meadow habitat, its former abundance in Minnesota, its present scarcity, and the difficulty in restoring habitats around the state. Each of the four species mentioned are Regional Conservation Priority Species and species of management concern on the Refuge. This objective would draw on several different habitats, including open water, mudflat, willow scrub, bulrush, and cattail.

Strategies:

Conduct spring drawdowns followed by mid-summer burning and mowing in various pools for willow and cattail control.

Monitor for invasion of reed canary grass and Phragmities.

In Webster Creek and Mud River Natural Watercourse Management Areas, evaluate success after 5 years. If successful, consider removing water control structures and portions of dikes where feasible. If sedge establishment fails, management should return the pools to a deep marsh habitat.

Objective 2.5: **Reducing Cattail and Phragmites Infestation:** Experiment with decreasing cattail and phragmities vegetation by 840 acres, converting it to sedge habitat to benefit species like LeConte's Sparrow, Sedge Wren, Nelson's Sharp-tailed Sparrow and the Yellow Rail in the next 10 to 15 years.

Rationale: This objective may require increases in funding or advances in technology or control methods to be realized. Displacement of sedge meadow habitat by willow shrub-scrub, reed canary grass and cattails is an ongoing problem at Agassiz NWR (and elsewhere), and a solution has yet to be discovered or devised. Prolonged high water – all too common in recent years – contributes to invasion of the sedge zone by cattails. Present management is to lower water levels prior to fall burning of sedge meadow, as well as cutting 200-300 acres of willows in the winter. However, these practices are proving insufficient and net losses of sedge will continue to mount under the present approach.

Strategies:

Utilize an adaptive management strategy that encourages experimentation with a variety of methods for maintaining and expanding sedge meadow acreage. For example solutions may involve spraying with chemicals (finding a herbicide with specificity for just willows/cattails may be impossible), extending dry periods for each pool, or implementing multiple burns over a short time period might improve success.

Experiment with multiple year pool drawdowns that would allow sedges to become better established and expand.

Experiment with back-to-back multiple burns of cattail-dominated areas.

Stay abreast of research developments, and experimental efforts on cattail management.

Explore cooperative research and restoration opportunities with the University of Minnesota, Minnesota DNR, and other institutions.

Continue to monitor habitat changes with aerial photo/GIS analysis and research advancements. Assess whether continuing to expend limited staff and funds to control cattail and willow encroachment on sedge meadow is a worthwhile cost.

Objective 2.6: **Maintaining Hardstem Bulrush Emergent Habitat**: Maintain 770 acres (1.3 percent of the Refuge) in hardstem bulrush emergent habitat for nesting Franklin's Gulls, Grebes, diving ducks, Black Terns and Black-crowned Night-herons during April - August.

Rationale: Bulrush emergent habitat, specifically in Agassiz Pool, benefits a number of water-related birds like those listed in the objective. Aggressive hybrid cattail tends to out-compete bulrush stands. Water level management is directed toward suppressing the spread of cattails into the bulrush emergent habitat.

Strategies:

Raise water levels to depths that will flood out cattails and favor bulrush emergent habitat.

Use drawdowns where indicated to maintain or re-establish bulrush where open water or mudflats occur.

Monitor extent of bulrush emergent habitat annually by visual inspection, aerial overflights, and GPS mapping. Use geo-referenced aerial photography and GIS spatial analyses to track long-term trends.

Monitor bird-nesting activities.

Objective 2.7: **Managing Water Impoundments:** Manage water impoundments as a complex of basins to provide wetland diversity and improve water quality for maximum benefits to migrating and breeding birds. Management will be within the capabilities of the wetland system as a whole and individual impoundments will be drawn down on a 3- to 10-year rotation.

Rationale: Water level manipulation allows managers to simulate different stages of the natural flood/drought cycle at the same time in different impoundments. This increases the diversity of habitat types and food resources in the wetland complex that is available to migrating and nesting birds. The emphasis is on semi-permanent wetlands as these wetlands can be the most productive type for marsh nesting birds. The larger impoundments on Agassiz NWR provide a wide diversity of habitats within each impoundment. Management can increase this diversity by varying the water regime in nearby impoundments. The outcome will be interspersion of cover and openings for dabbling duck and marsh bird pair and brood habitat, open bays and medium density cover for diving duck broods, and post breeding/molting habitat.

Strategies:

Agassiz Pool (9,350 surface acres) will be in drawdown once every 10 years. The emphasis is on maintaining the hardstem bulrush plant community which is the most desirable for the nesting colony of Franklin's Gulls.

The six small Golden Valley and Goose Pen impoundments (normal summer pool 25 to 52 surface acres in size; total 218 acres) will be in a drawdown cycle of 3 years with burning and mechanical treatments of mowing and discing.

Sixteen other impoundments totaling 16,276 acres will be staggered in a drawdown cycle of 4 to 6 years. The emphasis is on maintaining openings in cattail areas. Burning will be prescribed to occur during the drawdown phase. If the natural watercourse trial objective is not successful in establishing sedge meadow habitat in the 3 impoundments, they will be added to this strategy (total 1,300 acres).

Provide stable water levels from May 1 to July 15 in a variety of cover types for over-water nesting birds and to prevent flooding of upland nests.

Lower water levels 6 to 12 inches in some impoundments during the fall to provide shallow foraging sites for migrating waterfowl.

Maintain sufficient depth of water during the winter for minnow survival to maintain food resource for piscivorous (fish-eating) birds and for muskrat survival to increase openings in cattail.

Improve water quality on a watershed scale through input and coordination with other agencies, within the constraints of the biological parameters for providing habitat for breeding and migratory birds.

Assess status of siltation and nutrient buildup in the Refuge basins. Develop strategies to address these concerns.

Objective 2.8: **Increasing Bur Oak / Savanna Habitat:** Increase bur oak / savanna habitat by 50 acres in the Open Landscape Management Area by 2014 for the benefit of such wildlife as the Whippoorwill, black bear, and Northern Flicker. (Figure 13)

Rationale: The Whip-poor-will, black bear, and Northern Flicker are all species of management concern at Agassiz NWR and the former two are Regional Conservation Priority species as well. The increase in bur oak / savanna habitat will come primarily from elimination of aspens from stands of mixed deciduous forest.

Strategies:

Utilize techniques previously described to eliminate aspens, especially selective girdling and later removal by firewood harvesters.

Objective 2.9: **Mature Aspen Stands:** Provide mature aspen stands for Bald Eagle, Hooded Merganser and Bufflehead nesting activity.

Rationale: Currently seven eagle nests are located in mature aspen or cottonwood. During the past 10 years cavity nesting Hooded Merganser and Bufflehead pairs/ broods have increased, which coincides with aspen stands maturing beyond 70 years of age. Studies indicate that aspen need to reach the age of 70 before cavities will develop.

Strategies:

Develop a forest inventory through GIS and ground-truthing that identifies existing old growth aspen.

Identify areas that will be managed as old growth aspen.

Conduct prescribed burns in these areas under conditions that will not kill old growth aspen.

Consult experts in aspen management to develop a schedule of management practices that will ensure that mature aspen will be available as old growth areas decline.

Develop a Step-down Forest Management Plan.

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Objective 2.10: **Cropland Phase-out:** Beginning in 2005, phase out all cropland by converting to grassland and shrub to benefit species such as the Bobolink, Sharp-tailed Sparrow, Marbled Godwit, and LeConte's Sparrow.

Rationale: This phase-out will take place over the life of the CCP, 10-15 years. It has already begun, and will continue at a similar rate (60 acres since 1997). There are now 170 acres of cropland left. Croplands are generally being phased out at most national wildlife refuges in accordance with the Service's Ecological Integrity Policy, which emphasizes native vegetation and natural processes.

Strategies:

Fields are prepared for seeding and planting through a combination of discing, herbicides, and prescribed fire. It may be necessary for repeated treatments.

Conduct annual monitoring to ensure that weedy species and non-native plants do not become problematic.

Use GIS spatial analyses every 5-10 years to keep track of long-term changes.

Objective 2.11: **Coniferous Bog:** Maintain 2,380 acres (3.9 percent of the Refuge) in coniferous bog for the benefit of such species as the Olive-sided Flycatcher, Connecticut Warbler, orchids and ferns.

Rationale: This acreage is mostly within the designated Wilderness Area of Agassiz NWR, although about 10-15 percent is also located by the Middle CCC Pool and several other sites. Both the olive-sided flycatcher and the Connecticut warbler depend on these types of habitat for breeding and migration stop-over sites and are Regional Conservation Priority species.

Carnivorous pitcher plants and sundews also occur within the coniferous bog. No active vegetation management is conducted within the Agassiz Wilderness Area, though recent mortality of spruces and tamaracks along its western edge may be attributed to higher water levels in Thief Bay Pool, wetter conditions over the last 10 years, or water-flow pattern effects caused by the road/ditches that bisect the area. The causes of this mortality are currently under study and water level manipulation in Thief Bay and Webster Pools and portions of the road/ditches may be altered based on the results.

Strategies:

Continue investigating causes of recent mortality in spruces and tamaracks along the western edge of the coniferous bog in the Wilderness Area; complete by 2005.

Depending on results of ongoing research into tree mortality, it may be necessary to lower water in one or more pools and/or remove portions of the road/ditches that bisect the area into a north and south section.

Complete a plant inventory and determine fire history in black spruce/ tamarack bog habitat by 2006.

Objective 2.12: **Conservation Easements:** Annually, inspect or manage at least 2,000 acres of the 7,000 acres of Conservation Easements in the Refuge Management District to improve conservation of natural resources and increase wildlife benefits.

Rationale: Management options on private lands in the Refuge Management District are limited by the terms of each individual conservation easement. Staff workloads currently limit the amount of contact, inspections and management the Refuge can conduct on the easements in the Refuge Management District. Changes in federal and state farm programs and the expiration of Conservation Reserve Program contracts will increase the importance of the habitat conserved by Refuge Management District conservation easements.

Strategies:

Fill the Refuge Operations Specialist GS-485-9 RMD position at Agassiz NWR to meet the potential for management and cooperative agreements on private lands in the Refuge Management District.

Restore hydrology and naturally occurring habitat that can reasonably be maintained.

Set up wildlife inventories and habitat monitoring procedures (aerial photos, photo stations and ground inspections) for the conservation easements that can be conducted on a rotating 5-year basis. A variety of habitats are represented on easement lands and procedures will need to be tailored to each property.

Inspect at least 2,000 acres annually for trespass and compliance with the terms of the easements. Inspections will include aerial reconnaissance and ground visits.

Plan and conduct management activities such as prescribed burns, mowing, haying, grazing, tree cutting, and chemical applications to maintain hydrology and desired habitat on at least 1,000 acres annually.

Objective 2.13: **Off-Refuge Corridor Habitat:** Continue to restore corridor habitat off-Refuge through the Partners for Fish and Wildlife program with priority given to riparian habitats and to increase grassland block sizes within the seven-county Refuge Management District.

Rationale: As a result of extensive efforts over the last 5 years to restore thousands of acres of wetlands on hundreds of private parcels within the Refuge Management District through the CRP program and other programs, Refuge staff and the Service have built up good relations with private landowners and cooperating agencies. These relationships can be drawn upon to extend these efforts to develop wildlife corridors off the Refuge as well as improve water quality and reduce sedimentation off and on the Refuge.

Strategies:

Consult with partners and cooperating agencies like Minnesota DNR, the Tribes, NRCS, Ducks Unlimited, Minnesota Waterfowler Association, Legislative Council on Minnesota Resources, Watershed Districts, and The Nature Conservancy to find the best opportunities for developing wildlife corridors on private lands in the Refuge Management District.
Consult with watershed districts on watershed projects.
Utilize existing state and federal programs like CRP enrollment and Legislative Council on Minnesota Resources corridor program to find and link together potential corridor lands.
Take advantage of remote sensing, aerial photography, GIS, and gap analysis to explore the landscape within Refuge Management District for the most feasible, productive corridor opportunities.
Work with willing sellers interested in federal easements/ownership within designated corridors, large grassland blocks or flood prone areas adjacent to the Refuge.
Build positive relationships with County Boards for acceptance of federal easements/ownership from willing sellers within designated corridors, large grassland blocks or flood prone areas adjacent to the Refuge.
Increase the budget for management of new acquisition/easements.

Goal 3: People

Provide visitors and the community with opportunities to experience quality wildlife-dependent recreation activities and to understand and appreciate a natural, functioning landscape.

Hunting

Objective 3.1: **Deer Hunt:** Provide annual firearms deer hunt that meets definition of "quality" in the FWS manual and is designed to maintain deer population density at 15-20 deer/square mile.

Rationale: The deer population has finally recovered from the harsh winters of 1995/1996 and 1996/1997 and deer densities are at the desired Refuge goal. As a

result, deer hunters have steadily increased over the last 3 years from 165 to 285 in 2003. This increasing trend in deer hunters should continue for several years unless detrimental factors (weather, disease) develop that would negatively impact the herd.

The Fish and Wildlife Service Manual defines a "quality hunting experience" at 605 FW 2.1 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 effect on population management of resident or migratory species
Reflects positively on the individual refuge, the Refuge 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
Incorporates a message of stewardship and conservation in hunting opportunities.

Strategies:

Cooperate with Minnesota DNR to carry out the annual fall firearms deer hunt.
Contact and work with Minnesota DNR, schools, hunt clubs, 4-H, Boy and Girl Scouts, NRA, and/or other groups to implement youth hunt for deer on the Refuge.
Use the annual deer population estimates from the mid-winter census to decide whether to conduct antlered or antlerless hunts the following autumn.
Conduct informal survey /interact with hunters and listen to feedback on ways to improve hunt.
By 2006, update the Agassiz NWR step-down hunting plan outlining procedures and providing broad guidance for managing future hunts.

Objective 3.2: **Accessible Hunting Program:** Determine the need for and develop an accessible hunting program for disabled hunters by conducting surveys and feasibility study by 2010.

Rationale: At present, there is no accessible hunting program on the Refuge. There is one permanent, accessible deer stand available. There appears to be at least a modest demand for such a special hunt. A study would examine whether or not present access facilities on Refuge (roads, dikes, trails, blinds, tree stands) would be sufficient to allow for an accessible hunt, what deficiencies exist, and the cost of remedying these deficiencies.

Strategies:

Conduct a study on the demand for an accessible hunting program, the feasibility of carrying it out on the Refuge, and the best location or locations for doing so.

Conduct a pilot hunt if the study points towards its feasibility.

If an accessible hunt is recommended, incorporate it in the step-down Hunting Plan.

Objective 3.3: **Moose Hunting:** Provide moose hunting opportunities when the population recovers to above 200 moose.

Rationale: There has been a moose hunt at Agassiz NWR in the past, but the current moose population of fewer than 100 individuals does not allow for it. The Refuge conducts an annual moose census that observes population trends and estimates moose numbers. When the population exceeds 200 and remains on an upward trajectory, the Refuge, in conjunction with Minnesota DNR, can assess the situation and recommend reopening the moose hunt.

Strategies:

Continue to monitor the Refuge moose population annually and work closely with the Minnesota DNR on understanding the causes of the recent collapse as well as the current recovery and whether or not it is possible or desirable to mitigate such declines.

Cooperate with the Minnesota DNR on eventually reopening the moose hunt on Refuge and/or adjacent WMAs.

Objective 3.4: **Archery and Muzzle-loader Deer and Ruffed Grouse Hunts:** Provide hunting opportunities for deer (archery and muzzle-loader) and Ruffed Grouse during and after the state deer firearms season following state seasons and regulations. Access will be primarily walk-in with strategically located parking lots. The open area will be the same as for the deer firearms season.

Rationale: There has never been a season for archery and muzzle-loader hunting at Agassiz NWR, however, muzzle-loaders may be used during the regular firearms season. These hunts are popular among some hunters who seek a more challenging and primitive hunting experience. Due to the late season, this hunt will not cause disturbance to migrating birds.

Strategies:

Update the Agassiz NWR Refuge Hunt Plan (a step-down management plan) that outlines all hunting opportunities, seasons and locations on the Refuge as well as identify rules, controls, and constraints by 2006.

Work with partners like Minnesota DNR and local hunting clubs to implement archery and muzzle-loader hunts on the Refuge.

Modify hunting brochures to incorporate changes.

Provide additional law enforcement presence.

Objective 3.5: **Youth Waterfowl Hunt:** Provide a quality youth waterfowl hunt on Farmes Pool in compliance with the state youth season and regulations. A future hunting plan would identify access boundaries.

Rationale: Agassiz NWR has always been treated as a sanctuary for waterfowl and has never permitted waterfowl hunting, under the rationale that numerous areas outside the Refuge boundaries are open to hunting for ducks and geese. Comments received during scoping indicated both support for this policy as well as some desire to open at least one part of the Refuge to hunting. The Robert E. Farmes Pool is located in the southwestern corner of the Refuge, contiguous with Minnesota DNR's Elm Lake Wildlife Management Area. Further, it is clearly demarcated by east-west County Route 7. Thus, it is well situated to be clearly identifiable and isolated from the rest of the Refuge. In cooperation with Minnesota DNR, it should be feasible to confine waterfowl hunting to this portion of the Refuge during the normal state youth-only season.

Strategies:

Explore possible access and boundaries of the specific area that might be open to waterfowl hunting with Minnesota DNR.

If portions of Farmes Pool are opened to waterfowl hunting, incorporate details in the step-down Refuge Hunting Plan plan to be developed.

Ensure sufficient Refuge law enforcement presence.

Wildlife Observation and Photography

Objective 3.6: **Wildlife Observation/Photography:** Provide year-round opportunities for 25,000 visitors annually to observe and photograph wildlife and habitat. Designate cross-country ski, snowshoe, and walking trails for year-round observation of wildlife.

Rationale: There were 20,780 visitors to Agassiz NWR in 2002, but visitation has ranged from 15,000 to 25,000 per year. Due to the rather remote location of the Refuge, it is unlikely that it will become a prime target for most eco-tourists or wildlife enthusiasts, except birders. Agassiz NWR has a long-standing track record as a destination point for birders. Birding is the fastest growing outdoor recreation sport, and with successful marketing efforts like the Pine to Prairie Birding Trail, the Refuge can expect to see increased visitation for this purpose. An annual average of 25,000 visitors is a realistic objective that would signify the Refuge is successfully engaging the public. The 2002 Visitor Services Review Report for the Refuge contains a number of recommendations that are summarized here as strategies.

Strategies:

Improve the Parker Pool observation platform by providing universal accessibility, benches, and interpretive panels.

Continue to allow for controlled access to the fire tower.

Improve Maakstad Trail by expanding it, adding trail information (including information on cultural resources and history) and improving the trailhead and parking lot.

Expand opportunities at Farmes Pool by allowing for seasonal foot traffic, a new trail, and a possible observation point or platform.

Canvasback on nest. USFWS

Environmental Education

Objective 3.7: **On-site Environmental Education:** On-site, provide for annual visitation of 400 students and 15-20 group visits.

Rationale: A limited amount of onsite environmental education occurs at the present time, although school budgetary problems have made maintaining even the existing level a serious challenge. Several college-level natural resource classes have spent several days onsite. The Refuge does not have a full-time staff person to promote and conduct environmental education and interpretation. Nonetheless, Agassiz NWR is in a position to provide environmental education to grade-level and college students and the general public in northwest Minnesota.

Strategies:

Work with local teachers to develop grade-specific curricula that meet local, state and national education standards and that keep focus on the Refuge.

Continue to conduct workshops for teachers.

If feasible, train volunteers to provide tours or lessons for classrooms.

Contact schools annually notifying them of the Refuge's facilities, resources and educational opportunities by means of fliers or letters to individual teachers. In the higher grades, science and history teachers should be targeted.

Devise and encourage additional opportunities for research, wildlife surveys, or bird banding within the ability of high school science or biology classes.

Improve facilities for extended field trips and research opportunities for college and high-school-level natural resource classes by improving bunkhouse by 2005.

Improve facilities for college and high school-level natural resource classes and researchers by building an Environmental Education Lab by 2010.

Objective 3.8: **Outreach:** Off-site, make visits to 1,000 students annually, conduct satellite classroom visits, respond to requests from educators, provide county fair exhibits, and improve the Agassiz NWR website.

Rationale: As described earlier in this chapter, the Refuge has an energetic outreach program to all segments of the wider community in northwest Minnesota, limited only by available staff.

Strategies:

Continue with each of the efforts described earlier in this chapter, including classroom visits, participation in county fairs and parades, radio and TV interviews, and so forth.

Train volunteers to give presentations on behalf of the Refuge to primary, middle, and high schools throughout the seven counties of the Refuge Management District.

On an annual basis, notify every elementary school teacher and all science, social studies, and history teachers in middle (junior high) and high schools of environmental education opportunities on the Refuge and opportunities for off-site environmental education.

Send a bi-annual newsletter, "The Wild Note," to neighbors, county, watershed districts, media and schools.

Improve the website by 2006.

Continue to work with the Northwest Service Cooperative to distribute educational materials and exhibits on wildlife.

Interpretation

Objective 3.9: **Interpretation:** Provide interpretive auto tour route, hiking trails, visitor contact center and kiosks for 25,000 visitors annually.

Rationale: This objective overlaps a good deal with earlier objectives. The 2002 Agassiz NWR Visitor Services Review Report contained a number of recommendations on improving interpretation opportunities at the Refuge, which are listed here as strategies.

Strategies:

Update and upgrade Habitat Drive interpretive signing and ensure facilities are ADA-compliant (universally accessible) by 2006.

Continue the "Look and Listen" message throughout all stations on the auto tour route and enhance by adding a "sound post" with digital recordings of common wildlife sounds, calls, songs, and their sources.

Add interpretive panels on the Parker Pool scenic overlook on County Road 7. Add benches to the platform to accommodate the "Look and Listen" message.

Add interpretive panels to the fire observation tower cab. Add an "on-ground" accessible cab with interpretation.

Develop a simple interpretive brochure according to Service standards for the fully accessible Headquarters Trail by 2005. Interpretive signs, audio and tactile components should be developed for this short trail.

Develop several interpretive programs for the general public, starting from the visitor contact station. Some should be year-round while others are seasonal in nature. At least one cultural interpretation program should be offered.

Explore opportunities to develop volunteer-led interpretive programs and have volunteers to run the office on Sunday afternoons between May and September.

Interpret key resource issues.

Develop a Refuge plant list with plants categorized in associated habitat types.

Redesign and remodel the visitor contact area in the Visitor Center (which is the primary visitor contact for the Refuge outside of the entrance kiosks) to include information about the Refuge, the National Wildlife Refuge System, and the U.S. Fish and Wildlife Service.

Improve the website by 2005.

Involve volunteers and the future Friends Group with assisting in program development and implementation.

Hire a seasonal Park Ranger devoted solely to interpretation, outreach and environmental education.

Archeological and Cultural Values

Objective 3.10: **Archeological and Cultural Values:** Implement the measures and recommendations of the 2002 *Cultural Resources Management Plan*.

Rationale: Agassiz NWR's *Cultural Resources Management Plan*, completed in 2002, specifies a number of recommendations and measures to identify, preserve, and interpret the Refuge's cultural resources. At present, only historical resources have been found on the Refuge. While prehistoric resources certainly existed and likely persist in more undisturbed sites on the Refuge, the area's modern history – including widespread farming followed by extensive impoundment, dike and road construction – disturbed much of the Refuge grounds and may have obliterated certain cultural resources or rendered them inaccessible (e.g. inundated within the many pools that comprise most of the Refuge's acreage).

Strategies:

Conduct a Phase I archeological survey of the non-flooded areas of the Refuge, by qualified personnel, as a necessary first step in cultural resources management.

Follow procedures outlined in *Cultural Resources Management Plan* for consultation with RHPO, SHPO, and potentially interested American Indian tribes.

Follow procedures detailed in *Cultural Resources Management Plan* for inadvertent discoveries of human remains.

Continue to document the history of the area's settlers, known as the Mud Lakers, and the work of the Civilian Conservation Corps via written and oral media.

Ensure archeological and cultural values are described, identified, and taken into consideration prior to implementing undertakings.

Complete accessioning, cataloging, inventorying, and preserving the museum collection at the Refuge.

Chapter 5: Plan Implementation

Thief Bay Pool drawdown (foreground); spruce/tamarack trees in Wilderness Area (background). USFWS

New and Existing Projects

This CCP outlines an ambitious course of action for the future management of Agassiz NWR. The ability to enhance wildlife habitats on the Refuge and to maintain existing and develop additional quality public use facilities will require a significant commitment of staff and funding from the Service. The Refuge will continually need appropriate operational and maintenance funding to implement the objectives in this plan.

The following provides a brief description of the highest priority Refuge projects (Tier 1), as chosen by the Refuge staff and listed in the Refuge Operating Needs System (RONS). A full listing of unfunded Refuge projects and operational needs can be found in Appendix F.

Refuge Operating Needs (Highest Priority)

Ditch 11 Dike Rehabilitation (East & West of Agassiz Pool). Water management is the most important tool used to control wetland vegetation, providing critical habitat for birds and mammals at Agassiz NWR. In 1909, the Judicial Ditch No. 11 Drainage System was excavated, disrupting the natural flowage pattern of 609 square miles of the Thief River Subwatershed. Even today, this 455-mile ditch system is the largest single human-made impact on habitats within the Refuge. Waters entering the 61,500-acre Refuge from this system directly affect every wetland acre and the associated infrastructure. During a spring flood in 1996, waters from this system contributed over 12,000 acre-feet of water daily for 9 consecutive days.

In 1937, the establishment of the Agassiz NWR voided the easements for all roads, except County Road 7, and ditches and placed the responsibility for management and maintenance of these facilities on the Service. Ditch 11, both the ditch and associated dikes formed from the original spoil banks, affect wetland management in two basic ways. The ditch facilitates water flow into, within and out of the Refuge, all of which can contribute to the success and failure of management goals. The dikes form the foundational infrastructure for pool definition and wetland characteristics. Despite the historical or any futuristic effects the ditch system has had or could have on Refuge habitats, current management of the Refuge is based on it continuing to function. Human failure to complement natural hydrologic water physics has resulted in continuous maintenance of ditches and dikes, especially those associated with Ditch 11 within the Refuge boundary. Although there are signs where natural hydrologic forces are trying to reclaim landscapes along a majority of Ditch 11, the area that appears to be closest to catastrophic failure due to slumping of dike slopes is downstream (west) from the main Agassiz Pool control structure. This 2.5-mile segment affects dikes associated with two pools (Parker and Madsen) totaling 5.0 miles of dike. Test borings indicate that the

foundation of the dikes shows signs of deep pivoting, which could result in total loss of the dikes. This would be devastating to the habitats of both pools. The rehabilitation of the dikes is needed to preserve traditional wildlife goals of the Refuge. Without needed repairs both the capability of manipulating pool elevation and ability to isolate the pools from major floods will be lost. The cost of thousands of acres of destroyed prime wetlands habitat is incalculable.

Efforts to find cost effective solutions yet keep existing dikes within the current footprint began in 1999. In 2001, nearly $400,000 was spent to repair seven of 14 major slumps. Some of the slumps cost nearly $400/foot when pilings were installed based on soil compaction tests. The June 2002 flood event caused further extensive damage to both dikes. The estimated cost to repair the 5 miles of dikes west of Agassiz Pool using the piling method is $10,000,000. Currently we plan to complete soil compaction surveys of the entire dike and based on results seek a more cost effective solution – such as moving the dikes and ditch, lowering the dikes, etc.
Strategies 1.4.3, 1.5.2, 2.7.1. *Estimated cost:* Unknown at this time.

Complete Hydrological Data on Refuge Pools. Acquire hydrological data (i.e. acre-feet, flow pattern regimes, inlet flows, ditch capacity tables, pool storage, and sediment) that will be used to calculate accurate storage capacities on Refuge wetlands when flood conditions require management. The 49,000 acres of wetlands and willow shrublands on the Refuge not only support a wide variety of wildlife species but are critical to flood management within the Red Lake River Watershed during extreme events. Information from this project will provide data for the Refuge's Geographic Information System (GIS) and will be used in the implementation of the CCP. This project, which supports the Red Lake Watershed Districts mediation process, will be completed through a contract. *Strategy* 1.4.2. *Estimated cost:* $103,000.

Refuge staff member measures slumping. USFWS

Improve Habitat Management Assessments and Monitoring. Acquire and interpret aerial photos and other information to expand the GIS layers for all of Agassiz NWR, adjoining State Wildlife Management Areas and easement management areas. GIS is a computer-based system that will allow the Refuge improve its management capabilities by readily accessing and analyzing large amounts of data. GIS will link physical items such as ditches and roads with wildlife studies, vegetation changes and nesting sites. Up-to-date and accurate maps are essential. The process will include yearly infrared photos and interpretation that delineates roads, water features, and vegetation. Special emphasis will be placed on areas that have been intensively managed by fire, water level manipulation and mechanical means to monitor effectiveness of management. Work will be completed by contract in partnership with the Minnesota DNR. *Strategies* 1.1.5, 1.2.3, 1.4.2, 1.5.2, 1.6.3; Goal 2: Habitat – All strategies. *Estimated cost:* $51,000.

Headquarters trail on Agassiz NWR. USFWS

Increase Easement Management (Refuge Operations Specialist). Provide a Refuge operations specialist to develop and implement management plans and provide oversight for the 5,400 acres of easements within the Refuge's seven-county Management District. This position will also coordinate watershed management planning within five sub-watersheds of the Red River of the North to facilitate ecosystem management in northwestern Minnesota. The project directly supports the Tall Grass Prairie Initiative and includes Partners for Fish and Wildlife, LCMR Wildlife Corridor and Conservation Reserve Enhancement Program (CREP) initiatives, Watershed Districts, NRCS, and Red River Mediation Board. Northwestern Minnesota provides habitat for hundreds of species of wildlife that are the responsibility of the federal government. *Strategies* 2.12.5-7. *Estimated cost:* $139,000.

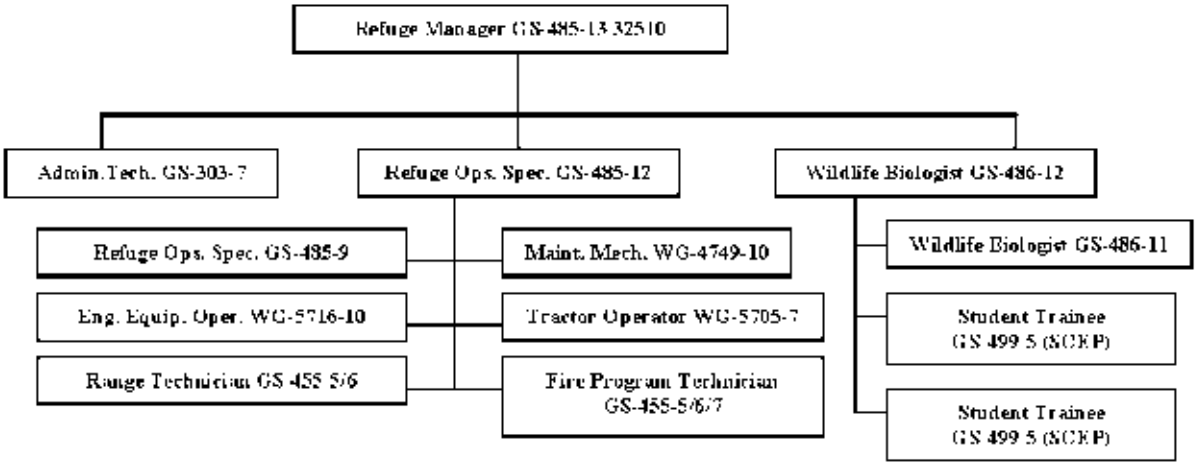
Assess Impacts and Need of Wilderness Area Exclusionary Road. A 2.25-mile road, which was an excluded right-of-way from the wilderness designation for water management purposes, bisects the 4,000-acre Wilderness Area that was established in 1976. The black spruce and tamarack trees on the west side of the Wilderness Area have been dying since 1994. Several factors could be causing this: raised water levels in Thief Bay Pool, unusually wet years with historic flooding, the excluded road that bisects the Wilderness Area into a north and south half providing an anchor system for beaver dams and maybe slowing drainage during floods, or the trees becoming so large and heavy that they sink in the bog and then drown.

Implement an historical and hydrological study to determine the impacts of the Wilderness Area exclusionary road and the impacts of water level management of adjacent pools on the black spruce/ tamarack bog. The study report will include a fire history model and recommendations for habitat restoration, if required. The dominant vegetation and hydrology of the area is black spruce/ tamarack bog. A pilot study was initiated in the fall of 2002 to begin investigating the effects of high water levels of managed impoundments on tree mortality. Work will be completed 2004. Based on the results of the pilot study recommendations, subsequent work will be completed through a contract with a university. *Strategy* 2.11.1. Estimated cost: $84,000.

Improve Refuge Exhibits. Expand the public use contact station and newly developed exhibits at Agassiz NWR to increase public use opportunities and improve the quality of the experience at the Refuge visitor contact area. This project also addresses the issue of safety as it applies to public office accessibility and is necessary to stay in compliance with federal accessibility standards. This project would accomplish the "priority public uses" of the NWRS Improvement Act of 1997, as it relates to Agassiz NWR. The Refuge is known for its resident wolf packs, moose herd, waterfowl, and 287 bird species that inhabit it. Improved opportunities will enhance visitor experience and their knowledge of nature. *Strategies* 3.7.8, 3.9.10. *Estimated cost:* $114,000.

Improve Customer Service (Park Ranger). Provide a permanent seasonal park ranger to coordinate visitor services programming and facilities development on Agassiz NWR. This person will implement a Visitor Services Plan that consists of development around the main administrative building (landscaping, interpretive trail, outdoor facility), and the construction of County Road 7 corridor and the Farmes Pool observation areas. The project will provide improved services to the 25,000 visitors who enjoy wildlife viewing on the Refuge's self-guiding auto tour route and hiking trails. The Plan will be completed in accordance with Service policy as outlined in the General Recreational chapter of the FWS Service Mannual. *Strategy* 3.7.9. *Estimated cost:* $64,000.

Figure 15: Current Staffing Chart, Agassiz NWR



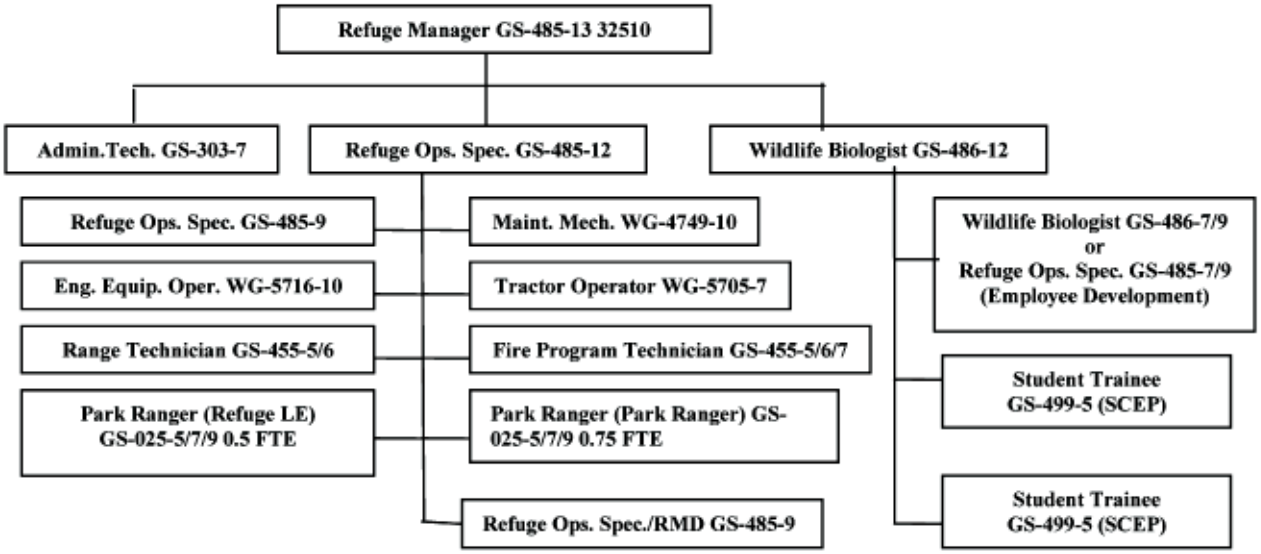
Restore Oak Savanna Plant Communities. Restore oak savanna habitat through a contract to girdle aspen and chemically treat invasive plant species. A majority of this critical habitat, which is beneficial to neotropical migrant birds, has been severely invaded by aspen and balsam popular trees. Agassiz NWR has nearly 120 acres of potential oak savanna, a transitional habitat zone between tall grass prairie and forest. This northern extension of the oak savanna habitat is very important to 100 species of birds and nine species of mammals. The project will be incorporated within a GIS database. *Strategy* 2.8.1. *Estimated cost:* $52,000.

Complete Research on the Ecology of the American Bittern. Final report pending on the American Bittern study initiated 1994 by Agassiz NWR and cooperators. All field work for the three phases of this study was completed in 2003. The study dealt with capture techniques, summer home range and habitat use, response to water/grassland management, census techniques, migration patterns, wintering habitat and juvenile dispersal. The study was initiated because the American Bittern is in a nationwide decline with the greatest declines of 48 percent over the last 20 years in the Midwest. This species' position in the food chain, wide distribution, and territorial call make it an ideal indicator species. Additional information is needed to develop survey methods. Partners included Agassiz Audubon, Eyes on Wildlife High School Curriculum, Minnesota DNR, University of Missouri-Columbia, Red Lake Band of the Chippewa, Big Stone NWR and Dr. John Toepfer, research consultant. *Strategy* 1.6.3.

Future Staffing Requirements

Implementing the vision set forth in this CCP will require changes in the organizational structure of the Refuge and District. Existing staff will direct their time and energy in new directions and new staff members will be added to assist in these efforts. The following are organizational charts and tables of the current staff of the Refuge and District, Fiscal Year 2004, as well as staff needed to fully implement this plan by Fiscal Year 2020 (Figure 15 and Figure 16 and Table 4.

Figure 16: Future Staffing Needs, Agassiz NWR



*An additional full-time position, Prescribed Fire Specialist GS-401-9, is located at Agassiz NWR but is supervised from outside the station.

Table 4: Staffing Required to Fully Implement the CCP by 2020, Agassiz NWR

Position	FTEs
Refuge Operations Specialist	1.0
Park Ranger (Refuge LE)	0.5
Park Ranger Outdoor Recreation Specialist	0.75
Total	2.25

Partnership Opportunities

Partnerships have become an essential element for the successful accomplishment of Agassiz NWR goals, objectives, and strategies. The objectives outlined in this draft CCP need the support and the partnerships of federal, state and local agencies, non-governmental organizations and individual citizens. This broad-based approach to managing fish and wildlife resources extends beyond social and political boundaries and requires a foundation of support from many. Agassiz NWR will continue to seek creative partnership opportunities to achieve its vision for the future.

Many national wildlife refuges have partner non-profit organizations, often called Friends groups, which serve as advocates for the refuge. These associations have the ability to reach out to the community for support and assistance for refuge projects and conservation issues. The remoteness of the Agassiz NWR has hindered the formation of a Friends group. However, Refuge staff would welcome the assistance from a Friends group or Association if one should form during the life of this plan.

Other notable partners include the Minnesota Department of Natural Resources; Natural Resources Conservation Service; Red Lake Band of the Chippewa Indians; The Nature Conservancy, Red Lake Watershed District; Agassiz Audubon; Northwest Services Cooperatives; Wildlife Forever; Northland Community and Technical College, Thief River Falls, Minnesota; Bemidji State University, Bemidji, Minnesota; University of Minnesota, Crookston, Minnesota; University of North Dakota, Grand Forks, North Dakota; University of Missouri and Gaylord Institute, Columbia, Missouri; South Dakota State University, Brookings, South Dakota; Minnesota Pine to Prairie Birding Trail Committee and Tamarack Interpretive Association.

Step-down Management Plans

Step-down management plans describe specific actions that support the accomplishment of Refuge objectives. The management plans identified in Table 5 will be reviewed, revised, or developed as necessary to achieve the results anticipated in this draft CCP.

Table 5: Step-down Management Plan Schedule, Agassiz NWR

Step-down Management Plan	Plan Date Completed/ Updated	Anticipated Revision
Wilderness Management Plan	1981	2006
Visitor Services Plan	X	2007
Hunting Plan	1983	2006
Law Enforcement Plan	1985	2007
Furbearer Management & Trapping Plans	1985	2007
Marsh & Water Management Plan	Annual	Annual
Habitat Management Plan	X	2005/06
Wildlife Inventory Plan	1989	2006
Resource Inventory Plan	1991	2008
Fire Management Plan	2001	2011
Cultural Resources Management Plan	2002	2012
Accessibility Plan	X	

Monitoring and Evaluation

The direction set forth in this CCP and specifically identified strategies and projects will be monitored throughout the life of this plan. On a periodic basis, the Regional Office will assemble a station review team whose purpose will be to visit Agassiz NWR and evaluate current Refuge activities in light of this plan. The team will review all aspects of Refuge and District management, including direction, accomplishments and funding. The goals and objectives presented in this CCP will provide the baseline from which this field station will be evaluated.

Plan Review and Revision

The CCP for Agassiz NWR is meant to provide guidance to Refuge managers and staff over the next 15 years. However, the CCP is also a dynamic and flexible document and several of these strategies contained in this plan are subject to such things as drought, floods, windstorms and other uncontrollable events. Likewise, many of the strategies are dependent upon Service funding for staff and projects. Because of all these factors, the recommendations in the CCP will be reviewed periodically and, if necessary, revised to meet new circumstances.

Appendix A: Finding of No Significant Impact

Finding of No Significant Impact
Environmental Assessment and Comprehensive Conservation Plan
for the Agassiz National Wildlife Refuge, Minnesota

An Environmental Assessment has been prepared to identify management strategies to meet the conservation goals of the Agassiz National Wildlife Refuge (Refuge). The Environmental Assessment examined the environmental consequences that each management alternative could have on the quality of the physical, biological, and human environment, as required by the National Environmental Policy Act of 1969 (NEPA). The Environmental Assessment presented and evaluated three alternatives for managing fish, wildlife and plant habitats, as well as visitor services, on the Refuge over the course of the next 15 years.

The EA identifies three possible alternatives primarily centered on habitat management. The Alternatives are A) Current Management Direction, B) Minimal Upland Habitat Management, and C) Open Landscape/Natural Watercourses. The three main differences between current and/or minimal management and the Open Landscape/Natural Watercourses Alternative are that under the latter, 1) there are larger areas of prairie grasslands and sedge meadow habitats, 2) winter wildlife observation opportunities will increase, and 3) deer hunting opportunities will be expanded and ruffed grouse hunting and a youth waterfowl hunt will occur.

The alternative selected for implementation is *Alternative C*. The strategies presented in the Comprehensive Conservation Plan (CCP) were developed as a direct result of the selection of this alternative. Restoration of grassland, sedge meadows, and mature forest habitat would benefit a variety of wildlife and plant species identified as Resource Conservation Priority species by the Service. Habitats would be managed for nesting and migrating songbirds, waterfowl, shorebirds and moose. Visitors to the refuge will also benefit through new hunting and winter wildlife observation opportunities including a designated, un-groomed cross country/snowshoe and walking trail. The new hunting opportunities are proposed during and after the deer/firearms season and include archery/deer, muzzleloader/deer, ruffed grouse and sharp-tailed grouse hunting. A "youth" waterfowl hunt will also be permitted in the Farmes Pool area in conjunction with the state youth waterfowl hunt season and regulations.

For reasons presented above and below, and based on an evaluation of the information contained in the Environmental Assessment, we have determined that the action of adopting Alternative C as the management alternative for the Refuge CCP 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.

Additional Reasons:

1. Future management actions will have a neutral or positive impact on the local economy.
2. A cultural resource inventory completed prior to this CCP included recommendations for the protection of cultural, archaeological and historical resources.
3. This action will not have an adverse impact on threatened or endangered species.

Supporting References:
Environmental Assessment
Comprehensive Conservation Plan

ACTING Regional Director

7/19/05
Date

Appendix B: Glossary

Appendix B: Glossary

Alternative	A set of objectives and strategies needed to achieve refuge goals and the desired future condition.
Biological Diversity	The variety of life forms and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.
Compatible Use	A wildlife-dependent recreational use, or any other use on a refuge that will not materially interfere with or detract from the fulfillment of the mission of the Service or the purposes of the refuge.
Comprehensive Conservation Plan (CCP)	A document that describes the desired future conditions of the refuge, and specifies management direction to achieve refuge goals and the mission of the National Wildlife Refuge System.
Community	A distinct assemblage of plants that develops on sites characterized by particular climates and soils, and the species and populations of wild animals that depend on the plants for food, cover and/or nesting.
Ecosystem	A dynamic and interrelated complex of plant and animal communities and their associated non-living environment.
Ecosystem Approach	A strategy or plan to protect and restore the natural function, structure, and species composition of an ecosystem, recognizing that all components are interrelated.
Ecosystem Management	Management of an ecosystem that includes all ecological, social and economic components that make up the whole of the system.
Ecotone	Edge or transition zone between two or more adjacent but different plant communities, ecosystems, or biomes.
Endangered Species	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*.
Environmental Assessment (EA)	A systematic analysis to determine if proposed actions would result in a significant effect on the quality of the environment.
Extirpation	The localized extinction of a species that is no longer found in a locality or country, but still exists elsewhere in the world.
Goals	Descriptive statements of desired future conditions.

Issue	Any unsettled matter that requires a management decision. For example, a resource management problem, concern, a threat to natural resources, a conflict in uses, or in the presence of an undesirable resource condition.
National Wildlife Refuge System	All lands, waters, and interests therein administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish, wildlife and plant resources.
Objectives	Actions to be accomplished to achieve a desired outcome or goal. Objectives are more specific, and generally more measurable, than goals.
Preferred Alternative	The Service's selected alternative identified in the Draft Comprehensive Conservation Plan.
Scoping	A process for determining the scope of issues to be addressed by a comprehensive conservation plan and for identifying the significant issues. Involved in the scoping process are federal, state and local agencies; private organizations; and individuals.
Species	A distinctive kind of plant or animal having distinguishable characteristics, and that can interbreed and produce young. In taxonomy, a category of biological classification that refers to one or more populations of similar organisms that can reproduce with each other but is reproductively isolated from – that is, incapable of interbreeding with – all other kinds of organisms.
Strategies	A general approach or specific actions to achieve objectives.
Wildlife-dependent Recreation	A use of refuge that involves hunting, fishing, wildlife observation and photography, or environmental education and interpretation, as identified in the National Wildlife Refuge System Improvement Act of 1997.
Threatened Species	Those plant or animal species likely to become endangered species throughout all of 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*.
Vegetation	Plants in general, or the sum total of the plant life in an area.
Vegetation Type	A category of land based on potential or existing dominant plant species of a particular area.
Watershed	The entire land area that collects and drains water into a stream or stream system.
Wetland	Areas such as lakes, marshes, bogs, and streams that are inundated by surface or ground water for a long enough period of time each year to support, and that do support under natural

conditions, plants and animals that require saturated or seasonally saturated soils.

Wildlife Diversity — A measure of the number of wildlife species in an area and their relative abundance.

Appendix C: Species Lists

Mammals Found on Agassiz NWR

Common Name	Scientific Name	Savanna/ Prairie	Conifer Bog	Aspen/ Lowland Shrub	Marsh and Open Water
Shrews					
Masked shrew	*Sorex cinereus*	s		s	
Water shrew	*Sorex palustris*				s
Arctic shrew	*Sorex arcticus*		r	r	
Pygmy shrew	*Microsorex hoyi*			r	
Short-tailed shrew	*Blarina brevicauda*	u	u	s	s
Moles					
Star-nosed mole	*Condylura cristata*			r	
Bats					
Little brown myotis	*Myotis lucifugus*	u		s	
Big brown bat	*Eptesicus fuscus*	u		s	
Red bat	*Lasiurus borealis*			s	c
Hoary bat	*Lasiurus cinereus*			s	
Rabbits and Hares					
Eastern cottontail	*Sylvilagus floridanus*	a		c	
Snowshoe hare	*Lepus americanus*		c	a	
White-tailed jackrabbit	*Lepus townsendii*	u			
Rodents					
Woodchuck	*Marmota monax*	c			
Thirteen-lined ground Squirrel	*Spermophilus tridecemlineatus*	c			
Franklin's ground squirrel	*Spermophilus franklini*	u			
Eastern chipmunk	*Tamias striatus*			c	
Gray squirrel	*Sciurus carolinensis*	u		u	
Fox squirrel	*Sciurus niger*			u	
Red squirrel	*Tamiasciurus hudsonicus*		c	u	

Mammals Found on Agassiz NWR (Continued)

Common Name	Scientific Name	Savanna/ Prairie	Conifer Bog	Aspen/ Lowland Shrub	Marsh and Open Water
Northern flying squirrel	*Glaucomys sabrinus*	u	u	u	
Plains pocket gopher	*Geomys bursarius*	s			
Beaver	*Castor canadensis*		a	a	a
Deer mouse	*Peromyscus maniculatus*	u			
White-footed mouse	*Peromyscus leucopus*	s		s	
Gapper's red-backed vole	*Clethrionomyms gapperi*	s	c	s	
Meadow vole	*Microtus pennsylvanicus*	u			
Muskrat	*Ondatra zibethica*		u	u	a
Norway rat #	*Rattus norvegicus*	u			
House mouse #	*Mus musculus*	u			
Meadow jumping mouse	*Zapus hudsonius*	s	u	s	
Porcupine	*Erethizon dorsatum*	u	u	u	
Canines					
Coyote	*Canis latrans*	r	r	r	
Gray wolf	*Canis lupus*	o	o	o	
Red fox	*Vulpes vulpes*	c	u	c	
Gray fox	*Urocyon cinereoargenteus*	r	r		
Other Carnivores					
Black bear	*ursus americanus*	u	u	u	u
Raccoon*	*Procyon lotor*	c	c	c	c
Bobcat	*Lynx rufus*	u	u	c	o
Weasel Family (Mustelidae)					
Fisher	*Martes pennanti*	o	o	o	o
Ermine (Short-tailed weasel)	*Mustela erminea*		o	u	
Least weasel	*Mustela nivalis*	u			
Long-tailed weasel	*Mustela frenata*		s	s	
Mink	*Mustela vison*	o	u	c	a

Mammals Found on Agassiz NWR (Continued)

Common Name	Scientific Name	Savanna/ Prairie	Conifer Bog	Aspen/ Lowland Shrub	Marsh and Open Water
Badger	*Taxidea taxus*	r			
Striped skunk	*Mephitis mephitis*	a		c	
River otter	*Lutra Canadensis*			u	c
Deer Family					
American Elk**	*Cervis elaphus*	r			
White-tailed deer	*Odicoileus virginianus*	a	a	a	c
Moose	*Alces alces*	u	u	c	c

Exotic species
* Not native to area before colonial settlement
** Not a resident mammal of the refuge
a – abundant: a common species that is very numerous
c – common: certain to be seen or heard in suitable habitat, not in large numbers.
u – uncommon: present but not always seen.
o – occasional: seen only a few times during the season.
r – rare: seen every 2 to 5 years.
s – secretive: common to abundant but rarely observable.

Bird Species Found on Agassiz NWR

Definitions

Spring (March–May), Summer (June–July), Fall (August–November), Winter (December–February).
a=abundant, common species that is very numerous
c=Common, certain to be seen in suitable habitat
u=Uncommon, present, but on certain to be seen
o=Occasional, seen only a few times during season
r=Rare, seen at intervals of 2 to 5 years.
*=Nesting
#=State threatened and endangered species.
.

Birds Found on Agassiz NWR

Common Name	Sp	Su	Fa	Wi
Loons				
Common Loon	o	r	o	
Grebes				
Pied-billed Grebe*	a	a	a	
Horned Grebe*#	o	r	o	
Red-necked Grebe*	c	c	c	
Eared Grebe*	u	u	o	
Western Grebe*	o	o	o	
Pelicans				
American White Pelican	c	c	c	
Cormorants				
Double-crested Cormorant*	c	c	c	
Herons and Bitterns				
American Bittern*	c	c	c	
Least Bittern*	u	u	u	
Great Blue Heron*	c	c	c	
Great Egret*	u	u	u	
Snowy Egret*	r	r		
Little Blue Heron	r			
Cattle Egret	r	r	r	
Green Heron*	u	u	u	
Black-crowned Night-Heron*	c	c	c	

Birds Found on Agassiz NWR (Continued)

Common Name	Sp	Su	Fa	Wi
Vultures				
Turkey Vulture	o	o	o	
Swans, Geese and Ducks (Waterfowl)				
Trumpeter Swan#	r			
Tundra Swan	c	r	c	
Greater White-fronted Goose	o		r	
Snow Goose	u		c	
Canada Goose*	c	a	c	
Wood Duck*	u	u	u	
Gadwall*	c	c	a	
American Wigeon*	c	c	a	
American Black Duck*	o	r	u	
Mallard*	a	a	a	
Blue-winged Teal*	a	a	a	
Northern Shoveler*	c	c	c	
Northern Pintail*	c	u	c	
Green-winged Teal*	c	u	a	
Canvasback*	c	c	u	
Redhead*	c	c	c	
Ring-necked Duck*	c	c	c	
Greater Scaup	u		u	
Lesser Scaup*	c	u	c	
White-winged Scoter	o	r	o	
Long-tailed Duck	r		r	
Bufflehead*	c	u	u	
Common Goldeneye*	c	r	u	
Hooded Merganser*	c	u	u	
Common Merganser	u	r	o	
Red-breasted Merganser	o			
Ruddy Duck*	c	c	c	

Birds Found on Agassiz NWR (Continued)

Common Name	Sp	Su	Fa	Wi
Hawks and Eagles				
Osprey	r		r	
Bald Eagle*#	u	u	u	o
Northern Harrier*	c	c	c	
Sharp-shinned Hawk*	u	r	c	
Cooper's Hawk*	o	r	o	
Northern Goshawk*	o		o	u
Broad-winged Hawk*	u	r	u	
Swainson's Hawk			r	
Red-tailed Hawk*	c	c	c	
Rough-legged Hawk	c		c	u
Golden Eagle	r		r	r
Falcons				
American Kestrel*	u	u	u	
Merlin	o		o	
Peregrine Falcon#	o		o	
Upland Game Birds				
Gray Partridge*	o	o	o	o
Ring-necked Pheasant			o	o
Ruffed Grouse*	c	c	c	c
Sharp-tailed Grouse*	o	o	o	o
Rails and Coots				
Yellow Rail*	u	u		
Virginia Rail*	c	c	c	
Sora*	c	a	c	
American Coot*	a	a	a	
Cranes				
Sandhill Crane*	c	c	a	
Shorebirds				
Black-bellied Plover	o		o	
American Golden-Plover	o		o	

Birds Found on Agassiz NWR (Continued)

Common Name	Sp	Su	Fa	Wi
Semipalmated Plover	c	r	c	
Killdeer*	c	c	c	
American Avocet*	r	r		
Greater Yellowlegs	c	o	c	
Lesser Yellowlegs	c	u	c	
Solitary Sandpiper	u	o	u	
Willet	r		r	
Spotted Sandpiper*	c	c	c	
Upland Sandpiper*	o	o		
Hudsonian Godwit	u			
Marbled Godwit*	o	o		
Ruddy Turnstone	r		r	
Sanderling	o		o	
Semipalmated Sandpiper	c	o	u	
Least Sandpiper	c	c	c	
White-rumped Sandpiper	o		r	
Baird's Sandpiper	o		o	
Pectoral Sandpiper	c		c	
Dunlin	u		o	
Stilt Sandpiper	u		u	
Buff-breasted Sandpiper	r		r	
Short-billed Dowitcher	u	o	u	
Long-billed Dowitcher	c		c	
Common Snipe*	c	c	c	
American Woodcock*	u	u	u	
Wilson's Phalarope*#	u	r	o	
Red-necked Phalarope	o		o	
Gulls and Terns				
Franklin's Gull*	a	a	o	
Bonaparte's Gull	u	r	u	
Ring-billed Gull	c	r	c	

Birds Found on Agassiz NWR (Continued)

Common Name	Sp	Su	Fa	Wi
Herring Gull	u		u	
Caspian Tern	o		o	
Common Tern#	o		r	
Forster's Tern*	c	c	c	
Black Tern*	c	c	c	
Doves				
Rock Dove	r	r	r	
Mourning Dove*	c	a	c	
Cuckoos				
Black-billed Cuckoo*	u	c	u	
Yellow-billed Cuckoo		r		
Owls				
Eastern Screech-Owl	r			
Great Horned Owl*	c	c	c	c
Snowy Owl	o		u	u
Northern Hawk Owl				r
Barred Owl	r		r	r
Great Gray Owl		r	r	r
Long-eared Owl	r	r		
Short-eared Owl*	o	r	o	o
Northern Saw-whet Owl*	r	r		r
Nighthawks and Nightjars				
Common Nighthawk*	u	u	u	
Whip-poor-will*	u	u	u	
Swifts				
Chimney Swift	r	r		
Hummingbirds				
Ruby-throated Hummingbird*	u	u	u	
Kingfishers				
Belted Kingfisher*	o	o	o	

Birds Found on Agassiz NWR (Continued)

Common Name	Sp	Su	Fa	Wi
Woodpeckers				
Red-headed Woodpecker	o	o	o	
Yellow-bellied Sapsucker	u	u	u	
Downy Woodpecker*	c	c	c	c
Hairy Woodpecker*	c	c	c	c
Black-backed Woodpecker	r	r	r	r
Northern Flicker*	c	c	a	
Pileated Woodpecker*	u	u	u	u
Flycatchers				
Olive-sided Flycatcher	r	r		
Eastern Wood-Pewee*	c	c	c	
Yellow-bellied Flycatcher		o		
Alder Flycatcher*	u	c		
Willow Flycatcher	r	r		
Least Flycatcher*	c	c	u	
Eastern Phoebe*	o	o	o	
Great Crested Flycatcher*	u	c	o	
Western Kingbird	u	r	u	
Eastern Kingbird*	c	c	c	
Shrikes				
Northern Shrike	o		o	
Vireos				
Yellow-throated Vireo*	o	o	o	
Blue-headed Vireo	o		o	
Warbling Vireo*	u	c	u	
Philadelphia Vireo	o	r	o	
Red-eyed Vireo*	c	c	u	
Jays, Magpies and Crows				
Gray Jay*	r	r	r	o
Blue Jay*	c	c	c	
Black-billed Magpie*	o	o	o	o

Birds Found on Agassiz NWR (Continued)

Common Name	Sp	Su	Fa	Wi
American Crow*	c	c	c	
Common Raven*	u	o	u	c
Larks				
Horned Lark*	o	o	o	r
Swallows				
Purple Martin*	o	r		
Tree Swallow*	c	c	c	
Northern Rough-winged Swallow	u	r	u	
Bank Swallow	o	o	o	
Cliff Swallow*	c	a	c	
Barn Swallow*	c	u	c	
Chickadees and Titmice				
Black-capped Chickadee*	c	c	c	c
Boreal Chickadee	o	o	o	o
Nuthatch				
Red-breasted Nuthatch	o	r	o	o
White-breasted Nuthatch*	c	c	c	c
Creepers				
Brown Creeper	o		o	
Wrens				
House Wren*	c	c	c	
Winter Wren	r	r	r	
Sedge Wren*	u	a	u	
Marsh Wren*	a	a	u	
Kinglets				
Golden-crowned Kinglet*	c	r	c	
Ruby-crowned Kinglet*	c	r	c	
Bluebirds and Thrushes				
Eastern Bluebird*	u	u	u	
Veery*	u	c	o	
Gray-cheeked Thrush	o		o	

Birds Found on Agassiz NWR (Continued)

Common Name	Sp	Su	Fa	Wi
Swainson's Thrush	u		o	
Hermit Thrush	u		u	
American Robin*	c	c	c	
Mimics				
Gray Catbird*	u	c	u	
Brown Thrasher*	u	u	u	
Starlings				
European Starling*	o	o	o	
Pipits				
American Pipit	o		u	
Waxwings				
Bohemian Waxwing	r		r	r
Warblers				
Golden-winged Warbler			r	
Tennessee Warbler	c		c	
Orange-crowned Warbler	u		u	
Nashville Warbler*	o	c	u	
Northern Parula	r		r	
Yellow Warbler*	c	a	c	
Chestnut-sided Warbler*	o	o		
Magnolia Warbler	u		u	
Cape May Warbler	u		u	
Yellow-rumped Warbler	a	o	a	
Black-throated Green Warbler	u	r	o	
Blackburnian Warbler*	o	u	o	
Pine Warbler	c		c	
Palm Warbler	c		c	
Bay-breasted Warbler	o		o	
Blackpoll Warbler	c		c	
Black-and-white Warbler	u	o	u	
American Redstart*	u	u	u	

Birds Found on Agassiz NWR (Continued)

Common Name	Sp	Su	Fa	Wi
Ovenbird*	u	u	o	
Northern Waterthrush	u	r	u	
Connecticut Warbler*	r	r		
Mourning Warbler	o	o		
Common Yellowthroat*	c	a	c	
Wilson's Warbler	u		o	
Canada Warbler	o	r		
Tanagers				
Scarlet Tanager	r	r	r	
Grosbeaks, Buntings and Sparrows				
Eastern Towhee		o		
American Tree Sparrow	c		c	
Chipping Sparrow*	u	o	u	
Clay-colored Sparrow*	c	a	c	
Vesper Sparrow*	u	c	u	
Savannah Sparrow*	u	u	u	
Grasshopper Sparrow		r		
Le Conte's Sparrow*	u	c	u	
Nelson's Sharp-tailed Sparrow*	o	u		
Fox Sparrow	c		c	
Song Sparrow*	c	c	u	
Lincoln's Sparrow	o		o	
Swamp Sparrow*	u	c	u	
White-throated Sparrow*	c	c	c	
Harris's Sparrow	u		u	
White-crowned Sparrow	u		u	
Dark-eyed Junco	c		c	
Lapland Longspur	u		u	
Snow Bunting	u		u	o
Grosbeaks and Buntings				
Rose-breasted Grosbeak*	u	c	o	

Birds Found on Agassiz NWR (Continued)

Common Name	Sp	Su	Fa	Wi
Indigo Bunting	r	r	r	
Blackbirds and Orioles				
Bobolink*	o	o	o	
Red-winged Blackbird*	c	c	c	
Western Meadowlark*	o	o	o	
Rusty Blackbird	u		u	
Yellow-headed Blackbird*	c	c	c	
Brewer's Blackbird*	o	o	o	
Common Grackle*	c	o	c	
Brown-headed Cowbird*	c	a	c	
Baltimore Oriole*	c	c	o	
Finches				
Pine Grosbeak	o		o	u
Purple Finch*	u	o	u	
House Finch	r			r
Red Crossbill			o	o
White-winged Crossbill			o	o
Common Redpoll	c		u	c
Hoary Redpoll	r			r
Pine Siskin	u	r	u	o
American Goldfinch*	c	c	c	
Evening Grosbeak	u		u	u
Old World Sparrows				
House Sparrow*	o	o	o	

Casual and Accidental Birds

Clark's Grebe	Western Sandpiper
Tri-colored Heron	Ruff
Yellow-crowned Night Heron	Laughing Gull
White-faced Ibis	California Gull

Casual and Accidental Birds (Continued)

Brant	Ross' Gull
European Widgeon	Boreal Owl
Cinnamon Teal	Acadian Flycatcher
Surf Scoter	Loggerhead Shrike
Mississippi Kite	Mountain Bluebird
Red-shouldered Hawk	Wood Thrush
Ferruginous Hawk	Northern Mockingbird
Gyrfalcon	Sage Thrasher
Prairie Falcon	Sprague's Pipit
Greater Prairie Chicken	Yellow-throated Warbler
King Rail	Prothonotary Warbler
Common Moorhen	Field Sparrow
Snowy Plover	Lark Bunting
Piping Plover	Smith's Longspur
Whimbrel	Northern Cardinal
Red Knot	

Amphibians

Common Name	Scientific Name	Savanna /Prairie	Conifer Bog	Aspen/ Lowland Shrub	Marsh and Open water
Wood Frog	*Rana sylvatica*		c	a	c
Western Chorus Frog	*Pseudacris triseriata*		c	a	
Spring Peeper	*Pseudacris crucifer*		u	u	u
Northern Leopard Frog	*Rana pipiens*			u	u
American Toad	*Bufo americanus*	c	c	c	c
Canadian Toad	*Bufo hemiophrys*	u	u	u	u
Great Plains Toad	*Bugo cognatus*	r			
Gray Treefrog	*Hyla versicolor*		c	c	
Copes Gray Treefrog	*Hyla chrysoscelis*		u	u	
Tiger Salamander	*Ambystoma tigrinum*		u	a	a

c – common: certain to be seen or heard in suitable habitat, not in large numbers.
u – uncommon: present but not always seen.
a – abundant: a common species that is numerous.

Reptiles Found on Agassiz NWR

Common Name	Scientific Name	Savanna/ Prairie	Conifer Bog	Lowland Shrub	Marsh and Open Water
Prairie Skink	*Eumeces septentrionalis*	u			
Snapping Turtle	*Chelydra serpentina*				u
Painted Turtle	*Chrysemys picta*				c
Plains Garter Snake	*Thamnophis radix*	u			u
Red-sided Garter Snake	*Thamnophis sirtalis parietalis*	a	a	a	a
Eastern Garter Snake	*Thamnophis sirtalis sirtalis*	a	a	a	a
Smooth Green Snake	*Opheodrys vernalis*	r			r
Redbelly Snake	*Storeria occipitomaculata*			u	
a= abundant c= common u= uncommon r=rare					

Fish Species Found on Agassiz NWR

Common Name	Scientific Name	Marsh & Open Water
Minnows		
Brassy Minnow	*Hybognathus hankinsoni*	r
Common Shiner	*Luxilus cornutus*	u
Pearl Dace	*Margariscus margarita*	u
Golden Shiner	*Notemigonus crysoleucas*	r
Bigmouth Shiner	*Notropis dorsalis*	r
Blacknose Shiner	*Notropis heterolepis*	r
Spottail Shiner	*Notropis hudsonius*	r
Sand Shiner	*Notropis stramineus*	r
Northern Redbelly Dace	*Phoxinus Eos*	c
Finescale Dace	*Phoxinus neogaeus*	c
Fathead Minnow	*Pimephales promelas*	a
Creek Chub	*Semotilus atromaculatus*	r
Suckers		
Carpsucker	*Carpiodes species*	r
White Sucker	*Catostomus commersoni*	c
Shorthead Redhorse	*Moxostoma macrolepidotum*	u
Bullhead Catfish		
Black Bullhead	*Ameiurus melas*	r
Tadpole madtom	*Notorus gyrinus*	r
Pikes		
Northern Pike	*Esox lucius*	r
Mudminnows		
Central Mudminnow	*Umbra limi*	c

Fish Species Found on Agassiz NWR

Common Name	Scientific Name	Marsh & Open Water
Sticklebacks		
Brook Stickleback	*Culaea inconstans*	a
Sculpins		
Slimy Sculpin	*Cottus cognatus*	r
Sunfish		
Bluegill	*Lepomis macrochirus*	r
Largemouth Bass	*Micropterus salmoides*	r
Black Crappie	*Pomoxis nigromaculatus*	r
Perch		
Iowa Darter	*Etheostoma exile*	u
Johnny Darter	*Etheostoma nigrum*	r
Blackside Darter	*Percina maculate*	r
River Darter	*Percina shumardi*	
Walleye	*Stizostedion vitreum*	r
Drums		
Freshwater Drum	*Aplodinotus grunniens*	r
Exotics		
European carp	*Cyprinus carpio*	

a – abundant
c – common
u – uncommon
r – rare

Appendix D: Compatibility Determinations

The following compatibility determinations were presented for public review in the Draft CCP/EA. Copies of the signed documents are available for viewing at the Agassiz NWR Headquarters.

- Hunting
- Firewood Cutting and Timber Harvest
- Trapping of Furbearers
- Environmental Education and Interpretation
- Wildlife Observation and Photography
- Haying
- Research

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 System 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, and 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. The 1997 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 (1977)*:* 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: Mandates the Secretary of Interior and thus the Service to protect the historic and recreational values of congressionally designated National Historic Trail sites.

Appendix F: Priority Refuge and District Operational and Maintenance Needs

Appendix F: Priority Refuge and District Operational and Maintenance Needs

The CCP directs an ambitious course for the future management of Agassiz National Wildlife Refuge. The following provides a brief description of some of the second-highest priority Refuge projects, or Tier II. The highest priority, or Tier 1, projects are described in Chapter 5 of the plan. Each project description also includes the number(s) of a corresponding objective or strategy; linking it to the Goals/Objectives/Strategies section of Chapter 4.Most of these projects are listed in the Refuge Operating Needs System (RONS); the Service's national database of unfunded operational activities. The RONS was established in 1990 as a planning, budgeting, and communication tool to enhance identification of funding and staffing needs for the National Wildlife Refuge System. RONS projects describe the need for new or expanded activities in order to implement plans, attain goals, or satisfy legal mandates. Data within RONS are used regularly in budget justifications presented to the Department of the Interior, the Office of Management and Budget, and Congress.

Refuge Operating Needs System

Complete an Extensive Flora Inventory of Agassiz Refuge including the Wilderness Area. Contract a botanist to survey the refuge for rare or unique plant species; priority areas are wilderness, bog and oak savannah habitat. The Aspen Parkland Biome on Agassiz is essential habitat for northwestern Minnesota. This botanical information is needed so that refuge management activities do not adversely affect plants or plant communities. Voucher specimens would be prepared and added to the refuge herbarium. Herbarium storage facilities will be improved. This project will support a GIS database and provide needed botanical information. Objective 2.11. Estimated cost: $42,000

Improve understanding of habitat management effects on grebes. Initiate a 3-year study on grebe ecology and the effects of refuge water management activities. The refuge will contract through a cooperative agreement to implement a study (3 years) that will provide techniques that can be used for grebe management at Agassiz NWR. Five species of grebes nest at the Agassiz NWR. Grebe populations have fluctuated greatly over the last 15 years. It has not been determined whether management techniques used to benefit waterfowl compliment grebe production. This project will supplement an independent study initiated in 1997 by a University of Nebraska professor on refuge grebes. Objective 1.7; Strategies 2.7.3 and 4. Estimated cost: $36,000

Survey water gauges and pool capacities in 20 impoundments. Purchase a Total Station Survey unit and software to facilitate conservation of 61,500 acres of Agassiz and the 7,000 acres of easements by accurately documenting boundaries, impoundments, pool capacities, sedimentation effects, location of unique features with GPS locations. Changes in impoundment size and spillway levels over the years make this necessary to plan or implement water management. This equipment will be used to survey elevations and accurately place gauges to improve water management and storage analysis and document easement storage needs. The conservation of the refuge and 7,000 acres of easements is critical to migrating/nesting migratory birds. Refuge pools have the capacity to hold 61,432 acre feet at the spillways and 116,036 acre feet of ungated storage. This large storage capacity is constantly under demand for use as flood control. This project will provide the needed information to factually inform watershed districts, county commissioners, and the public about refuge management strategies. Objectives 1.4, 5, and 6; and 2.4, 7, and 12. Estimated cost: $60,000

Habitat restoration through brush reduction. The project will purchase a hydromower that will be used to implement a 5-year mowing rotation to set back woody vegetation. Due to the lack of natural fires, prairie habitat has been degraded by willow and other woody brush encroachment. Because of the number of years without intensive management, the old willows and trees need to be mowed with a heavy duty mower to assist with the recovery process. Refuge and easement areas provide essential aspen parkland habitat to many wildlife species in Northwestern Minnesota. Strategies 2.1 and 3; 2.3.2; 2.8.1; Estimated cost: $300,000

Monitor species of emphasis. This project will implement monitoring /surveys for gray wolf, black terns, bitterns, marsh birds, point counts for neotropical migrants, amphibians, bio-control agents for invasive weeds, and quantitative vegetation response to prescribed burning, and water management. This will be done by a 4-year term appointment. The refuge has an active biological/ habitat management program that currently conducts 10 wildlife surveys and weekly migration counts for waterfowl and air photo interpretation for vegetation monitoring. Initial studies have been done by graduate students to obtain base line data. Capabilities to perform follow up monitoring, GIS data entry, and long-term response to management are not available. Strategies 1.3.2; 2.5.2; 2.6.6; 2.7.3 and 4; 2.10.3; Objectives 1.6; 1.7; 2.1 Estimated cost: $146,000

Increase aerial surveys. Annually acquire satellite imagery for ecosystem analysis of on refuge management activities and off refuge changes effecting the environment. Satellite imagery would aid with the surveillance of refuge easement, 7,000 acres, in a 7-county district. Illegal activities and threats to the integrity of the easements and wildlife use and response to management will be assessed. Agassiz NWR is often described as an island surrounded by a sea of agriculture. This condition warrants not only a constant visual assessment of the integrity of the refuge, but also close monitoring of wildlife response to threats to their habitats. These threats exist both on the 61,500 acre Refuge and throughout the 4.5 million acre management district. Strategies 2.2.4; 2.4.2; 2.6.6; 2.7.3 and 4; 2.9.1; 2.10.3; 2.12.4 Estimated cost: $48,000

Develop refuge video, TV clips, interactive computer display. Develop refuge videos that will enhance visitor's enjoyment and understanding of the refuge. These videos will contribute to online visitors as well as on-site visitors. The Service has declared understanding the Refuge System, the Service mission, nature and its processes and the interaction with the public as major goals. Development of a refuge specific video, public service announcements, use of new technological devices in displays and improvement of the HomePage are efficient and effective methods to disseminate information to the general public and educational institutes. This would be developed through NCTC, regional public use experts and contracted vendors. Objectives 3.6, 7, 8, 9 and 10. $135,000

Develop Station Health & Safety Plans to meet new standards. Develop and implement a variety of safety management plans i.e. Wellhead Protection Program, Sanitary survey, Hazardous Communications Plan, Contingency Plan for Hazardous Wastes, Spill Prevention Control and Counter Measure plan, Medical Waste Plan to protect the well being of 10 full time employees and 6-10 residential volunteers/students. This project would also complete Job Hazard Analysis forms for all activities and/or jobs conducted on the Refuge and/or Management District. 2-year term position will be hired- responsibilities include: asbestos survey, quarterly monitoring of water supplies, monthly interstitial fuel tank security, develop a computer accounting system. General Refuge Management – Employee and Public Safety. $129,000.

Volunteer Program Enhancement. This project will fund a cooperative agreement with the University of Minnesota - Crookston to develop a program to recruit, train, and supervise refuge volunteers (including recruitment of a Senior Volunteers Corps) and for assisting partner organizations in developing , coordinating and executing projects and programs under cooperative agreements with partner organizations. Supports implementation of Sections 4(b) and (c), 5(d)(2)

and 6(e) of the Volunteer and Community Partnership Enhancement Act of 1998. Objectives 1.7; 3.6, 7, and 8. Estimated cost: $24,000

Provide Public Safety, Security and Resource Protection (Law Enforcement Officer). Provide a full time refuge law enforcement officer to increase resource protection and provide for public safety on the 61,500-acre Agassiz NWR. Visitation at the refuge exceeds 25,000 annually. There are no law enforcement personnel currently on staff, although the Detroit Lakes WMD does provide limited coverage. The refuge is dependent on the state for much of its law enforcement needs. Objectives 2.12; 3.1,4,5, and 6. Estimated cost: $136,000

Maintenance Management System

The Maintenance Management System (MMS) is a database used by the Service to document Equipment Replacement, Deferred Maintenance and New Construction projects. Maintenance projects are structured around property items where repair or replacement is less than $750,000. New Construction is for constructing new facilities or repairing / replacing existing property where costs exceed $750,000. The following is an example list of the 115 projects identified in the 2003 database.

Project	Estimated Cost
Replacement of Bunkhouse	$451,000
Replace Madson Pool Water Control Structure	$164,000
Replace damaged sheetpile weir – Mud River	$ 81,000
Repair Madsen Dike/Ditch 11	$492,000
Repair Parker Dike/Ditch 11 slopes	$1,500,000
Replace underground electric cable at shop	$95,000
Repair east Ditch 11/north dike	$150,000
Rehabilitate Lab/Envt. Ed. Ctr/5 stall	$ 30,000
Replace 5-stall storage garage	$148,400
Replace 3-stall storage garage	$67,200
Resurface road on Parker Dike	$30,000
Replace deteriorated South Pool water control structure	$185,000
Construct accessible hiking trails and wildlife interpretive facilities	$500,000
Replace worn out International dump truck	$74,000
Replace worn-out John Deere 2630 Ag. Tractor, 58 hp	$91,000
Replace worn out Champion 715A Road Grader	$168,000

Appendix G: Mailing List

Appendix G: Mailing List

The following is an initial list of government offices, private organizations, and individuals who will receive notice of the availability of this CCP. We continue to add to this list.

Elected Officials

Senator Norm Coleman
Senator Mark Dayton
Representative Bill Luther
Representative Collin Peterson
Representative Mike Kennedy
Governor Tim Pawlenty
Representative Betty McCollum
Representative Martin Sabo

Tribal Government

Red Lake Band of the Chippewa Indians

Local Government

City of Baudette
City of Bemidji
City of Hallock
City of Roseau
City of Red Lake Falls
City of Thief River Falls
City of Warren
City of Middle City
City of Grygla
City of Crookston
City of Newfolden
Beltrami County
Kittson County
Lake of the Woods County
Pennington County
Red Lake County
Roseau County
Marshall County
Beltrami Co. Soil & Water Conservation District
Kittson Co. Soil & Water Conservation District
Lake of the Woods Co. Soil & Water Conservation Dist.
Pennington Co. Soil & Water Conservation Dist.
Red Lake Co. Soil & Water Conservation District
Roseau Co. Soil & Water Conservation Dist.
Marshall Co. Soil & Water Conservation District
Red River Watershed Management Board
Red River Basin Flood Damage Reduction Work Group
Red Lake Watershed District Mediation Committee
Snake River/Middle River Watershed Mediation Committee
Two Rivers Watershed District
Roseau River Watershed District

Federal Agencies

USDA, Natural Resources Conservation Service
USFWS, Albuquerque, New Mexico; Anchorage, Alaska; Atlanta, Georgia; Denver, Colorado; Fort Snelling, Minnesota; Hadley, Massachusetts; Portland, Oregon

State Agencies

Minnesota Environmental Quality Board
Minnesota Pollution Control Agency
Minnesota Department of Natural Resources (MNDNR)
Minnesota State Historic Preservation Officer (SHPO)
Minnesota Environmental Education Association

Colleges and Universities

University of Minnesota / Water Resources Center
University of Minnesota – Crookston, Natural Resources Department
Northland Community & Technical College, Biology Department
University of North Dakota, Grand Forks, North Dakota
St. Cloud State University
Bemidji State University, Biology Department

Organizations

The Nature Conservancy
Minnesota Deer Hunters Association
Minnesota Waterfowl Association
Pheasants Forever
Ducks Unlimited
National Audubon Society
Wildlife Management Institute
PEER Refuge Keeper
The Wilderness Society
National Wildlife Federation
Sierra Club, Midwest Office, Madison, WI
The National Wildlife Refuge Association
The Conservation Fund, Arlington, Virginia
Native Plant Society
Minnesota Nature Photography
Trust for Public Land
Minnesota Land Trust
The Wildlife Society, Minnesota Chapter
Minnesota Prairie Chicken Society
Animal Protection Institute, California
Thief River Falls Chamber of Commerce
Ruffed Grouse Society, Minnesota Chapter
Minnesota Bow Hunters Association
The Fund for Animals, Maryland
Minnesota Sharptailed Grouse Society
Goodridge Area Historical Society

Individuals

Individuals who have requested a copy of the draft CCP

Media

Thief River Falls, *Times & Northern Watch*
Grand Forks, North Dakota, *Grand Forks Herald Tribune*
Grygla, *Grygla Eagle*
Middle River, *Middle River Recorder*
Roseau, *Roseau Times*
Crookston, *Crookston Daily Times*
Hallock, *Kittson County Enterprise*
Bemidji, *The Pioneer*

Appendix H: List of Preparers

Appendix H: List of Preparers

Refuge Staff:

Margaret Anderson, Refuge Manager, Agassiz National Wildlife Refuge
Gary Tischer, Refuge Operations Specialist, Agassiz National Wildlife Refuge
Gary Huschle, Wildlife Biologist, Agassiz National Wildlife Refuge
Socheata Lor, Wildlife Biologist, Agassiz National Wildlife Refuge

Regional Office Staff:
Gary Muehlenhardt, Wildlife Biologist/Refuge Planner, Region 3, USFWS
Gabriel DeAlessio, Biologist-GIS, Region 3, USFWS
John Dobrovolny, Regional Historian, Region 3, USFWS
Jane Hodgins, Technical Writer/Editor, Region 3, USFWS

Mangi Environmental Group

Leon Kolankiewicz, Biologist/Environmental Planner/Consultant

Appendix I: Bibliography

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Appendix J: Public Scoping Process

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Open House

On the evening of December 5, 2002, the USFWS and Agassiz staff welcomed the public to an open house and CCP/EA scoping meeting at the Heritage Center in Thief River Falls. About 30 individuals attended the meeting, most of whom were from Marshall County and all of whom were Minnesota residents. Attendees listened to an overview of the CCP and NEPA processes and then were given the chance to address the gathering. Rather than provide information, cite concerns, or list issues they would like to be addressed in the CCP and NEPA documents, most of the speakers took the opportunity to acquaint fellow stakeholders and the USFWS with their own ideas as to how Agassiz should be managed in the future. The following comments were made in the order shown:

- Refuge should allow bow-hunting.
- Refuge should give flood control higher priority.
- Refuge should carry out better weed control (e.g. Canadian thistle).
- Refuge allows for adequate public use – it's open to a sufficient extent to see and appreciate resources.
- Refuge should open more areas to public visitation.
- Refuge should strive for better appearance around headquarters; mow more often.
- Refuge should have more food plots for game like ducks, geese and deer.
- Refuge should improve maintenance of legal drainage ditches, which are clogged with weeds and/or vegetation on banks.
- Refuge should lower pool level elevations; there should be less water and more upland habitat to benefit upland game in general.
- Refuge should seek better cooperation with neighbors and work with surrounding landowners (e.g. road maintenance, water release, infrastructure).
- Refuge should seek better cooperation and coordination with local governments, including counties, townships, and ditching authorities, in such matters as repair and works in legal drainage ditches.
- Refuge should construct more control structures on upper reaches of the refuge and diversion ditches upstream of the refuge to the south side in the WMA, so as to reduce summer flooding.
- Refuge should manage wildlife using biology/science instead of politics, to the maximum extent feasible.
- Refuge should allow for cross-country skiing trails.
- Refuge should increase payment in lieu of taxes to local government(s).
- Refuge should allow fishing.
- Refuge should modify dams or other water control structures to facilitate fish migration.
- Bookstore in visitor center is asset for refuge.
- Refuge should conduct more prescribed burning to enhance wildlife habitat.

Meeting attendees were also provided with a comment form or questionnaire, and encouraged to fill it out and submit it that evening or mail at a later date. The comment form contained the following questions:

What do you think are the most important issues facing the refuge?
How do you think these issues can be resolved?
Should refuge habitats be managed any differently than they are today?
Are the types of use and visitation permitted and encouraged by the refuge appropriate?
Any other comments you would like to make?

Those interested in making comments had until January 18, 2003 to submit this form. Any member of the public who wished to comment in writing also had until that date to send a letter. Comments could be sent by U.S. mail, e-mail, or via the Agassiz website on the Internet. Approximately 40 comment forms and other written comments were submitted to the refuge during the scoping process.

Comments, concerns, and suggestions received from the public and stakeholders during scoping included the following (the number in parentheses is the number of comments making essentially the same point):

What do you think are the most important issues facing the refuge?

Water management, hydrology, flood control and water rights (15)
Too much water held in pools, interfering with deer hunting
Too much water held in pools, reducing their flood control value
Local pressure to use Agassiz as a reservoir
Managing refuge water resources for wildlife while surrounded by private agricultural lands
Need for larger outlets on impoundments to make drawdown faster and reduce downstream flooding Off-site waters problematic
Work with ditch authority to keep ditches clean and in repair
Invasive species and weed control (2)
Public outreach resources
Resource utilization
Refuge expansion
Public use/involvement
Loss of moose population (2)
Management of deer, moose, and other brushland wildlife populations
Pressures to graze or farm the refuge
Perceived conflicts between some wildlife species given sanctuary on the refuge and surrounding agricultural communities
Public access is too restrictive
Mistrust between the USFWS and local government authorities and taxpayers (2)
To function more as a natural ecosystem
Determine if the refuge is managing people or resources
Lack of exposure to or awareness of refuge on the part of the public
Agassiz should be more accountable to the people of Minnesota, especially neighbors who are directly affected by its operations
Too much “upstream ditching” east and southeast of refuge
Public use and proper management

Keeping "wildlife first" on a national wildlife refuge
Diversion ditch would offer more flexibility for water management
Managing for wildlife areas, with emphasis on threatened and endangered species and habitats/species unique to Agassiz and region
Funding
Management of healthy wolf/moose populations
Showing the public that the USFWS is not anti-sportsman
Maintaining and restoring native plant and animal communities
Balancing needs of surrounding landowners with wildlife conservation on refuge
Opening up part of refuge for duck hunting
Conflicts between different uses – managing people white maintaining commitment to wildlife and other resources
Allowing knowledgeable, experienced staff to manage refuge without interference
Declining quality of refuge wetlands from silt and sedimentation, agricultural runoff, and excessive winter drawdowns for purpose of spring runoff storage that does not meet refuge objectives
Loss of forest openings and grasslands due to undesirable vegetative encroachment

How do you think these issues can be resolved?

Stand firmly behind the original mission of the NWR system and preserve remaining natural environments for future generations
Increase research funding and funding and programs for public outreach
Long-range studies of hydrology
Draw water down earlier
Local and nationwide education to increase support for NWR system (2)
Work with local interests, perhaps through a board or cooperative
Manage brushlands with mechanical treatment, prescribed fire, and, when compatible with waterfowl habitat goals, water level management
Employing local young people, students, and teachers in wildlife monitoring and management projects on refuge
Assist local residents to initiate wildlife watching tours that could be a source of local income while putting residents in touch with visitors
Open some mowed roads to foot traffic and cross-country skiing in winter
Better communication between all people involved
Achieve trust by keeping public involved as at present and with new ways
Make progress on water issues by upper basin storage, flood easements, buyouts, diversion, etc.
Close refuge to the public
Allow no hunting or harvesting of refuge resources
Restrict runoff water from agricultural lands from entering refuge
Enforce current county and state regulations
Open more of refuge to hunting, especially south of Rte. 7 to duck hunting

Off-site management is essential
Drain holding ponds in fall when ditches are empty
Avoid excessive water in Ditch 83 and associated flooding by supporting diversion (2)
Protect critical habitat
Study and research plants and wildlife
Greater lobbying and grant-writing for donations to secure more funds
Mow and spray weeds along township boundaries
Involve township or county in fall water level reduction and opening of gates in spring
Obtain space or building where public can view videotape of what USFWS does
Open refuge south of County Rte. 7, Northwest Pool and Pool 8.
Replicate natural water systems as closely as possible
Keep restoring private land wetlands in vicinity and acquire land to expand refuge
You can't please everybody (2)
Public input, agency coordination, and hard decisions
With water control structures already in place, it would be feasible for Agassiz to become a designated flood control facility
Maximize winter habitat manipulations like mowing, selective logging of aged aspen; also manipulate cattail and phragmites-dominated habitats with follow-up prescribed burning

Should refuge habitats be managed any differently than they are today?

No (3)
No, management is perfect, right on target (2)
No, focus of refuge should remain on providing high quality wetland and associated upland habitats for migratory birds (particularly waterfowl), but also for non-game species (2)
Not necessarily; remain flexible, but why change a program that many feel is successful?
Staff is doing a great job managing the refuge; especially noteworthy are the efforts to provide shorebird habitat
Lower summer pool elevations and emptying all pools in the fall for the benefit of upland game, infrastructure on and off the refuge, and neighboring farmland
Most of Agassiz uplands could be managed in brush landscapes
Increase prescribed burning and allow for "let-burn" wildfires (i.e. wildland fire use for resource benefits) (2)
Controlled burns are effective in maintaining current habitat
Allow the natural ecosystem to function on its own, in which wildlife populations would be self-regulating
Incoming water should be let in more slowly to allow for agricultural and industrial contaminants to be filered out
No; perhaps open trapping on a limited basis for fisher, bobcat, marten and weasel (2)
Aspen woodlots should be left to grow old and not be burned; some ridges should be mowed and kept as prairie
Conduct more prescribed burning to improve habitats, but not in the spring
Very aggressive habitat treatments, particularly prescribed burning, recognizing limitations like funding, manpower and weather

More food plots should be planted (2)
Maintain food plots for farmer and the birds
More grain fields – ducks, geese, and cranes need to eat
Continue prescribed burns to maintain prairies and keep fuel loads low in forests
Keep pool water levels more constant to establish more wetland than open water
More native plant gardens

Are the types of use and visitation permitted and encouraged by the refuge appropriate?

Yes (13)
There is a strong pressure to expand uses, but remember that it is a "wildlife" refuge
Expand all kinds of appropriate public use; conduct economic study laying out benefits of refuge
Uses are entirely appropriate but public waterfowl hunting opportunities can be expanded (2)
Logging, bow and arrow hunting, waterfowl hunting, and cross-country skiing should all be permitted
Gates on roads should be opened to allow public to view and enjoy more wildlife
There is interest in visitation to the wilderness area
Consider allowing small game/upland gamebird hunting
Incorporate more local history (e.g. homesteading, Civilian Conservation Corps, University of Minnesota Experiment Station) into visitation program, such as with a video
Provide for a true wilderness camping experience via canoe
The opportunity for wildlife and natural resource-related research on the refuge is important and should continue, as should birding, deer hunting, and moose observation opportunities
It is pleasing that refuge is managed for non-game as well as game species
Major portion of refuge is inaccessible; thus, there is greater traffic on portion that is open; experience of viewing birds from car is diminished by other passing cars
Limited hours of visitor center on weekends restrict opportunity for locals to ever get inside
Existing facilities and activities like tower, visitor center, viewing ducks and public involvement are very good but bicycling, cross-country skiing, and snowshoeing areas should be promoted (2)
A true refuge would be closed to the public, and some places, even to refuge personnel; public could use nearby state parks that are now underused and in danger of being closed
Motorized off-road vehicles should not have increased access
Given declining numbers of deer hunters, new concepts for future herd management may be required
Spend less money on research and more on refuge appearance
Refuge is not a park and public use of refuge should be compatible with wildlife
Keep visitor restrictions in place; public has adequate access to all areas
Some refuges are open more and others are almost in a lockdown status
Need to open gates to allow motor vehicles access to more of refuge; one road is not enough
Native flowers and grasses would attract more people; wildflower/ native plants landscaping around headquarters is good demonstration to public (2)

Any other comments you would like to make?

As a landowner in the area, I am interested in the process and hope to participate in it

Some refuges are open more and others are almost in a lockdown status

Less water equals earlier ice equals thicker ice equals safer ice equals more deer hunting area

How much longer will the refuge allow hunting?

Agassiz is unique and needs to be preserved and manage; due to its remote location, it will never have a lot of visitors compared to other refuges

The working relationship between Agassiz NWR and Minnesota DNR's Division of Wildlife is highly treasured; MNDNR looks forward to continuing this cooperative relationship

We appreciate the large wild landscapes that Agassiz NWR contains and it is one of the most important features that attracted us to buy and maintain property in this part of the country

Are there any volunteer programs available? Perhaps visitor center could have more weekend programs in the summer thereby allowing for more access by locals

Would like to see better cooperation between USFWS and local government authorities

During times of devastating floods, Agassiz NWR worked cooperatively with the Red Lake Water District (RLWD) to provide floodwater retention; every effort was made to reduce downstream flooding and still be able to maintain the refuge's infrastructure

The refuge should not be expected to be the holding reservoir to prevent flooding on farmland and in towns; government should pay each landowner to set aside a number of acres on their land to act as a sponge to hold excess water

In conversations with other people, most would like to see more foot access to more areas, i.e. walking trails and cross-country skiing

Allow use of electric trolling motors for duck hunting

As a public taxpayer I feel the refuge is paying their share of taxes

A township supervisor from each surrounding township should be on an advisory committee to help with public relations but not control refuge management

For sake of public safety, the policy of checking in and off the refuge should be continued

Another motorized trail should be established to Elm Lake or to the west

Weed control around headquarters would make it more attractive

Past and present managers and biologists dictate local programs in each federal refuge better than a "high priced" consulting firm located out of the refuge area

The 12-sq. mile block of habitat including Eckvoll and Elm Lake WMA is extremely diverse and valuable, providing benefits to the area, particularly flood control, wildlife viewing, waterfowl production and overall wildlife diversity

More area needs to be used for the sportsman

Agassiz is a wonderful paradise for wildlife and should continue being managed for maximum wildlife use

Allow a limited amount of hunting for ducks and geese; also blow hunting and black powder hunting for deer; allow county and township officials on CCP process to be on the committee

Agassiz should start buying up more marginal land that is being federally supported now by such programs as the CRP (Conservation Reserve Program)

Keep up the good work (2)

Environmental education is important for people to support and understand what the refuge does; inviting school and community groups to the refuge for tours is a good way to provide this

Stay with primary goal of wildlife enhancement; all other goals are secondary

One or two pools should be stocked with fish to benefit neighbors who would like to fish refuge

Image would be improved if refuge told public all the things it is doing, like helping save certain species; it would also be good to have a native flower garden open to the public to encourage them to plant wildflowers; this year I planted 50 kinds of wildflowers and have many kinds of butterflies and semi-rare birds;

I think you are doing a great job

Refuge staff should be active in environmental issues surrounding the refuge such as flood management issues

It would be useful to have a table and a portable toilet at each of the kiosks; many visitors stop for leaflets along the road; perhaps a notebook for sightings should be placed there to record birds seen when the refuge office is closed

The Red Lake Department of Natural Resources has had an excellent working relationship with Agassiz Refuge and looks forward to continued to continued cooperative projects; refuge personnel have always gone out of their way to involve the Red Lake DNR in state-of-the-art education and research efforts, and their outreach efforts have contribute to the growth and development of Red Lake's Wildlife Program; Red Lake DNR is confident the refuge is in good hands

Keep up the good work!

Other General Written Comments Received During Scoping:

There needs to be a way for more access to the refuge.

There should be an outdoor toilet available when the visitor center is locked. (Note: A portable toilet has been available on-site for several years.)

Please ban hunting and trapping on your National Wildlife Refuge

Minnesota law requires control of noxious weeds and Agassiz should do its share

The Thief River Falls Chamber of Commerce & Visitor's Bureau is supportive of the various amenities at the refuge, especially additional interpretive programming for visitors to the community; the refuge is a primary attraction for visitors to the Thief River Falls area.

Appendix K: Response to Comments

Appendix K: Response to Comments

The following is a summary of the comments received on the Draft CCP and how the issues are addressed in the CCP.

Comment 1: Two organizations wrote opposing the use of "thrillcraft" or personal watercraft, snowmobiles, all-terrain vehicles and two-stroke outboard motors on national wildlife refuges. One organization indicated that off-highway vehicle use needs to be addressed in the CCP to avoid possible future misunderstandings and controversies.

Response: We added the following statement to Chapter 4 in the Public Education and Recreation section: "The use of off-road vehicles such as snowmobiles, ATVs, motorized boats, etc. by the public for recreational purposes has never been permitted on Agassiz Refuge's lands and waters. The CCP would maintain this policy over the next 15 years."

Comment 2: One organization stated that emissions from two-stroke engines adversely impact air, water, and biological resources.

Response: The Service acknowledges this information and the general conclusion that two-stroke engines generate adverse environmental impacts.

Comment 3: One organization commended the Service for taking seriously the potential impacts of climate change, including potential impacts on Agassiz NWR itself.

Response: Comment acknowledged. A consensus of climatologists (Intergovernmental Panel on Climate Change) predicts substantial rises in global temperatures by the end of the 21st century, with far-reaching implications for natural ecosystems, including national wildlife refuges. Agassiz NWR would indeed be subjected to these forces, which could bring about profound changes in the Refuge's hydrology, vegetation, wildlife, and non-native species. Most of these impacts would be likely to occur after the 15-year planning horizon of the current CCP. However, there are indications from a moose study and preliminary indications from a Wilderness Area study that climate warming is already having affects on wildlife and habitat in the area. Moose research in northwestern Minnesota from 1995-2000, (Cox, et. al., in press), that investigated the declining moose population implicated warmer summers as the probable cause of additional stress in moose by allowing parasites to have lethal effects on moose. Additionally, hydrological investigations are currently being analyzed for plant relationship to the documented increase in temperature over the past 40 years.

Comment 4: One organization expressed concern that formal partnership agreements with private entities may circumvent or prevent necessary management actions on the Refuge.

Response: As discussed in Coordination Activities section in Chapter 4, Agassiz NWR cooperates with partners on a number of activities and projects on and off the Refuge. These partners include private citizens serving as volunteers on the Refuge, cooperative farmers, watershed associations, state and federal agencies, and non-governmental conservation organizations. By and large, this cooperation not only enhances goodwill among neighbors and institutions in the surrounding community, but augments Service habitat and wildlife management efforts on and off-Refuge. The Service has not and will not enter into formal agreements that hinder its ability to realize Agassiz's goals and objectives.

Comment 5: One organization opposes the inclusion of hunting and trapping in each of the management alternatives presented in the CCP/EA.

Response: Hunting is one of the six wildlife-dependent public uses of national wildlife refuges specifically encouraged by the National Wildlife Refuge System Management Act of 1997 (the "Organic Act" of the Refuge System). Whenever a particular type of hunting is compatible with the Refuge's purposes, goals and objectives, and can be conducted in a sustainable manner, it may be permitted. Wildlife populations are monitored, and where, as in the case of moose at present, the population is below the population objective, hunting is suspended or reduced until the population recovers.

Limited trapping is conducted at Agassiz of furbearers that damage infrastructure, like muskrat and beavers, and other mammalian predators and carnivores. The trapping by several permittees is on a sustainable, relatively small scale. Trapping data indicate that there is no adverse direct effect on the long-term populations of target species or indirect effect on related prey species. As with hunting, trapping is suspended when the populations of target species appear to be low; for example, no trapping of river otters was permitted in 1993 and 1994 because of low numbers and trapping of muskrats was closed in 2004/2005 due to low numbers. Low numbers of muskrats were due to a combination of drawdown and flooding events during the peak of litter production and not as a result of trapping.

Comment 6: One organization asserts that the Draft CCP for Agassiz does not meet the requirements of the National Wildlife Refuge System Improvement Act of 1997 because insufficient investigation of biological integrity, diversity and environmental health were undertaken prior to plan preparation. They state that rigorous biological analyses need to be conducted of wildlife populations to ensure that there is a surplus, before making any compatibility determinations about the killing of wildlife.

Response: The Draft CCP listed a number of wildlife surveys and censuses that are conducted at Agassiz, such as of moose, deer, waterfowl, and scent stations which in sum provide an adequate basis for making informed decisions on the compatibility of hunting and trapping. Beginning in 2004 an annual spotlight count of predators was initiated on a 22 mile route to alleviate any deficiencies in predator population data. In addition, the year-to-year trapping records themselves, and long-term trends in these numbers, furnish valuable information that can be used in opening or closing seasons. Recognizing that it does not have limitless budgetary and personnel resources to conduct ideal surveys that would yield perfect information on wildlife population sizes, the Refuge and Service use adaptive resource management, several features of which are monitoring, feedback, flexibility, and making adjustments in midcourse whenever the data point in that direction.

Comment 7: One commenter favors Alternative C (the Service's Preferred Alternative and basis for the proposed plan) because of the additional hunting opportunities it would furnish.

Response: Comment acknowledged. The commenter is correct that this alternative would indeed expand hunting opportunities at Agassiz.

Comment 8: One commenter favors Alternative C because of its partial restoration of natural flows in certain wetlands.

Response: Comment acknowledged. This alternative does indeed restore more natural hydrology on an experimental, adaptive management basis in part of the Refuge.

Comment 9: One commenter opposes opening the Refuge to waterfowl hunting because waterfowl need sanctuary in a region with many areas open to hunting and because non-hunters deserve a spot where they can see waterfowl unmolested by hunters.

Response: The proposed opening for a youth waterfowl hunt would be at Farmes Pool on the southern edge of the Refuge south of Rte. 7. This is limited to one weekend and adjoins a State Area which is open to waterfowl hunting. Opening this area would reduce crippling losses and spread hunters out on an area easily accessible by youth. The Service supports this type of wildlife-dependent activity. The great majority of the Refuge would remain closed to waterfowl hunting and would therefore continue to constitute a sanctuary for ducks and geese and those humans who appreciate observing and photographing them.

Comment 10: One organization supports implementation of the Preferred Alternative (C) because it integrates effective wildlife and habitat management with expanded public use opportunities.

Response: Comment acknowledged. The Service appreciates this statement of support from a partnering organization.

Comment 11: One national organization supports the Service's Preferred Alternative and commends the ambitious and ecologically sound management objectives outlined in the CCP.

Response: Comment acknowledged. The Service appreciates this endorsement of its proposed plan.

Comment 12: One national organization commends the Service for its proposed phase-out of croplands on Agassiz National Wildlife Refuge.

Response: Comment acknowledged. The Service appreciates this statement of support for its comprehensive efforts to restore native biodiversity and vegetative communities on the Refuge.

Comment 13: One national organization indicated that it is pleased to see that spruce and tamarack die-off in the Wilderness Area is being studied and that the conclusions of this study will be published and used in making future management decisions.

Response: Refuge management is hopeful that scientific research may explain the cause of this die-off and perhaps suggest solutions to the problem.

Comment 14: A concerned citizen expressed dissatisfaction with the way DNR [sic] originally obtained the land that now constitutes the Refuge from farmers 60-70 years ago and its general mismanagement of wildlife and wildlands in the region.

Response: Comment noted. As explained on pages 3 and 4 of the Draft CCP (under "History and Establishment"), the Minnesota Conservation Department (a predecessor agency to Minnesota's Department of Natural Resources) was involved in the original acquisition of Mud Lake Refuge (now Agassiz National Wildlife) in the 1930's. A poorly-conceived, federally-subsidized drainage project on an inherently wet, flood-prone site that should probably never have been farmed proved a terrible burden for struggling homesteaders and nearly plunged Marshall County into bankruptcy. The State Legislature stepped in and forgave the county its debt on the condition that the State would then appropriate the lands in the drainage district for conservation purposes.

In the decades since, the U.S. Fish and Wildlife Service (known as the Bureau of Sport Fisheries and Wildlife in the 1930's) has managed habitats on the Refuge to the overall benefit, not detriment, of waterfowl in particular and wildlife in general.

Comment 15: Two commenters strongly support Alternative C (Preferred Alternative – Open Landscape/Natural Watercourses) because it would aim to maintain and restore native grassland-shrubland wildlife species, like the sharp-tailed grouse, and their open habitats. One commenter further recommends the use of prescribed fire as a key management tool in maintaining open landscapes.

Response: Refuge management appreciates this expression of support for its Preferred Alternative and concurs with the commenter's view of the critical role prescribed fire use will play in maintaining open landscapes on the Refuge.

Comment 16: One commenter suggests that Appendix C, Species Lists, identify all exotic species documented on the Refuge, as was done with mammals. The commenter further observes that the house mouse should be identified as an exotic (non-native) mammal.

Response: Refuge management thanks the commenter for this suggestion and correction. We will adopt the suggestion to identify non-native species in the other vertebrate taxa listed in Appendix C, that is, birds, amphibians, reptiles and fish The commenter is correct that the house mouse is indeed an exotic species and should have been tagged as such; the correction has been made in the Final CCP.

The following is a list of other exotic species that have been observed on the Refuge: Gray Partridge, Ring-necked Pheasant, Rock Dove, House Sparrow, European Starling, and European Widgeon.

Comment 17: Minnesota DNR supports Preferred Alternative C, which will support and enhance DNR's own habitat management efforts on Elm Lake State Wildlife Management Area. DNR specifically supports the increased use of prescribed fire to set back succession and increase the acreage of open lands on the Refuge.

Response: The Service welcomes this expression of support for its Preferred Alternative from a partnering state agency.

Comment 18: The DNR supports the continued use of firearms deer hunting on the Refuge during the state season as well as the proposed archery deer hunting season. However, The DNR contends that as proposed, (walk-in hunts only, during and following the firearms season), these hunts would elicit only limited interest and participation by prospective hunters. The DNR thus encourages the consideration of additional archery hunting opportunities on the Refuge prior to the firearms season and suggests that disturbance to migratory waterfowl could be minimized by limiting the area open to archery deer hunting prior to freeze-up.

Response: The DNR may be correct in its assessment that the deer archery season as proposed would elicit only limited interest and participation by prospective hunters. However, an early archery season would be a safety concern placing hunters in the field during the Refuge's fall burning season. Fall burning is an important habitat management tool in the transition zone and on the refuge. Recent studies indicate that a more frequent cycle of burning than is currently practiced is needed to effectively control shrublands.

Annually, Agassiz NWR plans to burn between 10,000 to 15,000 acres during spring and fall. Burn units are large with several encompassing 3,000 to 5,000 acres. Adaptive management indicates that fall burning is an important habitat management tool occurring primarily during September and October. Recently during two seasons, fall burning conditions were perfect throughout November both during the deer firearms hunt and afterward. Prescribed burns were not conducted during the deer firearms season, but they were carried out later. However, since these conditions were atypical,

refuge staff focused on providing addition hunting opportunities during and after the deer firearms season. It is important to note that local DNR land managers are unable to conduct necessary fall burning due to hunter safety concerns and staff commitment to managing hunts.

Limited access, primarily walk-in access after the deer firearms season may limit interest. During the deer firearms season, archery hunters would have access to the same system of interior roads (20 miles) and parking lots (7) that are available to the firearms hunters. After the firearms hunt there are several parking lots (3), and associated roads (4 miles) within the interior of the refuge that could be left open until snow inhibits safe travel. Also, we plan to open the North Boundary Road (5 miles) after the deer firearms season. In the past, this road has been closed during all state hunting seasons. The details will be worked out in the Step-down Hunting Plan. It should be noted that limited access and OHV prohibitions on the refuge during the deer firearms season attracts hunters that are looking for this kind of experience, this would also be true for a segment of the archery deer hunter population.

Comment 19: The DNR states that the grouse hunt as proposed (walk-in hunts only, during and following the firearms deer season), would also draw limited interest and participation by prospective hunters. The DNR thus encourages consideration of opening portions of the Refuge to grouse hunting at other times as well. Disturbance to migratory waterfowl could be minimized by limiting the area open to grouse hunting to un-utilized areas prior to freeze-up. Moreover, hunting should be authorized for Sharp-tailed Grouse as well as Ruffed Grouse, since this would have very little anticipated impact to Sharp-tail numbers on the Refuge.

Response: The response to Comment 18 would apply here. The refuge agrees to Sharp-tailed Grouse hunting at the same time as Ruffed Grouse hunting.

Comment 20: The DNR thinks the proposed youth waterfowl hunt at Farmes Pool is a logical and reasonable addition to the existing youth hunt on the state side of the pool (in Elm Lake WMA).

Response: Comment acknowledged.

Comment 21: The DNR states that an earlier draft of the plan included a youth firearms deer hunt and encourages the Refuge to consider offering youth hunting opportunities.

Response: Objective 3.1 of the Draft CCP, second strategy states: "….Contact and work with Minnesota DNR, schools, …to explore possible youth hunt for deer on the refuge". The refuge agrees with conducting a special youth deer hunt in conjunction with adjacent State lands under the current parameters of the hunt (one weekend in October) and we have changed the wording of the strategy. The area that will be open to the youth hunt on the refuge will need to be identified in the Step-down Hunting Plan. It will not include the entire area opened during the deer firearms season. If the State decides to extend the season for the youth deer hunt, the refuge will not participate beyond one weekend, as this could affect fall burning activities.

Comment 22: One commenter wanted to know if the Refuge would participate in future efforts of the State mandated flood reduction mitigation process that was addressed under current Habitat Management (page 52, last paragraph) since the past flood reduction mitigation team recommendation is not part of this CCP.

Response: The paragraph did not intend to infer that the Refuge would not participate in future planning efforts. That portion of the flood reduction plan that affected the Refuge is not being incorporated into this CCP, because the plan that was developed by the mitigation team is not moving forward at this time, nor does it appear that it will happen in the immediate future. The

Refuge would like to see further comprehensive, basin wide watershed planning that would reduce flooding and improve water quality and would be very willing to participate in these planning efforts. Wording has been added to the final CCP to make this intention clear.

Comment 23: One person questioned current coordination activities regarding compromises to accommodate flood waters during extreme flooding events. Who makes the decision and with what criteria?

Response: These decisions are made on a case by case basis using biological parameters regarding nesting cover conditions, time of year, anticipated inflows and length of inundation, downstream implications, and infrastructure integrity. This has been clarified in the Final CCP. Also, during the decision making process during flooding events daily communications and coordination occur with the MnDNR and Red Lake Watershed District.

Comment 24: One commenter suggested placing some emphasis on water quality improvements that can be gained by habitat work in wildlife corridors in the Refuge Management District and suggested that actions for water quality improvements can be justified by responsibilities under the Clean Water Act (1977) and Executive Order 11988 (1977).

Response: The suggestion is well taken and wording has been added to show this concern in Goal 2.13.

Comment 25: One agency and an individual commenter addressed issues on the importance of water quality issues in the Thief River downstream from the Refuge, since it is part of the water supply for the town of Thief River Falls. Both provided supporting documents from past studies and dredging activities in the Thief River Falls impoundment. Seasonal problems with hydrogen sulfide, high sediment loads, high organic material loads, high phosphorus and low oxygen are some of the concerns.

Response: The Refuge would like to participate in comprehensive, basin wide watershed planning that would reduce flooding and improve water quality. The Refuge participated in a cooperative sediment study in 1995-97 that showed the importance of the Refuge in reducing sediment loads by 66% (Total Suspended Sediment Loadings Red Lake, Thief, Mud and Moose Rivers. Houston Engineering, June 6, 2003). The Refuge also recognizes that some sediment and nutrient load is part of the natural process. Butler (Reservoir Renovation and Sedimentation Study for Thief River Falls, Phase II) states that the sedimentation rates reflect the normal geologic sediment yield in the Thief River Falls impoundment. Past studies indicate that bank erosion may be the most important factor in sediment and Phosphorus loads. The Thief River was dredged to become Ditch 83 in the early 1900's and has the same 1:1 side slopes that are characteristic of the Ditches that deliver water to the Refuge. The Refuge impoundments have the same process of sediment build up that is of concern with the Thief River Falls impoundment.

Evaluation of data cannot just focus on extreme events such as floods and drawdowns and must address inflows to the Refuge as well as outflows. Participation by the Refuge in watershed planning will be guided by biological parameters that guide Refuge management for waterfowl and other marsh birds. These include maintaining stable water levels during the nesting season, minimizing water elevation bounces from run off events during the nesting season, over winter water depths that maintain adequate numbers of prey fish to provide a food base for piscivorous birds without creating large populations of fish that compete for invertebrates with waterfowl and other invertebrate eating birds, over winter muskrat populations to maintain a population that contributes to providing nest sites and open water areas for waterfowl and other birds.

One area that may provide opportunity to coordinate activities for better water quality are water releases prior to nesting season on years without major spring runoff events. Water quality concerns are now reflected in Objective 2.7.

Comment 26: One agency suggested that a Refuge representative participate in the Marshall County water planning process to keep informed about water management and water quality issues.

Response: The Refuge has a staff person participating in Marshall County's 10-year revision of their watershed plan.