

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 Farnes 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.

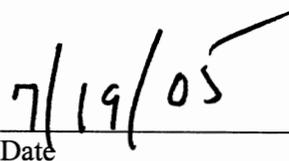
Additional Reasons:

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


Date

Agassiz

National Wildlife Refuge

Environmental Assessment

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

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

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Chapter 1: Purpose and Need

1.1 Background

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.” Though the Refuge was re-named Agassiz National Wildlife Refuge (NWR) in 1961, its fundamental purpose remained unchanged. Although its primary focus has been on waterfowl (ducks and geese), over the years, other water-dependent birds and other migratory birds such as neo-tropical migrants have received greater emphasis. “Other wildlife” – primarily moose, deer, and wolves have also been a high management priority.

As a result of the 1985 Food Security Act, Agassiz NWR assumed additional responsibilities for a seven-county management district, which includes Red Lake, Pennington, Marshall, Kittson, Roseau, and Lake of the Woods counties in their entirety, as well as a portion of Beltrami County and projects funded by other agency and private programs. In particular, Agassiz NWR staff is to 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 land enrolled in the Conservation Reserve Program (CRP).

We prepared this Environmental Assessment (EA) using guidelines established under the National Environmental Policy Act (NEPA) of 1969. NEPA requires us to examine the effects of proposed actions on the natural and human environment. In the following sections we describe three alternatives for future Refuge management, the environmental consequences of each alternative, and our preferred management direction. We designed each alternative as a reasonable mix of fish and wildlife habitat prescriptions and wildlife-dependent recreational opportunities, and then we selected our preferred alternative based on their environmental consequences and their ability to achieve Agassiz NWR’s purpose.

1.2 Purpose

The purpose of the proposed action is to specify a management direction for Agassiz NWR and its Refuge Management District (RMD) for the next 15 years. This management direction will be described in detail through a set of goals, objectives, and strategies in a Comprehensive Conservation Plan (CCP).

The action is needed because adequate, long-term management direction does not currently exist for the Refuge. Management is now guided by a dated Master Plan that was published in 1978 and by various general policies and short-term plans. Also, the action is needed to address current management issues and to satisfy the legislative mandates of the National Wildlife Refuge System Improvement Act of 1997, which requires the preparation of a CCP for all national wildlife refuges in the United States.

An additional purpose of the EA is to provide direction and consideration of the Refuge's fire management program, which is integral to the CCP.

1.3 Need for Action

The CCP ultimately derived from this EA will set the management direction for Agassiz NWR and the Refuge Management District for the next 15 years. The Refuge is currently guided by a Master Plan published in 1978 and the RMD has no long-term management plan. Management actions are now mostly guided by general policies and short-term plans like the Annual Marsh and Water Management Plan. This EA will present three management alternatives for the future of Agassiz NWR and its RMD. The preferred alternative will be selected based on its ability to meet identified goals. These goals may also be considered as the primary need for action. Goals for the Refuge and district were developed by the planning team and encompass all aspects of Refuge and district management including wildlife management, habitat management, and public use. Each of the three management alternatives described in this EA will be able to at least minimally achieve these goals.

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

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, aspen parkland, and northern coniferous forest, including habitat corridors for wildlife.

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

The critical needs for completing a Comprehensive Conservation Plan are:

- # To manage Agassiz NWR habitats for a high benefit for birds in migration.
- # To maintain hydrologic function of Refuge pools and control woody invasive species in favor of native grasses, sedges, and early successional habitats.
- # To provide a blueprint for quality wildlife-dependent recreation on the Refuge.

1.4 Decision Framework

The Regional Director for the Great Lakes-Big Rivers Region (Region 3 of the U.S Fish and Wildlife Service) will need to make two decisions based on this EA: (1) select an alternative and (2) determine if the selected alternative is a major Federal action significantly affecting the quality of the human environment, thus requiring preparation of an Environmental Impact Statement (EIS). The planning team has recommended Alternative C ("Open Landscapes / Natural Watercourses" Alternative) to the Regional Director. The Draft CCP was developed for implementation based on this recommendation.

1.5 Authority, Legal Compliance, and Compatibility

The National Wildlife Refuge System includes federal lands managed primarily to provide habitat for a diversity of fish, wildlife and plant species. National wildlife refuges are established under

many different authorities and funding sources for a variety of purposes. The purposes for the Agassiz NWR were established by a specific executive order of the president of the United States and are listed in the previous section.

Additional authority delegated by Congress, federal regulations, executive orders and several management plans guide the operation of the Refuge and RMD. The appendices of the CCP contain a list of the key laws, orders and regulations that provide a framework for the proposed action.

1.6 Scoping of the Issues

Agassiz NWR's CCP planning process began in early October 2002 with a kickoff meeting between Refuge staff, a regional planner from the USFWS Region 3 office, and a consultant assisting with preparation of the CCP. The group reviewed the Agassiz NWR vision statement and goals, existing baseline resource data, planning documents and other Refuge information. In addition, they identified a preliminary list of issues, concerns and opportunities facing the Refuge and RMD that would need to be addressed in the 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, MN newspaper. Approximately 30 people participated in an all-day focus group meeting, January 18, 2003, where they had the opportunity to discuss and explore in greater depth the various Refuge issues, goals, and opportunities in a congenial setting. Refuge staff sent invitations to a number of stakeholders in the area. Please see Chapter 2 of the CCP for more detail on the scoping of issues.

1.6.1 Issues and Concerns

A variety of issues, concerns, and opportunities were addressed during the planning process. Several recurring themes emerged from discussions among citizens, open house attendees, focus group participants, resource specialists, and Refuge planning staff. In general, these themes were related to habitat, water level, and wildlife management, public use and cultural resources. The issues raised during internal and public scoping included:

Habitat Management:

- # Loss of sedge meadow to cattail marsh
- # Drawdown frequency to provide shorebird habitat
- # Prairie restoration on old croplands
- # Invasive plant species (weed control)
- # Croplands (food plots)
- # Possible changes 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)
- # Research opportunities in this natural outdoor laboratory

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
- # Wildlife diseases
- # Wildlife research and monitoring

Visitor Services / Wildlife-Dependent Recreation:

- # Deer hunting (e.g., archery, muzzleloader, youth)
- # Upland game hunting
- # 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/snowshoeing, canoeing)
- # Road network, auto tour route, parking
- # Visitor Center
- # Visitor access (increase, current level adequate, no access)
- # Other facilities
- # Appearance (well groomed mowed lawns 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

Further discussion of these issues and concerns can be found in Chapter 2 of the CCP and Chapter 2 of this EA.

Chapter 2: Description of the Alternatives

2.1 Formulation of Alternatives

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

The three management alternatives were developed to address most of the issues, concerns, and opportunities identified during the CCP planning process. Specific impacts of implementing each alternative will be examined in five broad issue categories:

Habitat Management: What is an appropriate mix of habitats – upland, wetland, open water, mudflats, marsh, forest, brush, grassland, cropland, etc. – within this ecological transition zone in the 21st century, and what level of habitat restoration and maintenance is feasible given the constraints of funding and ecological succession?

Water Management: How can the Refuge best manage impoundment water levels and their timing, including drawdown, full pool, and flood management, to accommodate multiple and competing objectives and constraints with regard to habitats, nesting, migration, resting, and feeding, and flood control? How should drainage ditches be maintained?

Wildlife Management: Should the Refuge conduct nuisance wildlife control, and are appropriate resources allocated to non-game species? What is the effect of desired habitat conditions on wildlife populations?

Visitor Services: Should additional wildlife-dependent recreation opportunities be made available or are the existing opportunities for wildlife observation and photography, hunting, environmental education and interpretation adequate?

Cultural Resources: What bearing do tribal rights have on the Refuge and how can the Refuge document, preserve, and interpret the historical legacy of Native Americans, the Mud Lakers, and the structures they left behind? How should the potential for undiscovered historic and pre-historic resources and the means of ensuring their preservation on the Refuge be addressed?

2.1.1 Alternative A: Current Direction (No Action)

Agassiz NWR's No Action Alternative manages water impoundments to provide a variety of water conditions for waterbirds (e.g., ducks, geese, shorebirds, and wading birds) during spring, summer,

and fall. Furbearers are managed through a trapping program. 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 also managed for wildlife viewing and a quality hunt program, though their numbers are currently too low to permit hunting on the Refuge.

Under current management direction, wetland and upland succession is deliberately set back on a rotational basis Refuge-wide. Uplands currently include a mix of aspen forest, oak savannas, croplands, open grasslands, and shrub/scrub habitats. Existing cropland acreage is maintained at 170 acres of cultivated cropland and 60 acres of former cropland restored to native prairie. Because of the unpredictability and low incidence of naturally-ignited wildland fires in the fragmented landscape, prescribed fire is used to control succession. While there is minimal management of Agassiz NWR's designated Wilderness Area, both prescribed and wildland fire use are permitted there and do occasionally occur. Invasive plant species are controlled using a variety of chemical, mechanical and biological methods. Off-Refuge habitat activities include Farm Service Agency (FSA) easements, Partners for Fish and Wildlife projects, participation on inter-agency teams, and other partnership efforts.

Visitor services under the No Action Alternative are provided by a variety of on-Refuge environmental education, seasonal auto-tour routes, annual open houses, foot trails, visitor contact station, and observation platforms. The hunting program consists of a firearms deer season and moose season when appropriate. The Refuge's shallow and/or seasonal water bodies do not lend themselves to fishing. Off-Refuge outreach by Refuge staff includes school talks, radio programs, informational kits, displays at fairs, entering floats in parades, etc. Five of the six wildlife-dependent recreation uses allowed on the National Wildlife Refuge System are encouraged and take place at Agassiz NWR. Only sport fishing does not occur, primarily because no water bodies are deep enough to support viable sport fish populations. Also, waterfowl and marsh bird management of pools includes periodic drawdowns and low water levels which are not conducive to sport fish survival.

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

2.1.2 Alternative B: Minimal Upland Habitat Management

Under the Minimal Upland Habitat Management 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.

Under this alternative, natural succession unfolds on upland sites with minimal interference or intervention. Prescribed fire is utilized less frequently than under the Current Direction Alternative, and focuses more on wetland succession and hazard fuel reduction. Cropland acreage is gradually phased out and allowed to revert to grasslands, shrub/scrub, or woodlands. No management actions are undertaken in Agassiz NWR's designated Wilderness Area (except wildland fire). The Refuge dike road that now bisects the Wilderness Area may be removed in part or entirely to restore the natural hydrology of the area if a current study indicates the need to. Natural uplands include a high proportion of aspen forest, willow shrub/scrub and a small amount of mixed grass fields. Refuge management designates old-growth aspen areas. Invasive plant species are controlled using chemical, mechanical and biological methods, with an emphasis on biological controls. Off-Refuge habitat activities increase under this alternative – especially in riparian areas

district-wide – and include FSA easements, Partners for Fish and Wildlife projects, CREP initiatives, participation on inter-agency teams, and other partnership efforts.

As in the No Action Alternative, visitor services are provided through 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, un-groomed x-country/snowshoe/walking trail. The hunting program includes firearms deer and moose seasons, as under current direction. New hunting opportunities are provided. During and after the deer/firearms season, archery/deer and muzzleloader/deer hunting will be permitted in the same areas open to deer/firearms. This will be primarily a walk-in hunt as Refuge roads will not be plowed following the deer/firearms season. Strategic parking lots will be opened. This alternative actively explores possible new hunting opportunities – such as walk-in only hunts on the east side of the Refuge – for waterfowl and upland game; however, conflicts with fall burning and hunter safety are issues. The Refuge’s shallow and/or seasonal water bodies do not lend themselves to fishing, so as under the Current Direction Alternative, there is no fishing. 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.

The three main differences between the No Action Alternative and the Minimal Upland Habitat Management Alternative are that under the latter, 1) natural succession on upland habitats is allowed to proceed with a minimum of intervention by humans, 2) winter wildlife observation opportunities will increase, and 3) deer hunting opportunities and other hunting opportunities may be expanded.

2.1.3 Alternative C: Open Landscape / Natural Watercourses (Preferred Alternative)

Under the Open Landscape / Natural Watercourses 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 (Figure 5 on p. 88 of the CCP) focuses on setting back upland succession in the southeast corner of the Refuge (see Figure 6 on p. 89 of the CCP, Southeast Management Area) and experimenting with restoring sinuosity on two interior watercourses (see Figure 7 on p. 90 of the CCP, Kelly/Upper Mud and Webster Pool Management Areas) by lowering water levels in three pools. While there is minimal management of Agassiz NWR’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.

Visitor services under the Open Landscape / Natural Watercourses Alternative are provided 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, un-groomed x-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 Grouse hunting will be permitted in the same areas open to deer/firearms. Following the deer/firearms season there will be strategic parking lots 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 Farmed 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.

The three main differences between the No Action Alternative 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.

2.1.4 Alternative(s) Considered But Not Developed

2.1.4.1 Pre-settlement Conditions

The CCP planning team also considered the alternative of returning the Refuge to its original, pre-settlement condition. Attempting to restore Agassiz NWR’s pre-settlement condition would mean restoring it to the state it was in prior to large-scale settlement and draining by Euro-American homesteaders beginning in the 1880’s and 1890’s and continuing into the early 20th century. At that time, according to historical accounts, the lands that now comprise the Refuge were covered by swampy thickets, oak and aspen woodlands, and Mud Lake. To implement this alternative and meet its goals, all impoundments and dikes would have to be removed and ditches filled in.

The planning team dismissed this alternative on the grounds that it would be contrary to the established purposes of Agassiz NWR “...as a refuge and breeding ground for migratory birds and other wildlife” (Executive Order 7583, dated March 23, 1937) and “... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” (16 U.S.C. 715d, Migratory Bird Conservation Act). While reverting to pre-settlement conditions would undoubtedly benefit some wildlife, probably those species that favor forest and shrub/scrub, it would not allow the Refuge to meet its primary obligation to serve as a breeding ground for migratory birds. Moreover, this alternative would be very costly, at least at first, and would severely disrupt long-established drainage and flood control management institutions and infrastructure in northwestern Minnesota.

Table 1: Comparison of Objectives by Management Alternative

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
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.		
<i>Objective 1.1 – Breeding Ducks:</i> Maintain an annual average of 7,000 breeding pairs of ducks over a five year period by providing optimal breeding habitats via the Habitat and Marsh & Water Management Plans.	Same as Alternative A.	Same as Alternative A.
Strategies:	Strategies:	Strategies:
Employ same strategies as Alternative B except #8.	1. Conduct breeding bird pair surveys every spring to monitor number of breeding pair of dabbling and diving ducks and monitor success in reaching objective.	Employ same strategies as Alternative B except #8.
	2. By means of Annual Marsh and 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.	
	3. Maintain water control structures and dikes in good operating condition so that they can be relied upon to manipulate water levels according to plan.	
	4. Utilize prescribed fire, herbicides and drawdowns to maintain and improve marsh and adjacent upland shrub and grassland habitat for nesting waterfowl.	

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
	5. To encourage brood rearing of dabblers, seek to create emergent cover with numerous scattered openings that contain dense food-producing submergents.	
	6. To encourage brood rearing of divers, seek to create large open aquatic bed habitat that allow for escape from predators by diving and promote an abundant invertebrate food source.	
	7. For molting birds, promote medium-density cover that has a dense canopy but allows for unrestricted movement for feeding and escape from predators.	
	8. Hunting: In the event that a waterfowl hunt may be initiated, monitor effects of harvest on locally raised birds.	
	9. Develop step-down Habitat Management Plan by 2006.	
<i>Objective 1.2 – Duck Production:</i> Based on a 5-year average, maintain annual brood production above the long term average of over 13,000 ducklings.	<i>Objective 1.2 – Duck Production:</i> Same as Alternative A.	<i>Objective 1.2 – Duck Production:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. 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.	Employ same strategies as Alternative A.	Strategies Employ same strategies as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
2. Manage impoundments to provide a variety of breeding habitats in close proximity to each other.		
<i>Objective 1.3 – Duck Production on the Refuge Management District:</i> 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 RMD based on the four square mile survey analysis.	<i>Objective 1.3 – Duck Production on the Refuge Management District:</i> Same as Alternative A.	<i>Objective 1.3 – Duck Production on the Refuge Management District:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. Fill the Refuge Operations Specialist GS-485-9 RMD position at Agassiz National Wildlife Refuge to meet the potential for management and cooperative agreements on private lands in the RMD.	Employ same strategies as Alternative A.	Employ same strategies as Alternative A.
2. 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.		

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
3. 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.		
<i>Objective 1.4 – Nesting Franklin’s Gulls:</i> Maintain an annual average of 20,000 nesting Franklin’s Gull pairs over a five year period by providing ideal nesting conditions in Agassiz Pool.	<i>Objective 1.4 – Nesting Franklin’s Gulls:</i> Same as Alternative A.	<i>Objective 1.4 – Nesting Franklin’s Gulls:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. Conduct breeding gull surveys annually with aerial photography and mapping acreage on the water to determine density.	Employ same strategies as Alternative A.	Employ same strategies as Alternative A.
2. Manipulate water levels to maintain bulrush and low-density cattail for nesting habitat.		
3. Coordinate 10 to 15 year interval drawdown schedule of Agassiz Pool with Thief Lake WMA (MN), Sand Lake NWR (SD), and Lake Alice NWR (ND), to ensure some nesting habitat is available regionally.		
<i>Objective 1.5 – Marsh and Grassland Bird Monitoring:</i> Annually, determine population trends and relative abundance of inconspicuous marsh birds and birds occupying grassland and oak savanna habitats.	<i>Objective 1.5 – Marsh and Grassland Bird Monitoring:</i> Same as Alternative A.	<i>Objective 1.5 – Marsh and Grassland Bird Monitoring:</i> Same as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
Strategies:	Strategies:	Strategies:
1. Annually conduct the secretive marsh bird survey three times during the breeding season at the established survey points.	Employ same strategies as Alternative A.	Employ same strategies as Alternative A.
2. Increase the frequency of conducting point counts on grassland, sedge meadow and wetland birds to at least bi-annually.		
3. Submit data to the respective national coordinators/data bases and make changes to protocol as determined by the national evaluation.		
4. Analyze Refuge data to determine breeding bird response to management practices.		
<i>Objective 1.6 – Gray Wolves:</i> Maintain two gray wolf packs on the Refuge based on howling surveys.	<i>Objective 1.6 – Gray Wolves:</i> Same as Alternative A.	<i>Objective 1.6 – Gray Wolves:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. Manage for a Refuge deer herd at a density of 15-20 per square mile.	Employ same strategies as Alternative A.	Employ same strategies as Alternative A.
2. Continue to conduct howling surveys every five years.		
3. Manage water levels in a manner consistent with maintaining beaver and muskrat populations.		
4. Regulate trapping to maintain beaver and muskrat populations for wolf prey base.		

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
5. Maintain a mix of wetland, brush, forest, and grassland habitats that is conducive to healthy deer populations.		
<i>Objective 1.7 – Deer Population:</i> 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.	<i>Objective 1.7 – Deer Population:</i> Same as Alternative A.	<i>Objective 1.7 – Deer Population:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. 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 Agassiz NWR deer herd at a level commensurate with the population density objective.	Employ same strategies as Alternative A.	Employ same strategies as Alternative A.
2. Monitor the size and population density of the deer herd through an aerial census every winter.		
3. 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.		
4. Evaluate health of individual animals and herd using standard techniques, as needed, and by cooperating with the MNDNR.		

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
5. Utilize mowing and prescribed burning techniques to create and maintain browse and cover.		
6. Prepare step-down management Refuge Hunting Plan to guide hunt decisions.		
<i>Objective 1.8 – Moose Population:</i> 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.	<i>Objective 1.8 – Moose Population:</i> Same as Alternative A.	<i>Objective 1.8 – Moose Population:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. Continue to monitor moose numbers by means of annual mid-winter aerial surveys using both the quadrat and transect survey techniques.	Employ same strategies as Alternative A.	Employ same strategies as Alternative A.
2. Re-open moose hunting season when recovery of the moose herd exceeds the minimum objective of 200 individuals.		
3. Utilize winter mowing and prescribed fire to maintain shrub/scrub habitats.		
4. Prepare step-down management Refuge Hunting Plan to guide hunt decisions.		
<i>Objective 1.9 – Outdoor Laboratory:</i> Continue serving as an outdoor laboratory for natural resource research.	<i>Objective 1.9 – Outdoor Laboratory:</i> Same as Alternative A.	<i>Objective 1.9 – Outdoor Laboratory:</i> Same as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
Strategies:	Strategies:	Strategies:
1. Promote strong relationships with universities and USGS to conduct sound scientific investigations to answer natural resource questions.	Employ same strategies as Alternative A.	Employ same strategies as Alternative A.
2. Maintain bunk house availability for research technicians and volunteers working on projects.		
3. 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.		
4. Seek partners and funding for research projects.		

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
<p>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.</p>		
<p>Objective 2.1 – Lowland Shrub and Grasslands</p>		
<p><i>Objective 2.1 – Lowland Shrub and Grasslands:</i> Maintain 1,650 acres (2.7% of the Refuge) in grasslands to benefit species like the Bobolink, Sharp-tailed Grouse, Marbled Godwit, Western Meadowlark, and nesting dabbling ducks. Maintain 11,640 acres (18.9% of the Refuge) in lowland shrub (alder, willow, dogwood) to benefit species like the moose, white-tailed deer (wolf), Le-Conte’s Sparrow and Black-billed Cuckoo.</p>	<p><i>Objective 2.1 – Lowland Shrub and Grasslands:</i> Increase lowland shrub (alder, willow, dogwood) by 1,130 acres to benefit species like the moose, white-tailed deer (wolf), and Black-billed Cuckoo.</p>	<p><i>Objective 2.1 – Lowland Shrub and Grasslands:</i> 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.</p>
<p>Strategies:</p>	<p>Strategies:</p>	<p>Strategies:</p>
<p>1. Use prescribed fires, mowing, discing, or various combinations of these treatments to maintain grasslands.</p>	<p>1. Reduce use of prescribed fires, mowing, discing and other treatments to promote conversion to lowland shrub.</p>	<p>1. Use prescribed fires, mowing, discing, or various combinations of these treatments to prepare a given site for conversion to grassland.</p>
<p>2. Judicious use of herbicides may be necessary to help in the maintenance of grasslands.</p>	<p>2. 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.</p>	<p>2. Use seed mixes from sources of prairie grasses, forbs, and herbs within 50 miles of the Refuge to reseed these sites.</p>
<p>3. Use geo-referenced aerial photography and GIS spatial analyses to monitor long-term trends in these habitat types and measure pursuit of the objective for grasslands.</p>		<p>3. Judicious use of herbicides may be necessary to help in the establishment of a grassland.</p>

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
		4. 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.
<i>Objective 2.2 – Aspen and Mixed Hardwood, Grasslands and Lowland Shrub: Maintain 7,375 acres (12.0% of the Refuge) in aspen and mixed hardwood forest to benefit species like the white-tailed deer, Bufflehead, and deciduous forest warblers.</i>	<i>Objective 2.2 – Aspen and Mixed Hardwood, Grasslands and Lowland Shrub: Increase aspen and mixed hardwood forest by 970 acres over the next 10-15 years to benefit species like the white-tailed deer, Bufflehead, and deciduous forest warblers.</i>	<i>Objective 2.2 – Aspen and Mixed Hardwood, Grasslands and Lowland Shrub: Attain an increase in grasslands and shrublands by a net decrease of aspen and mixed hardwood forest within the Focus 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.</i>
Strategies:	Strategies:	Strategies:
1. Maintain harvested areas through mowing and prescribed burning.	1. Utilize prescribed fire less frequently than under Alternatives A and C and focus it more on wetland succession and hazard fuel reduction.	1. Commercially harvest 647 acres of aspen/mixed hardwood forest within the management area within five years.
2. Continue utilizing 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.	2. Gradually phase out cropland acreage, allowing it to revert to woodlands and other habitats.	2. Maintain harvested areas through mowing and prescribed burning.
3. Expand the use of girdling to kill trees in stands planned for conversion to grassland. Encourage the public to collect firewood in these sites.	3. Curtail use of girdling to kill aspens.	3. Continue utilizing 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.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
4. Coordinate with the MNDNR to manage the appropriate composition of brush and grasslands on adjoining WMAs.	4. Coordinate with the MNDNR on habitat management at Agassiz NWR and adjoining WMAs.	4. Expand the use of girdling to kill trees in stands planned for conversion to grassland. Encourage the public to collect firewood in these sites.
		5. Coordinate with the MNDNR to manage the appropriate composition of brush and grasslands on adjoining WMAs.
<i>Objective 2.3 – Open Water / Mudflats:</i> Maintain 8,890 acres (14.5% of the Refuge) in open water / mudflats habitat to benefit wildlife like migratory waterfowl, White Pelican, and shorebirds.	<i>Objective 2.3 – Open Water / Mudflats:</i> Same as Alternative A.	<i>Objective 2.3 – Open Water / Mudflats:</i> 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.
Strategies:	Strategies:	Strategies:
1. Continue with current water level management practices and drawdown schedules.	Employ same strategies as Alternative A.	1. Place Webster Creek, Kelly, and Upper Mud River Pools in drawdown to create conditions appropriate for sedge growth.
		2. 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.
		3. Monitor for invasion by reed canary grass and Phragmites.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
		4. Stay abreast of research developments, experimental efforts, and pilot projects elsewhere in the state with regard to restoration of sedge meadow habitat.
		5. Evaluate results after five 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.
<i>Objective 2.4 – Sedge Meadow:</i> Maintain 5,365 acres (8.7% of the Refuge) in sedge meadow to benefit species like the Yellow Rail, Sedge Wren, Nelson’s Sharp-tailed Sparrow and LeConte’s Sparrow.	<i>Objective 2.4 – Sedge Meadow:</i> Decrease sedge meadow by 1073 acres, by permitting succession and reversion to lowland shrub to benefit species like the moose, white-tailed deer, and Black-billed Cuckoo.	<i>Objective 2.4 – Sedge Meadow:</i> 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.
Strategies:	Strategies:	Strategies:
1. Conduct spring drawdowns followed by mid-summer burning and mowing in various pools for willow and cattail control.	1. Monitor for invasion of reed canary grass and Phragmites.	1. Conduct spring drawdowns followed by mid-summer burning and mowing in various pools for willow and cattail control.
2. Monitor for invasion of reed canary grass and Phragmites.	2. Monitor annual progress in reducing sedge habitat by visual inspection, aerial overflights and GPS mapping. Use digitized geo-referenced aerial photography and GIS spatial analyses to track long-term trends.	2. Monitor for invasion of reed canary grass and Phragmites.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
		<p>3. In Webster Creek and Mud River Natural Watercourse Management Areas, evaluate success after five 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.</p>
<p><i>Objective 2.5 – Cattail and Phragmites Infestation:</i> Maintain 21,050 acres (34.2% of the Refuge) in cattail / mixed emergent vegetation to benefit species like Franklin’s Gull, diving ducks, and bitterns.</p>	<p><i>Objective 2.5 – Cattail and Phragmites Infestation:</i> Same as Alternative A.</p>	<p><i>Objective 2.5 – Cattail and Phragmites Infestation:</i> Experiment with decreasing cattail and Phragmites 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.</p>
<p>Strategies:</p>	<p>Strategies:</p>	<p>Strategies:</p>
<p>Employ same strategies as Alternative C.</p>	<p>Employ same strategies as Alternative C.</p>	<p>1. 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); or extended dry periods for each pool; or multiple burns over a short time period might improve success.</p>
		<p>2. Experiment with multiple year pool drawdowns that would allow sedges to become better established and expand.</p>
		<p>3. Experiment with back-to-back multiple burns of cattail-dominated areas.</p>

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
		4. Stay abreast of research developments, and experimental efforts on cattail management.
		5. Explore cooperative research and restoration opportunities with the University of Minnesota, MNDNR, and other institutions.
		6. 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.
<i>Objective 2.6 – Hardstem Bulrush Emergent Habitat:</i> Maintain 770 acres (1.3% 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.	<i>Objective 2.6 – Hardstem Bulrush Emergent Habitat:</i> Same as Alternative A.	<i>Objective 2.6 – Hardstem Bulrush Emergent Habitat:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. Raise water levels to depths that will flood out cattails and favor bulrush emergent habitat.	Same as Alternative A.	Same as Alternative A.
2. Use drawdowns where indicated to maintain or re-establish bulrush where open water or mudflats occur.	Same as Alternative A.	Same as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
3. 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.	Same as Alternative A.	Same as Alternative A.
4. Monitor bird-nesting activities.	Same as Alternative A.	Same as Alternative A.
<i>Objective 2.7 – Managing Water Impoundments:</i> Manage water impoundments as a complex of basins to provide wetland diversity 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.	<i>Objective 2.7 – Managing Water Impoundments:</i> Same as Alternative A.	<i>Objective 2.7 – Managing Water Impoundments:</i> Same as Alternative A.
Strategies:		
1. 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.	Same as Alternative A.	Same as Alternative A.
2. 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.	Same as Alternative A.	Same as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
3. 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.	Same as Alternative A.	3. If the natural watercourse objective is not successful in establishing sedge meadow habitat in the 3 impoundments, they will be added to this strategy (total 1300 acres).
4. 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.	Same as Alternative A.	Same as Alternative A.
5. Lower water levels 6 to 12 inches in some impoundments during the fall to provide shallow foraging sites for migrating waterfowl.	Same as Alternative A.	Same as Alternative A.
6. 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.	Same as Alternative A.	Same as Alternative A.
<i>Objective 2.8 – Bur Oak / Savanna Habitat:</i> Restore 150 acres (0.2% of the Refuge) in the bur oak / savanna habitat to benefit species like the Whip-poor-will, black bear, and Northern Flicker.	<i>Objective 2.8 – Bur Oak / Savanna Habitat:</i> Decrease bur oak / savanna habitat (converting to aspen & mixed hardwood) by 90 acres. Whip-poor-will, black bear & N. Flicker will lose habitat while white-tailed deer, Bald Eagle, Bufflehead & Golden-winged Warbler will gain.	<i>Objective 2.8 – Bur Oak / Savanna Habitat:</i> 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.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
Strategies:	Strategies:	Strategies:
Employ same strategy as Alternative C.	1. Cease active intervention in ecological succession process in woodlands, which would allow bur oak / savanna habitat to succeed naturally to aspen & mixed hardwood.	1. Utilize techniques previously described to eliminate aspens, especially selective girdling and later removal by firewood harvesters.
<i>Objective 2.9 – Mature Aspen Stands: Provide mature aspen stands for Bald Eagle, Hooded Merganser and Bufflehead nesting activity.</i>	<i>Objective 2.9 – Mature Aspen Stands: Same as Alternative A.</i>	<i>Objective 2.9 – Mature Aspen Stands: Same as Alternative A.</i>
1. Develop a forest inventory through GIS and ground-truthing that identifies existing old growth aspen.	Same as Alternative A.	Same as Alternative A.
2. Identify areas that will be managed as old growth aspen.	Same as Alternative A.	Same as Alternative A.
3. Conduct prescribed burns in these areas under conditions that will not kill old growth aspen.	Same as Alternative A.	Same as Alternative A.
4. Consult experts in aspen management to develop schedule of management practices that will ensure mature aspen will be available as old growth areas demise.	Same as Alternative A.	Same as Alternative A.
5. Develop a Step-down Forest Management Plan	Same as Alternative A.	Same as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
<i>Objective 2.10 – Cropland:</i> Maintain 170 acres (0.4% of the Refuge) in cropland to benefit species like the Sandhill Crane, black bear, Mallard, and Canada Goose.	<i>Objective 2.10 – Cropland:</i> Phase out all cropland, by converting to grassland initially, and as a result of management much will eventually convert to shrub, and aspen, to benefit a variety of species that depend on successional habitats.	<i>Objective 2.10 – Cropland:</i> 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.
Strategies:	Strategies:	Strategies:
1. Fields are prepared for seeding and planting through a combination of discing and herbicides. It may be necessary for repeated treatments.	Same as Alternative A, however prairie grass would be the crop planted.	Same as Alternative B.
2. Conduct annual monitoring to ensure that weedy species and non-native plants do not become problematic. Use mowing to make crop available to migrating birds.	Same as Alternative A, however prairie grass would be the crop planted.	Same as Alternative B.
3. Use GIS spatial analyses every 5-10 years to keep track of long-term changes.	Same as Alternative A.	Same as Alternative B.
<i>Objective 2.11 – Coniferous Bog:</i> Maintain 2,380 acres (3.9% of the Refuge) in coniferous bog for the benefit of such species as the Olive-sided Flycatcher, Connecticut Warbler, orchids and ferns.	<i>Objective 2.11 – Coniferous Bog:</i> Same as Alternative A.	<i>Objective 2.11 – Coniferous Bog:</i> Same as Alternative A.
1. 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.	Same as Alternative A.	Same as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
2. 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.	Same as Alternative A.	Same as Alternative A.
3. Complete a plant inventory and determine fire history in black spruce/tamarack bog habitat by 2006.	Same as Alternative A.	Same as Alternative A.
<i>Objective 2.12 – Conservation Easements:</i> 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.	<i>Objective 2.12 – Conservation Easements:</i> Same as Alternative A.	<i>Objective 2.12 – Conservation Easements:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
Employ same strategies as Alternative C except for strategies 1, 3 and 5.	Same as Alternative C.	1. Fill the Refuge Operations Specialist GS-485-9 RMD position at Agassiz NWR National Wildlife Refuge to meet the potential for management and cooperative agreements on private lands in the RMD.
	Same as Alternative C.	2. Restore hydrology and naturally occurring habitat that can reasonably be maintained.
	Same as Alternative C.	3. 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.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
	Same as Alternative C.	4. 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.
	Same as Alternative C.	5. 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.
<i>Objective 2.13 – Off-Refuge Corridor Habitat:</i> 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.	<i>Objective 2.13 – Off-Refuge Corridor Habitat:</i> Same as Alternative A.	<i>Objective 2.13 – Off-Refuge Corridor Habitat:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
Employ same strategies Alternative C except for strategy 7.	Same as Alternative C.	1. Consult with partners and cooperating agencies like MNDNR, the Tribes, NRCS, Ducks Unlimited, Minnesota Waterfowler Association, Legislative Council on Minnesota Resources (LCMR), and The Nature Conservancy to find the best opportunities for developing wildlife corridors on private lands in the RMD.
	Same as Alternative C.	2. Consult with watershed districts on watershed projects.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
	Same as Alternative C.	3. Utilize existing state and federal programs like CRP enrollment and LCMR corridor program to find and link together potential corridor lands.
	Same as Alternative C.	4. Take advantage of remote sensing, aerial photography, GIS, and gap analysis to explore landscape within RMD for the most feasible, productive corridor opportunities.
	Same as Alternative C.	5. Work with willing sellers interested in federal easements/ownership within designated corridors, large grassland blocks or flood prone areas adjacent to the Refuge.
	Same as Alternative C.	6. 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.
	Same as Alternative C.	7. Increase 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.		
<i>Objective 3.1 – Deer Hunt:</i> Provide annual firearms deer hunt that meets definition of “quality” in FWS manual and designed to maintain deer population density at 15-20 deer/square mile.	<i>Objective 3.1 – Deer Hunt:</i> Same as Alternative A.	<i>Objective 3.1 – Deer Hunt:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. Cooperate with MNDNR to carry out the annual fall firearms deer hunt.	Same as Alternative A.	Same as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
2. Contact and work with MNDNR, schools, hunt clubs, 4-H, Boy and Girl Scouts, NRA, and/or other groups to explore possible youth hunt for deer on the Refuge.	Same as Alternative A.	Same as Alternative A.
3. Use the annual deer population estimates from the mid-winter census to decide whether to conduct antlered or antlerless hunts the following autumn.	Same as Alternative A.	Same as Alternative A.
4. Conduct informal survey /interact with hunters and listen to feedback on ways to improve hunt.	Same as Alternative A.	Same as Alternative A.
5. By 2006, update the step-down management plan – the Agassiz National Wildlife Refuge Hunting Plan – that outlines procedures and provide broad guidance for managing future hunts.	Same as Alternative A.	Same as Alternative A.
<i>Objective 3.2 – Accessible Hunting Program:</i> Provide one accessible hunting platform for disabled hunter use.	<i>Objective 3.2 – Accessible Hunting Program:</i> Determine need for and develop accessible hunting program for disabled hunters, if warranted.	<i>Objective 3.2 – Accessible Hunting Program:</i> Determine need for and develop accessible hunting program for disabled hunters, by conducting surveys and feasibility study by 2010.
Strategies:	Strategies:	Strategies:
1. Assess the best location for an accessible hunting platform by consulting with disabled hunters.	Same as Alternative C.	1. Conduct a study on the demand for an accessible hunting program, the feasibility of carrying it out on the Refuge, and the best location(s) for doing so.
	Same as Alternative C.	2. Conduct pilot hunt if study points towards its feasibility.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
	Same as Alternative C.	3. If accessible hunt is recommended incorporate in the step-down hunt plan.
<i>Objective 3.3 – Moose Hunting:</i> Provide moose hunting opportunities when the population recovers to above 200 moose.	<i>Objective 3.3 – Moose Hunting:</i> Same as Alternative A.	<i>Objective 3.3 – Moose Hunting:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. Continue to monitor the Refuge moose population annually and work closely with MNDNR 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.	Same as Alternative A.	Same as Alternative A.
2. Cooperate with MNDNR on eventual reopening of moose hunt on Refuge and/or adjacent WMAs.	Same as Alternative A.	Same as Alternative A.
<i>Objective 3.4 – Archery and Muzzle-loader Deer and Ruffed Grouse Hunts:</i> No archery and muzzle-loader deer and Ruffed Grouse hunts would be offered on the Refuge.	<i>Objective 3.4 – Archery and Muzzle-loader Deer and Ruffed Grouse Hunts:</i> Same as Alternative C.	<i>Objective 3.4 – Archery and Muzzle-loader Deer and Ruffed Grouse Hunts:</i> 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 strategic parking lots. Open area will be the same as for the deer firearms season.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
Strategies:	Strategies:	Strategies:
No strategies are necessary for Alternative A under this objective.	Same as Alternative C.	1. 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.
	Same as Alternative C.	2. Work with partners like MNDNR and local hunt clubs to experiment with archery and muzzle-loader hunts on the Refuge.
	Same as Alternative C.	3. Modify hunting brochures to incorporate changes.
	Same as Alternative C.	4. Increase budget to ensure Refuge law enforcement presence.
<i>Objective 3.5 – Other Hunts:</i> No other hunts would be provided.	<i>Objective 3.5 – Other Hunts:</i> Explore providing walk-in hunting opportunities for bear (no baiting), waterfowl and small game on a portion of the east side of the Refuge following state seasons and regulations. Future hunt plan would identify zones, season length, and explore conflicts with hunter safety and prescribed burning during the fall and law enforcement.	<i>Objective 3.5 – Other Hunts:</i> Provide a trial quality youth waterfowl hunt on Farnes Pool in compliance with state youth season and regulations. Future hunt plan would identify access boundaries.
Strategies:	Strategies:	Strategies:
No strategies are necessary for Alternative A under this objective.	1. Explore possible access and boundaries of the specific areas that might be open to various kinds of hunting with MNDNR.	1. Explore possible access and boundaries of the specific area that might be open to youth waterfowl hunting with MNDNR.
	2. Increase funding to ensure Refuge law enforcement presence will be staffed.	2. Explore possibilities of conducting a youth hunt.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
		3. If portions of Farmes Pool is opened to youth waterfowl hunting, incorporate details in the step-down management plan to be developed for the Refuge on hunting.
		4. Increase funding to ensure Refuge law enforcement presence will be staffed.
<i>Objective 3.6 – Wildlife Observation/Photography:</i> Provide year-round opportunities for 25,000 visitors annually to observe and photograph wildlife and habitat.	<i>Objective 3.6 – Wildlife Observation/Photography:</i> Provide year-round opportunities for 25,000 visitors annually to observe and photograph wildlife and habitat. Designate a cross-country ski, snowshoe, and walking trail for winter observation of wildlife.	<i>Objective 3.6 – Wildlife Observation/Photography:</i> Provide year-round opportunities for 25,000 visitors annually to observe and photograph wildlife and habitat. Designate a cross-country ski, snowshoe, and walking trail for winter observation of wildlife.
Strategies:	Strategies:	Strategies:
1. Maintain the Parker Pool observation platform in a safe condition.	Same as Alternative C.	1. Improve the Parker Pool observation platform by providing for handicapped accessibility, benches, and interpretive panels.
2. Continue to allow for controlled access to the fire tower.	Same as Alternative C.	2. Continue to allow for controlled access to the fire tower.
3. Maintain Maakstad Trail and the trailhead and parking lot in their current condition.	Same as Alternative C.	3. Improve Maakstad Trail by expanding it, adding trail information (including information on cultural resources and history) and improving the trailhead and parking lot.
4. Maintain existing wildlife observation opportunities at Farmes Pool by allowing for seasonal foot traffic, a new trail, and a possible observation point or platform.	Same as Alternative C.	4. Expand opportunities at Farmes Pool by allowing for seasonal foot traffic, a new trail, and a possible observation point or platform.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
<i>Objective 3.7 – On-site Environmental Education:</i> Onsite, provide for annual visitation of 400 students, and 15-20 group visits.	<i>Objective 3.7 – On-site Environmental Education:</i> Same as Alternative A.	<i>Objective 3.7 – On-site Environmental Education:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. Continually welcome teachers to encourage their colleagues to bring their classes to the Refuge. Provide environmental education at appropriate levels described in the General Recreation Policy – Visitor Services Handbook.	Same as Alternative A.	Same as Alternative A.
2. Continue to work with the Northwest Service Cooperative to distribute educational materials and exhibits on wildlife.	Same as Alternative A.	Same as Alternative A.
3. Continue to conduct seminars for teachers.	Same as Alternative A.	Same as Alternative A.
4. If feasible, train volunteers to provide tours or lessons for classrooms.	Same as Alternative A.	Same as Alternative A.
5. 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.	Same as Alternative A.	Same as Alternative A.
6. Devise and encourage additional opportunities for research, wildlife surveys, or bird banding within the ability of high school science or biology classes.	Same as Alternative A.	Same as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
7. Improve facilities for extended field trips for college and high school level natural resource classes and research opportunities by improving bunkhouse by 2005.	Same as Alternative A.	Same as Alternative A.
8. Improve facilities for college and high school level natural resource classes and research opportunities by building an Environmental Education Lab by 2010.		
		9. Increase funding for seasonal Park Ranger devoted solely to these efforts.
<i>Objective 3.8 – Off-site Environmental Education:</i> 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.	<i>Objective 3.8 – Off-site Environmental Education:</i> Same as Alternative A.	<i>Objective 3.8 – Off-site Environmental Education:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
Same as Alternative C except for strategy 6.	Same as Alternative C.	1. Continue with each of the efforts described in chapter 4 of the CCP, including classroom visits, participation in county fairs and parades, radio and TV interviews.
	Same as Alternative C.	2. Train volunteers to give presentations on behalf of the Refuge to primary, middle, and high schools throughout the seven counties of the RMD.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
	Same as Alternative C.	3. Send out one letter annually to every elementary school teacher and all science, social studies, and history teachers in middle (junior high) and high schools notifying them of Refuge and opportunities for off-site environmental education.
	Same as Alternative C.	4. Send an annual newsletter, “The Wild Note”, to neighbors, county, watershed districts, media and schools.
	Same as Alternative C.	5. Improve the website by 2005.
	Same as Alternative C.	6. Increase funding for seasonal Park Ranger devoted solely to these efforts.
<i>Objective 3.9 – Interpretation:</i> Provide interpreted auto tour route, hiking trails, visitor contact center and kiosks for 25,000 visitors annually.	<i>Objective 3.9 – Interpretation:</i> Same as Alternative A.	<i>Objective 3.9 – Interpretation:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
Employ same strategies as Alternative C except for strategies 4, 13, and 14.	Same as Alternative C.	1. Update and upgrade Habitat Drive interpretive signing as outlined in the 2002 Visitor’s Service review and ensure facilities are ADA compliant by 2006.
	Same as Alternative C.	2. Continue the “Look and Listen” message throughout all stations on auto-drive and enhance by adding a “sound post” with digital recordings of common wildlife sounds, calls, songs, and their sources.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
	Same as Alternative C.	3. Add interpretive panels on the Parker Pool scenic overlook on County Rd. 7. Add benches to the platform to accommodate the “Look and Listen” message.
	Same as Alternative C.	4. Add interpretive panels to the fire observation tower cab and install video camera. Add “on-ground” accessible cab with interpretation.
	Same as Alternative C.	5. Develop a simple interpretive brochure according to USFWS standards for the fully accessible Headquarters Trail by 2005. Interpretive signs, audio and tactile components should be developed for this short trail.
	Same as Alternative C.	6. Develop several interpretive programs for the general public, starting from the visitor contact station. They should be both year-round and seasonal in nature. At least one cultural interpretation program should be offered.
	Same as Alternative C.	7. Explore opportunities to develop volunteer-led interpretive programs and volunteers to run the office on Sunday afternoons May through September.
	Same as Alternative C.	8. Interpret key resource issues.
	Same as Alternative C.	9. Develop a Refuge plant list with plants categorized in associated habitat types.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
	Same as Alternative C.	10. 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.
	Same as Alternative C.	11. Send an annual newsletter, “The Wild Note”, to neighbors, county, watershed districts, media and schools.
	Same as Alternative C.	12. Improve the website by 2005.
	Same as Alternative C.	13. Develop a Friends Group to assist in program development and implementation.
	Same as Alternative C.	14. Increase funding for seasonal Park Ranger devoted solely to these efforts and for improvements to facilities.
<i>Objective 3.10 – Archeological and Cultural Values:</i> Implement the measures and recommendations of the 2002 Cultural Resources Management Plan (CRMP).	<i>Objective 3.10 – Archeological and Cultural Values:</i> Same as Alternative A.	<i>Objective 3.10 – Archeological and Cultural Values:</i> Same as Alternative A.
Strategies:	Strategies:	Strategies:
1. 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.	Same as Alternative A.	Same as Alternative A.

Table 1: Comparison of Objectives by Management Alternative (Continued)

Alternative A – Current Direction (No Action)	Alternative B – Minimal Upland Habitat Management	Alternative C – Open Landscape / Natural Watercourses
2. Follow procedures outlined in CRMP for consultation with RHPO, SHPO, and potentially interested American Indian tribes.	Same as Alternative A.	Same as Alternative A.
3. Follow procedures detailed in CRMP for inadvertent discoveries of human remains.	Same as Alternative A.	Same as Alternative A.
4. Continue to document history of Mud Lakers via written and oral media.	Same as Alternative A.	Same as Alternative A.
5. Ensure archeological and cultural values are described, identified, and taken into consideration prior to implementing undertakings.	Same as Alternative A.	Same as Alternative A.
6. Complete accessioning, cataloging, inventorying, and preserving the museum collection at the Refuge.	Same as Alternative A.	Same as Alternative A.

Chapter 3: Affected Environment

3.1 Introduction

This chapter includes a summary description of the affected environment of the Refuge and RMD. More detail is contained in Chapter 3 of the CCP itself.

Located in northwestern Minnesota, Agassiz NWR lies in the aspen parkland transitional zone between the coniferous or boreal forest to the north and east and the tall grass prairie and prairie pothole provinces 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. The Refuge is a key breeding ground for 17 species of ducks, as well as an important migration rest stop for waterfowl, but it 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; and
- # 170 acres of cropland
- # 670 acres of developed land (roads, parking lots, etc.)

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.

Agassiz NWR is an integral part of a sizeable complex of lands managed for wildlife. The Minnesota Department of Natural Resources (MNDNR) has acquired and manages over 50,000 acres in three large and several smaller nearby Wildlife Management Areas (WMA's). MNDNR works closely with Refuge staff on issues of mutual concern, as does the Red Lake Band of the Chippewa Indians, which also has extensive wildland holdings in the extended area.

3.2 Climate, Geography, and Hydrology

Northern Minnesota has a continental climate, with long, cold winters and relatively short, hot summers. Annual mean precipitation at Agassiz NWR is 22 inches, which includes an average 39 inches of snowfall a year. Spring and summer thunderstorms that drop more than five inches of rainfall on a single day occur infrequently. The major threat of flooding at Agassiz NWR is the result of spring runoff from snowmelt following long, 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.

Agassiz NWR is located in the eastern valley of the Red River of the North 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. The layer of till and lake sediments at Agassiz NWR is estimated to exceed 200 feet in depth. Agassiz NWR's surface soils are typical of lakebed deposits, consisting of mostly peat or silty loams and clays. Peat occurs at depths of 1-2 feet but is thicker in some areas. Clayey glacial drifts with pockets and lenses of sand are found beneath the surface soils.

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 Agassiz NWR's surface soils impedes recharge of even its more permeable aquifers.

The Red Lake River watershed in which Agassiz NWR sits drains into the northward-flowing Red River of the North. Approximately 640 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. The Thief River drains Thief Lake, a large waterfowl marsh located four miles north of Agassiz NWR ; this lake, in turn, is fed by the Moose River. The Mud River Judicial Ditch 11 system drains from the east into the Refuge.

Flooding is one of the main issues affecting the Refuge – both its habitat and its facilities – as well as the neighboring region. Flooding also impacts relations between the Refuge and local property-owners and officials. Floods occur most often during March, April and May, when spring rains may combine with snowmelt to exceed channel capacity.

The Refuge includes 26 impoundments (known variously as lakes, or pools) and three small natural lakes. Whiskey and Kuriko Lakes are located in a designated Wilderness Area, and Webster Lake is in the northeast corner of the Refuge. The artificial impoundments vary from 160 acres to 9,350 acres in size. Water is maintained 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 NWR's impoundments with their marshes, mudflats, and open water are the dominant geographic features of the Refuge.

3.3 Natural Resources

3.3.1 Habitats

As noted above, 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 tall grass prairie and prairie pothole provinces to the west and south. It includes the major habitat types in acreages listed in the introduction to this chapter.

Wetlands and Open Water – This includes cattail/mixed emergent marsh, bulrush emergent, open water/mudflats, and sedge meadow. Wetlands and open water are crucial to many of the migratory birds found at Agassiz NWR , either during the nesting season or in transit during migration. Ducks, geese, shorebirds, wading and some 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 and depend on these habitats as well.

Lowland Shrub – This plant community is dominated by willows, speckled alder, and dogwoods. Among the species that commonly utilize lowland shrub habitat are the moose, white-tailed deer, Le-Conte's Sparrow, 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. Certain migratory birds and waterfowl also use this habitat for nesting and cover.

Woodland – Upland woodlands at Agassiz NWR consist primarily of aspen and mixed hardwood forest patches and bur oak savanna. They tend to be partially open forests with abundant undergrowth. Fire has always been integral to their maintenance. Included in the woodlands are 2,380 acres of coniferous bog. Refuge woodlands are utilized by many bird species in the summer, including the Ovenbird, Northern Saw-whet and Great-horned Owls, Red-tailed Hawk, Cooper's Hawk and Broad-winged Hawk, and various sparrows and warblers. Winter residents are much fewer but include Gray Jays, Crows, Ravens, Chickadees, Nuthatches, finches, Ruffed Grouse, Downy Woodpecker, Hairy Woodpecker, Black-backed Woodpecker and Pileated Woodpecker. A number of mammals also utilize woodlands, including shrews, bats, squirrels, voles, mice, red foxes, porcupines, raccoons, fishers, weasels, skunks, bobcats, moose, deer, and wolves.

Grassland – Prairie grasslands at Agassiz NWR are dominated by tall and medium-height grasses, but also contain forbs as well as several low shrub or sub-shrub species. 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. Grasslands provide feeding, foraging, or breeding habitat for numerous species of birds, including geese, nesting dabbling ducks, Marbled Godwit, several species of hawks and owls, American Kestrel, Northern Harrier, Sharp-tailed Grouse, Killdeer, American Woodcock, Eastern Bluebird, Bobolink, Western Meadowlark, and various sparrows. Mammals that particularly utilize grasslands include a number of small and medium-sized rodents, rabbits, red fox, badger, white-tailed deer, and wolves.

Cropland – Crops are cultivated on seven units in the southern half of the Refuge. 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.

3.3.2 Wildlife

The Refuge's assorted habitats support a diverse assemblage of wildlife species native to northwestern Minnesota, described briefly as follows.

Birds – About 287 species of birds have been recorded on the Refuge, of which more than 120 have been documented nesting. Agassiz NWR is especially important to migratory birds, in particular migratory waterfowl, both during nesting and migrating seasons, hosting 17 species of breeding ducks as well as Giant Canada Geese. The Refuge also supports one of the world's largest colonies of Franklin's Gulls, as well as many pairs of nesting Black Terns, Black-crowned Night Herons, and Eared Grebes, in addition to many non-breeding American White Pelicans.

Mammals – Forty-nine species of mammals have been recorded at Agassiz NWR. The largest and most prominent, if not always the most conspicuous, are the moose, white-tailed deer, gray wolf, and black bear. Other less celebrated mammals that find a home on the Refuge include shrews, bats, woodchucks, rabbits, hares, squirrels, chipmunks, muskrats, mice, voles, beavers, porcupines, red foxes, raccoons, and many members of the weasel family. The Refuge's comparatively large size and diversity of habitats meet the needs of these mammals for food, cover, and water.

Amphibians and Reptiles – 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. Nine species of reptiles are known to occur at Agassiz NWR , of which six are snakes, two are turtles and one skink.

Fish – Thirty species of fish have been documented in Agassiz NWR’s shallow pools, ponds, and watercourses. Twenty of these species are smaller fish, such as minnows, sticklebacks and darters. These minnows adapt more readily to the water management on the Refuge than sport fish and provide an important food base for many migratory birds and mammals.

3.3.3 Threatened and Endangered Species

Two federally listed species of animals occur at Agassiz NWR , the gray wolf and the Bald Eagle, both listed as threatened. Populations of both of these species are recovering regionally as well as nationally. The wolf was recently reclassified from endangered to threatened in adjoining states by the Service and the Bald Eagle may be “de-listed,” and removed from the list of species protected by the federal Endangered Species Act of 1973. No federally listed plants are documented on the Refuge.

The first wolf pack was established in 1981 and two packs have resided on Agassiz NWR and adjacent Wildlife Management Areas for over 13 years. In recent years, about a half-dozen Bald Eagle nests have been used on Agassiz NWR ; the eagles typically build their nests in large, old aspens and cottonwoods. Many more Bald Eagles utilize the Refuge for feeding at different times of the year, especially during early spring and late fall when as many as 60 have been observed.

3.4 Cultural Resources

In addition to its natural habitat and wildlife, Agassiz NWR also has resources of archeological and cultural value that tell fragments of the long story of human habitation and endeavor in the area. The history of human presence in northwestern Minnesota can be divided into three broad contexts or periods: pre-contact (10,000 years B.C. to A.D. 1700), contact (circa A.D. 1630 to 1820), and post-contact (circa A.D. 1830 to present). The pre-contact contexts emphasize patterns of regional adaptation or technological and cultural traditions, while the contact and post-contact contexts are generally organized by themes addressing different interactions and industries. Pre-contact or contact resources or properties have yet to be discovered at Agassiz NWR , but that doesn’t mean they are absent altogether.

With regard to the post-contact period, three general contexts have been identified, of which two are represented at Agassiz NWR . The Railroads and Agricultural Development (1870 to 1940) context is represented on the Refuge by Judicial Ditch 11 itself, former homesteads and farmsteads, schools, post offices, a store and an agricultural (peat) experimental station. The Federal Relief Construction in Minnesota (1933 to 1941) context is represented at Agassiz NWR by the existence of the national wildlife Refuge itself and by a number of structures built by the Civilian Conservation Corps (CCC), including dikes, drainage ditches, roads, and several small buildings.

While a century of extensive and intensive landscape modification at Agassiz NWR may have destroyed or compromised historic sites 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. A Cultural Resources Management Plan

completed in 2002 for Agassiz NWR identifies a number of steps to identify, preserve, and interpret the Refuge's cultural heritage.

3.5 Fire Management

This section contains detail about the prescribed fire and wildfire suppression procedures used on the Agassiz NWR. We have included more detail on this subject here and in Chapter 4 of the EA in order to fully document the Refuge's recent Fire Management Plan (FMP) in compliance with the National Environmental Policy Act.

3.5.1 Prescribed Fire

Prescribed fire is used regularly on the Refuge as a habitat management tool. Periodic burning of grasslands and wet meadows reduces encroaching woody vegetation such as willow. Fire also encourages the growth of desirable species such as native, warm-season grasses, sedges and forbs.

Trained and qualified personnel perform all prescribed burns under precise plans. The Refuge has an approved FMP that describes in detail how prescribed burning will be conducted. A burn is conducted only if it meets specified criteria for air temperature, fuel moisture, wind direction and velocity, soil moisture, relative humidity, and several other environmental factors. The specified criteria (prescription) minimize the chance that the fire will escape and increase the likelihood that the fire will have the desired effect on the plant community.

There are three burning seasons on the Agassiz NWR. The first burning season starts as soon as spring thawing conditions will allow burning. This is usually in late March or April. It extends until the nesting season of waterfowl begins in early May. The second season starts in August after the nesting season and continues into September. The fall season starts in late September and continues until fall rains, snow or low temperatures eliminate burning conditions.

How often established units are burned depends on management objectives, historic fire frequency, and funding. The interval between burns may be 2 to 5 years or longer. As part of the prescribed fire program, we will conduct a literature search to determine the effects of fire on various plant and animal species, and we will begin a monitoring program to verify that objectives are being achieved.

Prescribed fires will not be started without the approval of the Regional Fire Management Coordinator when the area is at an extreme fire danger level or the National Preparedness level is V. In addition, we will not start a prescribed fire without first getting applicable concurrence when local fire protection districts or the State of Minnesota have instituted burning bans.

Spot fires and escapes may occur on any prescribed fire. The spot fires and escapes may result from factors that cannot be anticipated during planning. A few small spot fires and escapes on a prescribed burn can usually be controlled by the burn crew. If so, they do not constitute a wildland fire. The burn boss is responsible for evaluating the frequency and severity of spot fires and escapes and, if necessary, slowing down or stopping the burn operation, getting additional help from the Refuge staff, or extinguishing the prescribed burn. If the existing crew cannot control an escaped fire and it is necessary to get help from the Minnesota DNR or other local fire units, the escape will be classified as a wildland fire and controlled accordingly. Once controlled, we will stop the prescribed burning for the burning period.

3.5.2 Fire Prevention and Detection

In any fire management activity, firefighter and public safety will always take precedence over property and resource protection.

Historically, fire influenced the vegetation on the Refuge. Now, fires burning without a prescription are likely to cause unwanted damage. In order to minimize this damage, we will seek to prevent and quickly detect fires by:

Discussing fire prevention at safety meetings prior to the fire season and during periods of high fire danger and periodically training staff in fire prevention.

Posting warnings at visitor information stations during periods of extreme fire danger.

Notifying the public via press releases and personal contacts during periods of extreme fire danger.

Investigating all fires suspected of having been set illegally and taking appropriate action.

Depending on neighbors, visitors, cooperators, and staff to detect and report fires.

3.5.3 Wildfire History

Wildfires were known in this area prior to the establishment of the Refuge in 1937. From 1942 to 1952 a total of 13 wildfires consumed approximately 23,000 acres. This 11 year period was followed by eight years of no fire.

Wildfires occurred approximately every three years from 1961-1971. Since then, from 1972-1998, 18 fires have been documented. A few of these fires burned considerable acreage. During the spring of 1973 5 fires burned 15,037 acres. In April 1977, 7,200 acres burned and threatened the entire Refuge headquarters complex, and in April 1990, 28,000 acres burned on the eastern side of the Refuge and threatened the maintenance center. Seven of the fires occurred in 1998. Six of those were along the north boundary, and were believed to have been arson.

The period of highest fire danger occurs from 1 April to 15 May and 1 September to 15 November. Generally, spring rains and vegetative green up have occurred by Memorial Day; in the fall, precipitation and colder temperatures reduce the fire hazard by early November.

The Refuge contains 25 water impoundment-s, most of which are surrounded by firebreaks such as a road, trail, dike, ditch or large bay of open water. These firebreaks have reduced widespread wildfires in recent history. However, weather still has the greatest influence on wildfires in this area. A combination of prolonged drought conditions, lack of winter snow fall or delayed early spring rains can result in wildfire potential. Southerly winds in excess of 15 MPH are quite common and coupled with dried Phragmites (common reed) and cattail can create explosive conditions.

3.5.4 Fire Suppression

We are required by Service Policy to use the Incident Command System (ICS) and firefighters meeting National Wildfire Coordinating Group (NWCG) qualifications for fires occurring on Refuge property. Our suppression efforts will be directed towards safeguarding life while protecting Refuge resources and property from harm. Mutual aid resources responding from Cooperating Agencies will not be required to meet NWCG standards, but must meet the standards of their Agency.

All wildland fires occurring on the Refuge and staffed with Service employees will be supervised by a qualified Incident Commander (IC). The IC will be responsible for all management aspects of the fire. The IC will obtain the general suppression strategy from the Fire Management Plan, but it will be up to the IC to implement the appropriate tactics. Minimum impact suppression tactics will be

used whenever possible. As a guide, on low intensity fires (generally flame lengths less than 4 feet) the primary suppression strategy will be direct attack with hand crews and engines. On higher intensity fires (those with flame lengths greater than 4 feet) we may use indirect strategies of back fires or burning out from natural and human-made fire barriers. The barriers will be selected based on their ability to safely suppress the fire, minimize resource degradation, and be cost effective.

Chapter 4: Environmental Consequences

4.1 Effects Common to all Alternatives

Specific environmental and social impacts of implementing each alternative are examined in the five broad issue categories: habitat management, water management, wildlife management, public use, and cultural resources. However, several potential effects will be very similar under each alternative and are summarized below:

4.1.1 Air Quality

Air quality in Northern Minnesota is generally good. Habitat management involving prescribed fire will occur under each alternative, but only under ideal weather conditions. Approved smoke management practices developed by state and federal land management agencies in Minnesota will be implemented in all burning events. In addition, the generally low population density of the farmlands and wildlands (including Wildlife Management Areas) bordering the Refuge serves to minimize even temporary smoke-related, air quality impacts by reducing the number of potential “sensitive receptors” that could be affected by excessive smoke. Tailpipe emissions from operation of Refuge equipment and from visitation to the Refuge by the motoring public are negligible in comparison with overall regional emissions.

4.1.2 Water Quality

Water quality in Refuge water bodies such as the pools, lakes, and drainage ditches is generally good. Proposed Refuge management activities such as prescribed fire, mowing, conversion of some habitat types to others, and approved herbicide use to control invasive and weedy plant species, should not negatively affect water quality. The same conclusion applies to present and proposed visitor use, including such activities as walking the nature trails, driving the auto tour route, deer and waterfowl hunting, photography, nature observation, and interpretation.

4.1.3 Cultural Resources

The Service is responsible for managing archeological and historic sites found on national wildlife refuges. At the start of the CCP planning process, the Service contracted with The 106 Group, Ltd. to produce a Cultural Resources Management Plan for the Refuge (Vermeer and Stark, 2002). The plan was submitted in September 2002. As described earlier, Agassiz NWR contains a number of post-contact cultural resources of the Railroads and Cultural Development theme and the Federal Relief Construction in Minnesota theme. Historic sites include foundations of homesteads, farmsteads and schools, dikes, drainage ditches, roads, and several CCC buildings. Several sites have been evaluated regarding their eligibility for the National Register of Historic Places and were determined not eligible.

Under each of the alternatives in this EA, the Cultural Resources Management Plan would be used by Refuge managers to ensure compliance with relevant federal laws and regulations. Prior to all

habitat and facility projects, appropriate efforts will be made to identify cultural resources within the area of potential impact by contacting the Regional Historic Preservation Officer.

4.1.4 Environmental Justice

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

None of the management alternatives described in this EA will disproportionately place any adverse environmental, economic, social, or health impacts on minority and low-income populations. The percentage of minorities in Marshall County, where Agassiz NWR is located, and all but one of the seven counties in the Refuge Management District is lower than in the State of Minnesota and much lower than the United States as a whole. Average incomes and poverty rates within these counties are comparable to other rural counties in the state. Public use activities that would be offered under each of the alternatives are available to any visitor regardless of race, ethnicity or income level. Agassiz NWR has a good working relationship with the nearby Red Lake Band of Chippewa Indians. The Refuge also cooperates with Mud Lake pioneers and their descendents, who were displaced prior to the Refuge’s establishment because of farming difficulties and loan defaults in the 1930s.

4.1.5 Climate Change Impacts

The U.S. Department of the Interior issued an order in January 2001 requiring federal agencies under its direction that have land management responsibilities to consider potential climate change impacts as part of long range planning endeavors. The increase of carbon dioxide (CO₂) within the earth’s atmosphere has been linked to the gradual rise in surface temperature commonly referred to as global warming. In relation to comprehensive conservation planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy’s “Carbon Sequestration Research and Development” (U.S. DOE, 1999) defines carbon sequestration as “...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere.”

Vegetated land is a tremendous factor in carbon sequestration. Terrestrial biomes of all sorts – grasslands, forests, wetlands, tundra, and desert – are effective both in preventing carbon emission and acting as a biological “scrubber” of atmospheric CO₂. The Department of Energy report’s conclusions noted that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere. One Agassiz NWR activity in particular – prescribed burning – releases CO₂ directly to the atmosphere from the biomass consumed during combustion. However, there is actually no net loss of carbon, since new vegetation quickly germinates and sprouts to replace the burned-up biomass and sequesters or assimilates an approximately equal amount of carbon as was lost to the air. Overall, there should be little or no net change in the amount of carbon sequestered at Agassiz NWR from any of the proposed management alternatives.

Conserving natural habitat for wildlife is the heart of any long-range plan for national wildlife refuges. The actions proposed in this CCP would conserve or restore land and habitat, and would thus retain existing carbon sequestration on the Refuge. This in turn contributes positively to efforts to mitigate human-induced global climate change.

4.1.6 Prescribed Fire

Social Implications – A prescribed burn on the Refuge will benefit the public in creating recreational opportunities through increased wildlife populations for hunting and observation. If a wildland fire occurs on or near the Refuge, the areas that were prescribed burned and the firebreaks intended for prescribed burning will help in controlling the fire.

Smoke from a Refuge fire could impair visibility on roads and become a hazard. All efforts will be taken to assure that smoke does not impact smoke sensitive areas such as roads and local residences. The impact of smoke can be reduced through management actions, which include: use of traffic control, signing, altering ignition techniques and sequence, halting ignition, suppressing the fire, and use of local law enforcement officers to assist with control traffic. Burning will be done only when the smoke will not be blown across the community or when the wind is sufficient to prevent heavy concentrations.

Combustion of fuels during prescribed fire operations may temporarily impact air quality, but the impacts are mitigated by small burn unit size, direction of wind, and distance from population centers. In the event of wind direction change, mitigation measures will be taken to assure public safety and comfort. Refuge staff will work with neighboring agencies and State air quality personnel to address smoke issues that require additional mitigation. The Prescribed Fire Plan describes specific measures to deal with smoke management problems for each unit.

Any smoke from the Refuge may cause some public concern. This concern will be reduced through a concerted effort by Refuge personnel to inform the local citizens about the prescribed burning program, emphasizing the benefits to wildlife and the safety precautions that are taken. Interpretive programs, explaining the prescribed burning program, may also be conducted on and off the Refuge.

In general, local public attitude toward fire is positive. In fact, during the spring or fall, smoke becomes a familiar part of the surrounding landscape. Most of the recent wildfires that have entered the Refuge or adjacent State Wildlife Management Areas have resulted from brush or road ditch fires that have escaped into adjoining public land.

Cultural and Archaeological Resources – There may be archaeological sites within prescribed burn units. When these units are burned, it is doubtful that the fire will have any adverse impact on the sites. The fire will be only a temporary disturbance to the vegetation in the area and in no way destroy or reduce the archaeological value, since artifacts are buried beneath the surface. No known sites will be impacted by prescribed burning operations.

Constructing firebreaks usually involves some shallow ground disturbance that could damage or destroy these resources. If a firebreak is needed on undisturbed ground, the area will be surveyed prior to construction to protect any cultural or archaeological resources.

Flora – The prescribed burning program will have a visible impact on vegetation and the land. Immediately after a fire much of the land will be blackened. There will be few grasses or ground forbs remaining and most of the brush will be scorched. Trees may be scorched. Because of wet ground conditions or discontinuous fuel, there may be areas within the burn unit that are untouched by the fire.

In spring, grasses and forbs will begin to grow within a few days of the burn. The enriched soil will promote rapid growth such that after two or three weeks the ground will be covered. In some cases, young trees will re-sprout. Some of the less fire resistant trees will show signs of wilting and may succumb. After one season of regrowth, most signs of the prescribed burn will be difficult to detect without close examination.

Other signs of the burn will remain for longer periods. The firebreaks will be maintained for use in containing wildland fires and future prescribed burns. Vehicle tracks through the burn are visible on the freshly burned ash and may be longer lived if the vehicle created ruts in the ground. Travel across the burn area will be kept to a minimum. Vehicle travel is necessary in some instances, such as lighting the fire lines or quickly getting water to an escape point. A fire plow will be used only in the event that an escape occurs and cannot be controlled by any other method. The trench of the plow would be repaired by filling, which would eliminate it from view after several years.

Listed Species – Ecological Services has reviewed the Refuge's Fire Management Plan to ensure that prescribed burning will not negatively impact listed species. Precautions will be taken to protect threatened and endangered species during prescribed burning. Nesting trees for Bald Eagles will be protected and burning will not be conducted at a time or in a way to negatively impact any nesting eagles. If any of the known populations of listed plant species are in or near a burn unit, precautions will be taken to avoid the plants if fire is detrimental to their existence.

Soils – The effect of fire on soil is dependent largely on the fire intensity and duration. On areas with high fuel loads, a slow backing fire is usually required for containment and desirable results. The intense heats generated by a slow backing fire will have a greater effect on the soils than fast, cooler head-fires. The cool, moist soils of wetter areas in the burn units or areas with little fuel will be minimally affected by the fire.

The degree of impact to the soil is a function of the thickness and composition of the organic mantle. In cases where only the top layer of the mantle is scorched or burned, there will be no effect on the soil. This usually occurs in the forested areas of the burn units.

On open grassland sites, the blackening of the relatively thin mantle will cause greater heat absorption and retention from the sun. This will encourage earlier germination during the spring growing season.

Nutrient release occurs as a result of the normal decomposition process. Fire will speed up the nutrient release process. The rate and amount of nutrients released will be dependent on the fire duration and intensity as well as the amount of humus, duff and other organic materials present in the mantle. The increase, immediately after a burn, of calcium, potash, phosphoric acid and other minerals will give the residual and emergent vegetation a short-term boost.

There is no evidence to show that the direct heating of soil by a fire of low intensity above it has any significant adverse affect. Fire of this type has little total effect on the soil, and in most cases would be beneficial.

Peat Fires – An ecological impact that can result from wildfire is ignition of peat soils. Most of the Refuge's upland soils are overlain with peat varying in depth from a few inches to six feet or more. Once started, peat is often difficult to extinguish and can burn down to mineral soils. This can change the vegetation composition in an area. Peat fire suppression efforts can also have an adverse effect on the vegetation through the use of heavy equipment (dozers, fire trucks, etc).

Examination of some previously burned areas with prolonged peat fires has shown that the resulting habitat has become exceptional for waterfowl. The burned-out areas created potholes in what were

otherwise temporary or cattail-choked wetlands. The damages versus benefits of burning peat will need to be addressed on a case by case basis.

Escaped Fire – The possibility exists that prescribed fire may escape to the surrounding area. An escape can be caused by factors that may, or may not, be preventable. Inadequate firebreaks, too few personnel, unpredicted changes in weather conditions, peculiar fuel type, and insufficient knowledge of fire behavior are factors that can lead to a loss of control. An escaped fire can turn into a very serious situation. On the Refuge's wildlands, an escaped fire would cause less severe damage than on land where buildings, equipment, and land improvements could be damaged. Many of the prescribed burn areas are well within the Refuge and of minimal threat to private or other improved lands. We will exercise extreme care, careful planning, and adherence to the unit prescription when we conduct all prescribed burns. We will place an extra emphasis on control when burning areas that are near developed areas or the Refuge boundary.

In the event that a prescribed fire does jump a firebreak and burn into unplanned areas, there is a high probability of rapid control with minimal adverse impact. In general, prescribed burns will have light fuel loads (0.25 to 3 tons of fuel per acre), will be burned under low fuel moisture conditions, and will be burned under specific wind direction and atmosphere stability conditions. The network of firebreaks and roads will greatly assist in rapid containment.

In most cases all of the Refuge fire fighting equipment will be immediately available at the scene with all nearby water sources previously located. The applicable MNDNR fire suppression crews and local fire departments will always be notified of a prescribed burn. Thus, maximum numbers of experienced personnel and equipment are immediately available for wildfire suppression activities.

4.2 Summary of Effects by Alternative

This section describes the environmental consequences of adopting each Refuge management alternative. Table 2 addresses the likely outcomes for specific issues and is organized by broad issue categories.

4.2.1 Alternative A: Current Direction (No Action)

Under Alternative A, the Refuge would continue to manage water impoundments to provide a variety of water conditions for waterbirds (e.g., ducks, geese, shorebirds, and wading birds) during spring, summer and fall, resulting in generally beneficial impacts on these species. Nuisance wildlife, mostly furbearers, would be managed under a trapping program, as at present. Their populations would remain stable rather than being allowed to increase and perhaps collapse. Hunting would continue to be 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 would be managed primarily for wildlife viewing and a quality hunt program, if their numbers were to recover to a threshold exceeding 200. Alternative A may benefit the moose population on the Refuge and adjoining lands.

Under current management direction, wetland and upland succession are deliberately set back on a rotational basis Refuge-wide. This would result in a higher percentage of Refuge lands being maintained as open water, wetlands, and open forest patches than if succession were permitted to unfold without intervention, the result of which would be a higher percentage of the Refuge reverting to shrub/scrub habitat in the near future. The current upland mix of habitats, which includes aspen forest, oak savannas, croplands, open grasslands, and shrub/scrub habitats would not change under Alternative A, which would use prescribed fire, mowing, and selective tree control to

set back succession. Cropland acreage would be maintained at 170 acres of cultivated cropland and 60 acres of former cropland already restored to native prairie. Agassiz NWR's designated Wilderness Area would be subjected to minimal management activities such as an occasional prescribed fire, otherwise natural disturbances like wildland fire, windthrow, and ice storms would be the norm and are unlikely to change much. One area, along the western edge of the Wilderness Area, is experiencing conifer mortality. Ongoing research may indicate the need for measures to prevent further die-off of spruce and tamarack. Infestation by invasive plant species would be at least partially checked by using a variety of chemical, mechanical and biological methods. Off-Refuge habitat activities would continue to be restored in cooperation with Agassiz NWR partners in and out of government.

Visitor services under the No Action Alternative would not be experience any change. Visitor services would include on- and off-Refuge environmental education, seasonal auto-tour routes, annual open houses, foot trails, visitor contact station, and observation platforms. The hunting program, currently consisting of a firearms deer season, would not change. A moose season would be reopened when the population exceeds 200. No new hunts would be added. No fishing would take place on the Refuge, as at present. Five of the six wildlife-dependent recreation activities emphasized on the National Wildlife Refuge System would continue to be encouraged and would occur at Agassiz NWR.

4.2.2 Alternative B: Minimal Upland Habitat Management

Under Alternative B, the Refuge would continue to manage water impoundments to provide a variety of water conditions for waterbirds (e.g., ducks, geese, shorebirds, and wading birds) during spring, summer and fall, resulting in generally beneficial impacts on these species. Nuisance wildlife, mostly furbearers, would be managed under a trapping program, as at present. Their populations would remain stable rather than being allowed to increase and perhaps collapse. Hunting would continue to be 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 would be managed primarily for wildlife viewing and a quality hunt program. As under Alternative A, Alternative B would not open moose hunting until their numbers exceed 200. Alternative B would likely benefit the moose population on the Refuge and adjoining lands by allowing for an increase in the area of lowland shrub.

Under the Minimal Upland Habitat Management Alternative, natural succession would proceed on upland sites with minimal interference or intervention, leading to more aspen and mixed hardwood forest and shrub/scrub and less prairie and bur oak savanna. Since prescribed fire is utilized less frequently than under the Current Direction Alternative, succession would not be set back as often, shrub density is likely to increase in forests and lowland shrub. Prescribed fire would focus primarily on hazard fuel reduction and wetland habitat management. Refuge management would designate old-growth aspen areas, which would benefit cavity-nesting species like the Bufflehead as well as Bald Eagles, which favor tall aspens for their nests. Cropland would gradually be phased out and allowed to revert either to grasslands, shrub/scrub, or woodlands since no intervention would be made, except to control invasive and non-native plants. Except for occasional wildland fire, no management actions would be undertaken in Agassiz NWR's designated Wilderness Area. The Refuge dike road that now bisects the Wilderness Area may be removed in part or entirely to restore the natural hydrology of the area if a current study indicates this action is needed.

Natural uplands that would develop under Alternative B would likely include a high proportion of aspen forest, willow shrub/scrub and a small amount of mixed grass fields. Invasive plant species would continue to be controlled using chemical, mechanical and biological methods, with a greater emphasis on biological controls. Increased off-Refuge habitat activities under Alternative B, focusing on FSA easements, Partners for Fish and Wildlife programs, CREP initiatives,

participation on inter-agency teams, other partnership efforts, would likely lead to increased habitat, especially riparian corridors, which would benefit wildlife generally across the District.

As in the No Action Alternative, under Alternative B visitor services would continue through a variety of on-Refuge environmental education, seasonal auto-tour routes, annual open houses, foot trails, visitor contact station, and observation platforms. Expanding winter use activities, such as cross-country skiing and snowshoeing, would occur on designated un-groomed trails. Adding a small environmental education lab would promote in-depth exploration of wetland plants, invertebrates, water quality and provide a safe environment for necropsy work. Alternative B's hunting program includes firearms deer season, as under current direction. New hunting opportunities will be provided for deer/archery and deer/muzzleloader hunters during and after the deer/firearms season. This alternative would explore walk-in hunting opportunities for waterfowl and upland game like rabbits and squirrels in an area on the east side of the Refuge. Conflicts with auto tour motorists would be minimal. Conflicts with "limited" access wildlife viewers could exist. Conflicts with fall prescribed burning activities would need to be addressed. The Refuge's shallow and/or seasonal water bodies do not lend themselves to fishing, so as under Current Direction, there would be no fishing under this alternative. Off-Refuge outreach would continue to include school talks, radio programs, informational kits, displays at fairs and floats in parades. In sum, of the six wildlife-dependent recreation activities allowed and generally encouraged on the National Wildlife Refuge System, five would be practiced at Agassiz NWR under Alternative B.

The primary difference between the impacts of the Minimal Upland Habitat Management Alternative and those of the No Action Alternative are that, 1) aspens and mixed hardwood forests as well as lowland shrub-scrub would expand at the expense of grasslands, with a commensurate benefit to wildlife that prefer those habitats, 2) winter wildlife viewing opportunities would increase, and 3) deer hunting opportunities would increase.

4.2.3 Alternative C: Open Landscape / Natural Watercourses (Preferred Alternative)

Under the Open Landscape / Natural Watercourses Alternative, the preferred alternative, management of Agassiz NWR's impoundments would continue to provide a variety of water conditions for waterbirds (e.g., ducks, geese, shorebirds, and wading birds) during spring, summer and fall. Drawdowns, raised and lower water levels, and timing would vary from pool to pool to optimize habitat conditions for birds with different life history requirements. Shorebirds would continue to receive enhanced emphasis. As in the No Action Alternative, nuisance species, which are mostly furbearers, would be managed through a trapping program. Their natural population fluctuations would thus be somewhat stabilized. Hunting would be 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 would be managed primarily for wildlife viewing and a quality hunt program, though their numbers are currently too low to permit hunting on the Refuge. Refraining from opening the moose hunt until their numbers rebound to 200 would probably allow the population to recover.

The Open Landscape / Natural Watercourses Alternative focuses on setting back upland succession in the southeast corner of the Refuge and experimenting with restoring sinuosity to two interior watercourses by lowering water levels in three pools. These interventions would allow for increases in wetland and upland habitats that are in decline and considered valuable for certain bird and mammal species.

While there is minimal management of Agassiz NWR's designated Wilderness Area, both prescribed and wildland fire use would be permitted there. Ongoing research may indicate the need for

measures to prevent further die-off of spruce and tamarack along the western edge of the Wilderness Area. This may involve adjusting water management activities in adjoining pools or removing part of the road that bisects the area to restore normal hydrology patterns.

In cooperation with Minnesota DNR and the adjacent Wildlife Management Areas, a large focal area of uplands in the southeast area would be managed as a grassland matrix. This would likely increase a number of such wildlife species as the Bobolink, Sharp-tailed Grouse, Marbled Godwit, Western Meadowlark, and nesting dabbling ducks. Remaining uplands would be managed in a mix of aspen forest, oak savannas, open grasslands, and shrub/scrub as time and personnel resources allow after activities in the focus area are achieved. Refuge management would designate old-growth aspen areas, which would benefit cavity-nesting species like the bufflehead, as well as bald eagles, which favor tall aspens for their nests. The extensive use of prescribed fire under Alternative C would help forestall and set back natural succession in the focus area. Croplands would be phased out over time and restored as natural grassland habitats. Results of this habitat change on wildlife would be mixed. (Grains and certain other crops, though highly artificial plant communities, are utilized by many birds and mammals.) Reducing water levels in three pools would decrease overall marsh and open water habitat, but could be expected to increase sedge meadow and free flowing stream habitats. Invasive species, such as reed canary grass, are of concern. If invasives become dominate as a result of this shift in management we would return to former impoundment management. Control of invasive plant species would use a variety of chemical, mechanical and biological methods, as in the No Action Alternative, and probably meet with partial success in preventing the spread of weedy species.

The expansion of off-Refuge habitat activities, with a primary focus on lands adjacent to the Refuge, open areas, and riparian areas district-wide, would have a beneficial impact on wildlife habitat and populations throughout the seven-county Refuge Management District. Off-Refuge habitat activities would include FSA easements, Partners for Fish and Wildlife programs, CREP initiatives, participation on inter-agency teams, and other partnership efforts.

Visitor services under the Open Landscape / Natural Watercourses Alternative are provided through a variety of on-Refuge environmental education, seasonal auto-tour routes, annual open houses, foot trails, visitor contact station, and observation platforms. Expanding winter use activities, such as cross country skiing and snowshoeing, would occur on designated un-groomed trails. Adding a small Environmental Education Lab would promote in-depth exploration of wetland plants, invertebrates, water quality and provide a safe environment for necropsy work. The hunting program would include a firearms deer season, in accordance with state regulations. Changes in the hunting program will occur throughout most of the Refuge. Archery/deer, muzzleloader/deer and Ruffed Grouse hunting will be permitted during and after the deer/firearms season in the same areas open to deer/firearms. Following the deer/firearms season there will be strategic parking lots opened. However, this will be primarily a walk-in hunt as Refuge roads will not be plowed. A youth waterfowl hunt will occur on Farmed Pool in conjunction with the state youth waterfowl hunting season. Thus, opportunities will increase for hunters. Conflicts with fall prescribed burning activities would be minimal. The Refuge's shallow and/or seasonal water bodies do not lend themselves to fishing, so as in the other two alternatives, there would be no fishing under this alternative. Off-Refuge outreach would include school talks, radio programs, informational kits, displays at fairs, and floats in parades. In sum, as with the other alternatives, five of the six wildlife-dependent recreation activities allowed on the National Wildlife Refuge System are encouraged at Agassiz NWR and would take place under this alternative.

The two main differences between the impacts of the No Action Alternative and the Open Landscape / Natural Watercourses Alternative are that under the latter, 1) there are larger areas of prairie grasslands and desirable marsh habitats like those dominated by sedges, 2) winter wildlife viewing opportunities would increase, and 3) deer hunting opportunities will be expanded and Ruffed Grouse hunting and a youth waterfowl hunt will be added.

4.3 Cumulative Impact Analysis

“Cumulative impact” is the term that refers to impacts on the environment that result from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In this section, the cumulative impacts of each of the three alternatives are discussed in terms of grasslands and environmental education.

4.3.1 Grasslands

Prior to the Euro-American settlement of Minnesota, vast prairie grasslands – some 18 million acres – extended from the northwestern to the southeastern corners of the state. These grasslands varied from sparsely vegetated sand dunes to immense fields of big bluestem up to 8 feet tall. Low, wet sedge meadows transitioned to short-grass prairies on the bluffs of the Mississippi River. Herds of large grazing mammals like bison and elk roamed the plains – pursued by the massive Plains grizzly (a sub-species of the grizzly bear) – and prairie birds such as the Upland Sandpiper and Sandhill Crane were plentiful. A century and a half later, bison and elk have been virtually eliminated in the state, and the Plains grizzly is extinct.

With the onset of Euro-American settlement in Minnesota, much of the flat and fertile prairie grasslands succumbed to the pioneer’s plow. Now, just a century and a half later, only 1 percent (about 150,000 acres) of the original 18 million acres of prairie remains. Urban sprawl, agricultural expansion, and gravel mining continue to threaten this rich resource. As natural prairie habitats have shrunk, so too have the numbers of prairie mammals, birds, and insects that depend on these grasslands. At one time, prairie birds such as Marbled Godwits, Upland Sandpipers, Sprague’s Pipits, Chestnut-Collared Longspurs, Bobolinks, Meadowlarks, and Kingbirds were abundant. Today they are scarce.

In Minnesota, as elsewhere in the Midwest, multiple efforts are under way to save existing remnant native grasslands, reverse degraded grasslands, and restore native grasslands to sites they formally occupied where they are now absent. Agassiz NWR has 1,710 acres of grasslands, slightly more than 1 percent of the total state acreage. Alternative A (Current Management Direction) would not change this acreage, and would therefore have no cumulative impacts one way or the other. Alternative B (Minimal Upland Habitat Management), under which there would be a net loss of grasslands on the Refuge, would contribute in a minor way to adverse long-term, cumulative impacts on native prairie grasslands. Alternative C, the Open Landscape / Natural Watercourses Alternative, by adding approximately 115 acres of grassland, would have a negligible beneficial cumulative impact on grasslands in Minnesota.

4.3.2 Environmental Education

Environmental education is provided by a variety of institutions inside and outside of the formal classroom. In addition to K-12 public schools, in which environmental education is generally included under the life and physical sciences, especially biology, but also within chemistry, geography, civics, and history, museums, zoos, parks, libraries, television and the news media (e.g., newspapers, magazines, the Internet) all contribute to improving environmental education for American students and citizens. As a result of the cumulative impact of these combined efforts, in recent decades the average American’s level of environmental knowledge and awareness appear to have gradually increased.

At present, Agassiz NWR provides a moderate amount of environmental education on and off the Refuge. These efforts are focused primarily on wildlife, habitat, and water management, which is appropriate for a national wildlife refuge. Efforts and results are constrained in part by staffing and budgetary limitations; Agassiz NWR is not able to dedicate one entire staff person's efforts to environmental education, rather it is a collateral duty. Under Alternative A, this would remain the same, and there would be a continuing modest contribution to overall environmental education efforts in the region. Under Alternatives A and B, environmental education would receive increasing emphasis both on and off-Refuge. These enhanced efforts would likely lead to a concomitant cumulative, beneficial impacts on the level of environmental knowledge and awareness in the citizens of northwestern Minnesota.

Table 2: Summary of Impacts for Management Alternatives at Agassiz National Wildlife Refuge and Refuge Management District

Issues	Alternative A: Current Direction (No Action)	Alternative B: Minimal Upland Habitat Management	Alternative C: Open Landscape / Natural Watercourses (Preferred Alternative)
Habitat Management			
<i>Loss of sedge meadow to cattail marsh</i>	Probable continuing gradual loss of sedge meadow	Modest decrease in sedge meadow acreage	Increase in sedge meadow acreage
<i>Drawdown frequency to provide shorebird habitat</i>	Continue current drawdown frequency to benefit shorebirds	Same as Alternative A	Slight decrease in shorebird habitat
<i>Prairie restoration on retired cropfields & exotic grasslands</i>	Long-term gradual restoration of prairie but weeds (invasive plants) problematic	Abandon active efforts to maintain seeded prairie; scrub and forest may encroach	Increase in grasslands by 465 acres
<i>Croplands (food plots)</i>	170 acres maintained in cropland	Cropland entirely phased out and restored to prairie grasslands	Same as Alternative B
<i>Invasive plant species (weed control)</i>	Partially controlled by a variety of means; some infestations continue	Greater efforts at control with emphasis on biological controls	Same as Alternative A
<i>Possible loss of Wilderness habitat from high water levels</i>	Die-off of spruce and tamarack under study; uncertain outcome	Same as Alternative A	Same as Alternative A
<i>Prescribed burning</i>	Continue using prescribed fire at current frequency & locations	Prescribed fire used less; emphasis on hazard fuel reduction, & wetland habitat management	Prescribed fire likely used more than in Alternative A to set back succession
<i>Forest habitats</i>	Area of aspen/mixed hardwoods & scrub stays the same	Aspen/mixed hardwood forest & scrublands all expand over current area; less oak	Aspen area decreases; bur oak increases; modest conversion to prairie
<i>Commitment to wild-life/natural resources</i>	Strong commitment to “wildlife comes first,” despite pressures	Same as Alternative A	Same as Alternative A
<i>-Off-Refuge involvement in providing habitat</i>	Current level of cooperation with other jurisdictions & agencies on variety of issues	Same as Alternative A	Expand outreach to other agencies, esp. MNDNR & tribe; more habitat restoration off-Refuge

Table 2: Summary of Impacts for Management Alternatives at Agassiz National Wildlife Refuge and Refuge Management District (Continued)

Issues	Alternative A: Current Direction (No Action)	Alternative B: Minimal Upland Habitat Management	Alternative C: Open Landscape / Natural Watercourses (Preferred Alternative)
Water Management			
<i>Waterfowl vs. non-game water species</i>	Pool water levels managed to benefit waterfowl, species of emphasis (F.Gulls), & shorebirds	Same as Alternative A	Increase sedge meadow habitat to benefit yellow & sora rails, sharp tailed sparrows; decrease open water/mudflats for migrating waterfowl & shorebirds
<i>Flood control</i>	Continue to participate in area-wide efforts to seek flooding solutions	Same as Alternative A	Same as Alternative A
<i>Retention of spring and summer flood waters</i>	Compromise when possible to reduce flooding downstream	Same as Alternative A	Small increase in capacity to retain flood waters temporarily
<i>Maintenance of drainage ditches</i>	Cooperate and communicate with local flood control authorities and communities	Same as Alternative A	Same as Alternative A
Wildlife Management			
<i>Nuisance wildlife control</i>	Continue trapping program to control species as necessary	Same as Alternative A	Same as Alternative A
<i>Non-game species</i>	Many aquatic and terrestrial organisms continue to thrive	Same as Alt. A, but more benefits to species that prefer scrub/shrub & woods with a probable decrease in some priority species such as nesting puddle ducks, LeConte's and sharp tailed sparrows	Same as Alt. A, but more benefits to species such as some nesting puddle ducks, yellow rails, LeConte's & sharp tailed sparrows that prefer prairie, savanna, & sedge meadow
<i>Threatened and endangered species</i>	Wolf and bald eagle continue to thrive on Refuge	Same as Alternative A	Same as Alternative A
<i>Wildlife Diseases</i>	CWD and West Nile Virus remain threats; cooperation & contingency plan needed	Same as Alternative A	Same as Alternative A
Wildlife-Dependent Recreation			
<i>Deer hunting (e.g., bow, muzzle, take-a-kid)</i>	Deer hunting opportunities remain unchanged	Archery & muzzleloader deer hunting will be permitted during & after deer/firearms season	Same as Alternative B

Table 2: Summary of Impacts for Management Alternatives at Agassiz National Wildlife Refuge and Refuge Management District (Continued)

Issues	Alternative A: Current Direction (No Action)	Alternative B: Minimal Upland Habitat Management	Alternative C: Open Landscape / Natural Watercourses (Preferred Alternative)
<i>Upland Game</i>	No upland game hunting, as at present	Opportunities to hunt upland game on the east side will be considered; but possible conflicts with fall burning & adequate enforcement	Ruffed grouse hunting will be permitted during & after deer/firearms season
<i>Waterfowl hunting</i>	No waterfowl hunting, as at present	Waterfowl hunting on the east side will be considered; but possible conflicts with fall burning & adequate enforcement.	A youth waterfowl hunt will be permitted south of Co. Rd. 7 on Farmes Pool in conjunction with the state youth waterfowl hunt
<i>Fishing</i>	No opportunities due to lack of sport fish habitat & disturbance to migratory birds	Same as Alternative A	Same as Alternative A
<i>Wildlife observation; fire tower and other viewing platforms</i>	Current facilities will continue; liability concerns may close tower	Develop new trail with viewing platform over Farmes Pool	Same as Alternative B
<i>Miscellaneous forms of motorized and non-motorized recreation</i>	No change from current situation: no ORV's, no snowshoeing, canoeing	Designate an un-groomed snowshoe/x-country ski trail	Same as Alternative B
<i>Road network, auto tour route, parking</i>	Road network, auto tour route and parking remain the same	Same as Alternative A	Same as Alternative A
<i>Visitor Contact Station</i>	Remains the same; visitor contact opportunities, exhibits unchanged	Same as Alternative A	Same as Alternative A
<i>Visitor access (increase, current level adequate, no access)</i>	No change in access; north boundary stays closed	Consider opening North Boundary Road	Same as Alternative B
<i>Appearance (well groomed vs. natural)</i>	Keep balance between groomed look & natural look at Visitor Center	Same as Alternative A	Same as Alternative A
<i>Better outreach</i>	Outreach continues as at present; does not expand	Same as Alternative A	Same as Alternative A
<i>More environmental education with schools, universities, and local communities</i>	Current level of environmental education continues; does not expand (staffing limits)	Expand onsite opportunities with Environmental Education Lab (increase staff 0.5)	Expand onsite opportunities with Environmental Education Lab (increase staff 0.5)

Table 2: Summary of Impacts for Management Alternatives at Agassiz National Wildlife Refuge and Refuge Management District (Continued)

Issues	Alternative A: Current Direction (No Action)	Alternative B: Minimal Upland Habitat Management	Alternative C: Open Landscape / Natural Watercourses (Preferred Alternative)
Cultural Resources			
<i>Interpretation of Mud Lake homesteads and CCC buildings</i>	Implement 2002 CRMP to identify, protect & interpret properties	Same as Alternative A	Same as Alternative A
<i>Tribal rights</i>	Continue cooperation with Red Lake Band of Chippewa and other interested tribes	Same as Alternative A	Same as Alternative A

Chapter 5: List of Preparers

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Chapter 6: Consultation and Coordination With Stakeholders

The Agassiz NWR Comprehensive Conservation Plan and Environmental Assessment has been written with the participation of USFWS and Refuge staff, Refuge users, an environmental consultant, and the local community. The CCP planning process began in the fall of 2002 with the formation of a Refuge planning team. In early December 2002, the planning team hosted an open house in Thief River Falls, with participation by members of the public, local officials, non-profit groups, and state agencies. In January 2003, an all-day focus group meeting/workshop was held at Northland Community and Technical College in Thief River Falls. The entire group addressed each issue on a list of concerns, issues and opportunities generated by earlier scoping. The discussions, suggestions, comments and analyses from these meetings and groups provided valuable information for the authors of this plan.

Representatives of the Minnesota Department of Natural Resources and the Red Lake Band of the Chippewa participated with Refuge staff and the planning team in a three-day biological review and goals/objectives/alternatives workshop. The workshop drafted a vision and goals for Agassiz NWR, in addition to crafting three management alternatives and various objectives for the Refuge. Please see Chapter 2 of the CCP for more information on the public scoping process.

Chapter 7: References and Literature Cited

Please see Appendix I of the CCP.

