

# Chapter 4: Management Direction

## Planned Refuge Programs

### Introduction

#### Managing Habitat for Wildlife

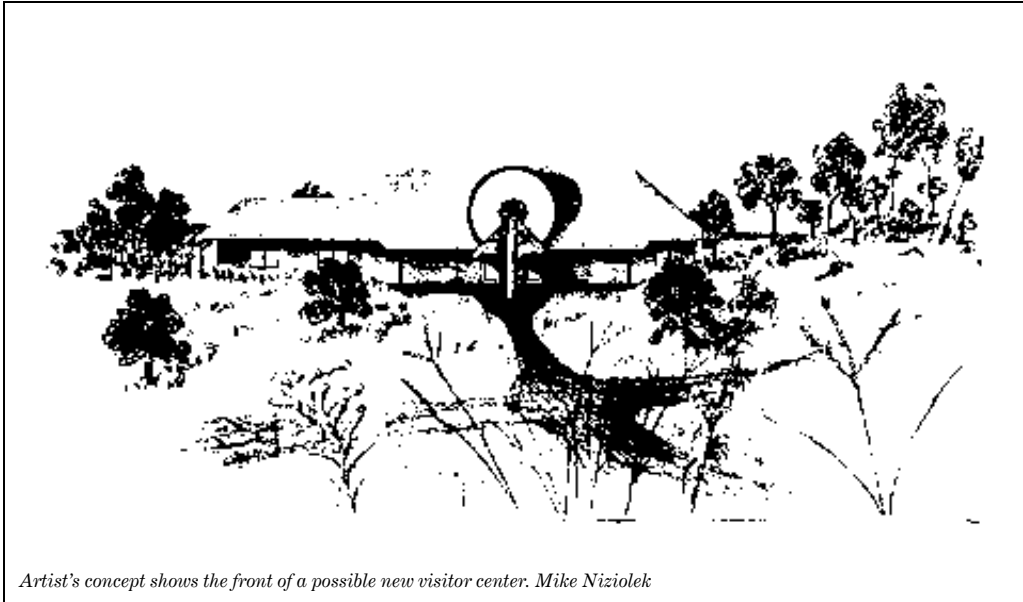
In the past, management of Sherburne NWR has followed a mixed strategy. As a result, the uplands of Sherburne NWR are a mosaic of habitats forming many different communities from oak savanna to grasslands and big woods to shrub. The wetlands have been largely maintained at high water with some experimental reductions in water level. Future management will focus on oak savanna in the upland (Alternative 4 in the EA). The result will be one of the largest oak savanna restorations in the Midwest. Oak savanna is recognized as globally endangered and this large scale restoration effort will take many years



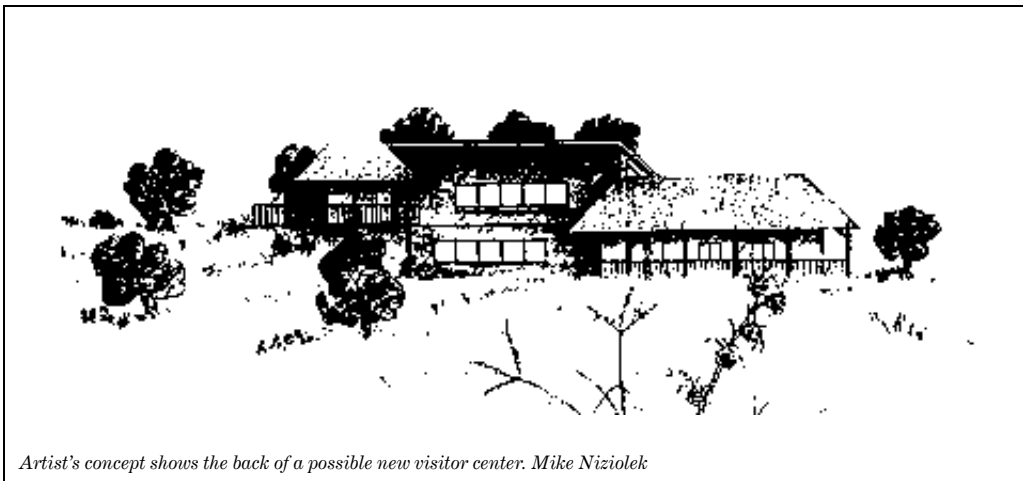
*Gary Moss*

beyond the 15-year planning horizon of the CCP. The wetlands of Sherburne NWR will be managed to maximize their productivity for water birds in migration. This means that many of the wetlands will be drawn down asynchronously on a 4- to 5-year cycle to simulate semipermanent wetlands. This wetland type creates a dynamic cycling of water and nutrients and provides a rich resource for all waterbirds.

Refuge management will maintain a portion of the current water impoundment system to provide migratory habitat for water birds. This would create a diversity of wetland types to support water-dependent species. Vegetation communities and hydrology on the remainder of the Refuge would approximate conditions typical of the Anoka Sandplain in the mid-1800s. Management of upland habitats will focus on maintaining and restoring these plant communities through the use of ecological processes that shaped these communities prior to European settlement. Environmental interpretation and education programs on and off-Refuge will compare the biology of managed systems to that of natural landscapes and the cultural history of pre-European settlement to post-European settlement. Opportunities for hunting, fishing, wildlife observation, and wildlife photography will give visitors a personal experience with wildlife and native habitats. Off-Refuge outreach, private lands, and partnership activity will emphasize natural processes, and native habitat restoration and conservation to form ecologically functioning connections to and from the Refuge. Cultural resources of the Refuge will be valued, interpreted and conserved.



*Artist's concept shows the front of a possible new visitor center. Mike Niziolek*



*Artist's concept shows the back of a possible new visitor center. Mike Niziolek*

The specifics of how this shift in management will be conducted is outlined in the following goals and objectives. The lack of knowledge regarding the hydrologic regime on the Refuge is a major concern for Refuge staff and regional planners preparing the comprehensive conservation plan. To address this concern, a hydrologic study is proposed with the understanding that the information gained may require refining and revising planned management actions.

### **Improving Visitor Services**

A new visitor center and headquarters facility will be designed to provide optimal educational opportunities for teaching the visiting public and school groups about Refuge wildlife and habitat management. The visitor's education begins on the short walk from the parking area to the building, which leads them through native habitats, preparing them visually for the messages they will receive inside.

The lobby area, immediately inside the front doors, will hold a reception desk, brochure display area, public restrooms, and a video alcove where up to 10 people can view an orientation film on the Refuge. The Friends of Sherburne will have a retail area close to the reception desk where educational materials will be available.

An exhibit hall will provide space for a variety of interactive educational displays that will inform the visitor about Refuge habitat, habitat management activities, and the wildlife using the Refuge. Large windows will provide a view of School House Pool and wildlife using the Pool. A meeting room that can also be used as a classroom will provide seating for a minimum of 100 people.

Visitor support facilities will include two staff offices, a volunteer staging area with lockers, a kitchenette and a workroom. All necessary mechanical, janitorial, and storage rooms will be included.

Outside the visitor center a modest trail system will provide an opportunity for short-stay visitors and school groups to experience oak savanna, prairie opening and wetland habitats. Interpretive signs providing habitat and wildlife messages, an observation deck for wildlife viewing, and a wetland boardwalk to facilitate wetland studies, will be provided.

In addition to the proposed new visitor center, improvements to visitor services will be accomplished as environmental education and interpretation programming continues to grow. Additional information kiosks and interpretive panels of current facilities are possible. Partnerships with local schools, communities and businesses will also facilitate improved programming. To reduce potential conflicts among and between recreational user groups, management methods such as time zoning, hunt quotas, and recreational carrying capacities may be employed. These management activities will lead to improved visitor services.

## Goals, Objectives and Strategies

The goals are designed to meet the purposes of the Refuge and the mission of the National Wildlife Refuge System. The following goals were established for Sherburne NWR and will form the direction for the Refuge over the next 15 years.

- # *Goal 1:* Upland Anoka Sandplain habitats approximate mid-1800s conditions, contributing to the preservation of these declining ecotypes and their associated Service priority species.
- # *Goal 2:* A diverse mosaic of riverine and wetland habitats meets the needs of Service priority riparian and other wetland-dependent species.
- # *Goal 3:* A balanced diversity of native migratory birds and other native wildlife reflects an emphasis on Service priority species appropriate to Refuge habitats.
- # *Goal 4:* A complex of natural areas, corridors, and watershed conservation practices in the surrounding landscape complements Refuge habitat and wildlife goals.
- # *Goal 5:* Visitors enjoy wildlife-dependent opportunities that further an appreciation of Refuge wildlife and habitats.
- # *Goal 6:* Visitors and local citizens demonstrate a strong conservation ethic that leads to support of the Refuge, conservation of the surrounding landscape, and global environmental awareness.
- # *Goal 7:* The cultural resources and cultural history of the Refuge are valued and preserved, and connect Refuge staff, visitors, and the community to the area's past.

The objectives are specific statements of what will be accomplished to help achieve a goal. Objectives describe the who, what, when, where, and why of what is to be accomplished. Strategies are potential actions or courses of action that can be taken to achieve the objectives. There is flexibility where and if these strategies are implemented. To help visualize how the Refuge would look in the future, maps were created to show the ultimate habitat distribution (100 years from now) (Figure 20). Then resource managers met in working groups to determine what was practical to accomplish in the 15-year time frame of this document, based on their technical expertise and experience in the field. With

today's GIS technology, maps were created to give a visual representation of the practical acreages and show the potential 15-year habitat changes (Figure 21). These maps help visualize the future conditions and facilitated the comparison of alternative management scenarios. The potential accomplishments were based on the philosophical agreement of those involved in the working groups. For example, there may have been agreement that creating larger blocks of certain habitats was important, or it may have been decided what habitats seemed most likely to be able to be converted within the 15-year time frame to meet an objective. These maps are meant to illustrate the potential within 15 years, but not require the exact location of implementation for any particular strategy on the ground. It will be up to the staff to decide during the CCP implementation, what strategies to apply, at what level they should be applied, and where to apply them on the ground.

### **Goal 1:**

Upland Anoka Sandplain habitats approximate mid-1800s conditions, contributing to the preservation of these declining ecotypes and their associated Service priority species.

#### **Objective 1.1**

*Restore Big Woods:* In 15 years, initiate restoration efforts on 540 acres with an expected total restoration of 1,050 acres in 100 years. Although it can take hundreds of years for full canopy development, composition and placement of key trees should simulate Big Woods canopy.

*Rationale:* Big woods, also known as maple-basswood forest, is a plant community that takes hundreds of years to fully develop. Canopy cover in a mature forest is 80 to 100 percent and the trees can stretch 70 to 80 feet high. Tree species in the canopy are typically a mixture of maple, bass, elm, red oak, and green ash. There is a subcanopy of ironwoods and sugar maple, a sparse shrub layer, and diverse ground layer of mesic forest herbs. Sherburne NWR is located in a confluence of three ecosystems and the maple-basswood forest typifies one of them. The forest was originally present on the northern border of the Refuge where the natural course of the St. Francis River blocked many wildfires and where the soils form a clay base, due to a variation in the glacial history. Unlike many oak species, maple and basswood flourish in areas that are not burned and where moisture is retained in the soil.

*Strategies:*

- # Exclude fire to replicate a natural return interval of greater than 100 years as identified in the Refuge's *Fire Management Plan*.
- # Plant desirable species such as maple, basswood, elm, red oak, and green ash.
- # Protect seedlings by excluding herbivores.

#### **Objective 1.2**

*Manage Dry Oak Forest:* Allow dry oak forest to develop in outlying areas that can not be burned effectively given the urban development that is occurring around the Refuge.

*Rationale:* Dry oak forest is the native habitat in areas that have been protected from fire, where the soil is sandy and prone to drought. It was the natural result when fire was suppressed in this area after European settlement. The habitat type provides a home to many species of animals and plants that do not occur in the more open oak savanna. Dry oak forest plant community is identified as a deciduous forest community with relatively short canopy of oak at 50 feet and 85 percent cover. The subcanopy is sparse or absent, the shrub layer is often dense, and the ground layer is patchy. Canopy species include northern pin oak, bur oak, quaking aspen. Subcanopy species include black cherry, red maple, and bur oak. Forests of recent

Figure 20: Future Desired Upland Condition, 100-year Preferred Vegetation, Sherburne NWR

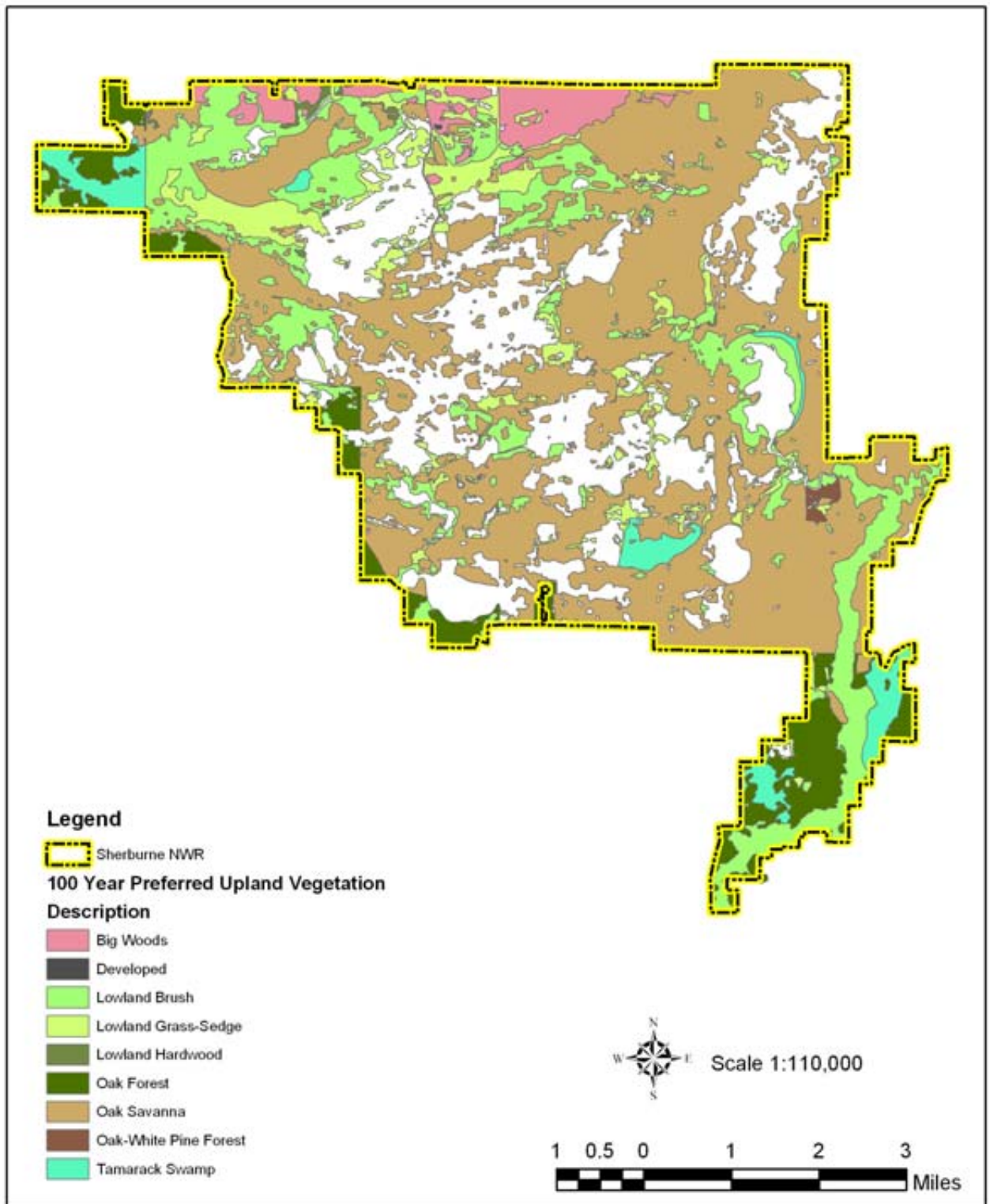
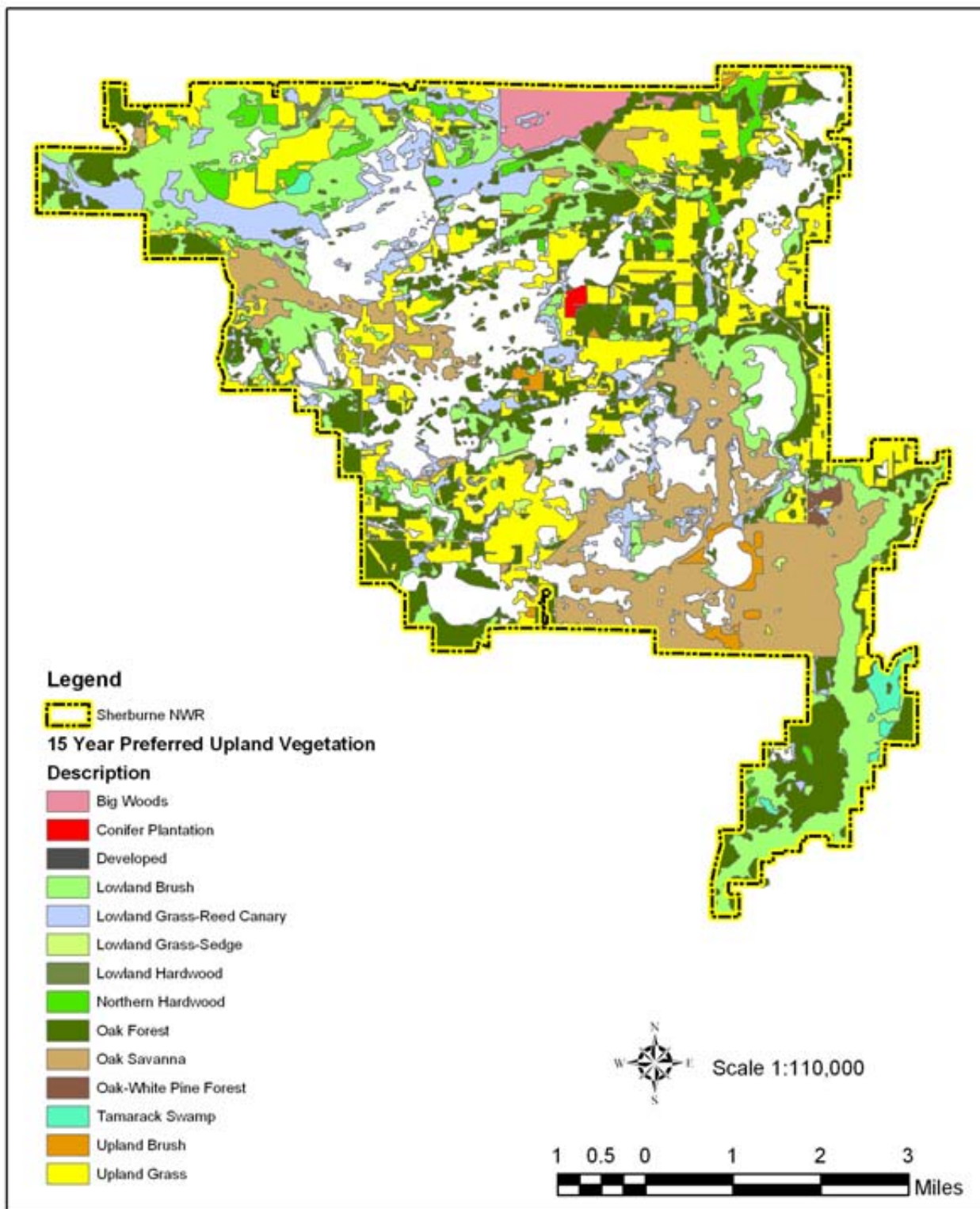


Figure 21: Future Desired Upland Condition, 15-year Preferred Vegetation, Sherburne NWR



origin typically have even-aged, multiple stemmed trees with a fairly dense, even-height canopy. Older forest have single stem trees of different ages, canopy trees with wide rounded crowns and natural gaps filled with aspen or birch.

*Strategies:*

- # Prescribed burning with longer return burn intervals (50 years or more) and lower intensity burns as identified in the *Fire Management Plan*.
- # Plant areas to native vegetation.

**Objective 1.3**

*Restore Oak Savanna:* Restore oak savanna in the uplands with a 15-year goal of 3,900 acres and a 100-year goal of 13,000 acres.

*Rationale:* “The uplands of Sherburne were predominantly oak openings,” Kevin Kenow writes in describing the early surveyors notes about the Sherburne landscape. The restoration of oak savanna outlined in this CCP will be one of the largest attempted in the Midwest. It is important because this habitat type is so rare throughout its former range. The Nature Conservancy has identified oak savanna as a globally endangered habitat type. In the past 150 years, most oak savanna was converted to agriculture but the open appeal of the landscape and the beauty of the trees also stimulated housing developments as urban areas moved into surrounding country. Oak savanna requires hundreds of years to fully develop and is characterized by 10-85 percent canopy closure, 5-35 percent relative cover of shrubs, and at least 25 percent relative cover of diverse native grasses and 25 percent relative cover of diverse native forbs.

*Strategies:*

- # Convert grassland patches greater than 40 acres in size by planting trees. Do not actively plant trees in grassland openings less than 40 acres in size.
- # Rotational burning every 3 years as a goal but not letting anything go more than 10 years as outlined in the *Fire Management Plan*.
- # Mechanical followed by chemical treatments can be used to get to the goal acres, but once goal is achieved natural process will be used to maintain.
- # Convert woodlands to oak savanna.
- # Convert old field and cropland to oak savanna.
- # Convert cottonwood and pine plantations to oak savanna.
- # Convert old grassland plantings (planted with non-local ecotypes), replant all acres of planted grassland with local ecotype seeds and ultimately convert to oak savanna.
- # Maintain current oak savanna.

**Objective 1.4**

*Oak/White Pine Forest:* Maintain 60 acres of oak/white pine forest.

*Rationale:* This area is representative of a natural habitat type identified by the Minnesota DNR (*Minnesota’s St. Croix River Valley and Anoka Sandplain: A guide to native habitats* by Wovcha et al. 1995). The habitat type was present on a portion of the Refuge at the time of European settlement. This forest is characterized as a dry to dry mesic community, it usually has a tall canopy of white pine with 20 to 80 percent cover beneath which is a short canopy of oak, aspen or maple trees. Canopy species include white pine, red oak, red maple, big toothed aspen, basswood, bur oak, northern pin oak.



*Strategy:*

- # Protect the area from fire because its natural fire return interval is 200 to 300 years.

**Objective 1.5**

*Grassland Management:* Manage 5,000 acres of upland grasslands.

*Rationale:* Many of the farm fields were converted to grasslands, some with non-local ecotypes and southern grass species. These will eventually be a part of the oak savanna restoration, but this will take many years to complete. In the interim, these grasslands will be burned during the process of conversion. In many places, conversion to oak savanna will require planting trees (see oak savanna objectives). Grasslands are characterized by less than 10 percent canopy closure, less than 5 percent shrub cover, and a diverse native grass and forb species mix.

*Strategies:*

- # Burn each unit on rotation every 3 to 10 years as outlined in the *Fire Management Plan*.
- # Convert grassland patches greater than 40 acres in size by planting trees. Do not actively plant trees in grassland openings less than 40 acres in size.
- # When burning is not effective in controlling brush, use mechanical treatments such as brush cutting and hydro-axe. Use chemical treatments if burning and mechanical control are not effective.
- # Convert old grassland plantings (planted with non-local ecotypes), replant all acres of planted grassland with local ecotype seeds and ultimately convert to oak savanna.

**Objective 1.6**

*Invasive Species Control:* Inventory and actively reduce invasive species throughout the Refuge. Reduce invasive species locations by 50 percent from 2004 levels and eliminate new infestations as they occur.

*Rationale:* Invasive species are often introduced from other areas (usually Europe) and they have no native biological controls. They are often early successional species adapted to disturbance and they move in quickly. They are difficult to control and they interfere with natural ecological processes. If they are not controlled, they can completely take over an area, out-competing native flora and fauna and reduce its biological potential and benefit to native wildlife.

*Strategies:*

- # When available, use biological control as a preferred strategy.
- # If effective biological control techniques have not been developed, use chemical and mechanical means to control infestations.
- # Fire can be effective in controlling invasive plant species.
- # Monitor the infestations and effectiveness of control measures through field work.
- # To conserve Refuge habitat, monitor exotic/invasive plant species within a 15-mile radius and continue to work with partners and landowners on a control program.
- # Document the location and size of invasive populations with GIS mapping.



**Objective 1.7** Apply prescribed fire on an average of 5,000 burnable acres annually as determined by the *Fire Management Plan*, and monitor its effect.

*Rationale:* Prescribed fire is an important tool in restoring and maintaining oak savanna, the scale of the restoration requires an ambitious prescribed fire program. If an average of 5,000 acres can be burned every year, the identified restoration will be possible to achieve in the time frame of the plan.

*Strategies:*

- # Follow the *Fire Management Plan*.

## **Goal 2**

A diverse mosaic of riverine and wetland habitats meet the needs of Service priority riparian and other wetland-dependent species.

**Objective 2.1** *Tamarack Swamp:* Maintain a minimum of 200 acres of existing tamarack swamp with additional restoration of 730 acres occurring after the 15-year planning horizon.

*Rationale:* Tamarack swamp was on the Refuge at the time of European settlement and it is identified by the early surveyors. It will be retained in areas on the Refuge because it is a unique wetland type, and because it benefits and provides habitat for trust species such as the Golden-winged Warbler.

*Strategies:*

- # Plant seedlings in specified areas.
- # Aerial seeding of seeds.
- # Fire prevention. Fire breaks have been installed around seeded areas.

**Objective 2.2** *Sedge Meadow (Reed Canary Grass Conversion):* Assess the feasibility of converting reed canary dominated areas to native species. By the end of the 15-year planning period, increase native sedge meadow/lowland graminoids by a minimum of 20 acres.

*Rationale:* Sedge meadow is a rare wetland habitat in the region due to habitat destruction. The Nature Conservancy has identified Sherburne NWR as important regionally because the Refuge retains a small portion of the remaining sedge meadow present in the Midwest. Sedge meadow is vulnerable to invasion by reed canary grass, and once this tenacious grass has taken root, it is very difficult to remove.

*Strategies:*

- # Initiate a research project to study feasibility of converting reed canary to native species (cord grass and native sedges, etc.).
- # Manipulate habitat and develop test plots.
- # Experiment with a variety of ways to recreate sedge meadow habitat and control reed canary grass.
- # Encourage sedge meadow in basins that are allowed to return to pre-ditched water levels. Monitor reed canary grass domination.

- # Use prescribed fire to reduce brush encroachment in combination with drawdowns.
- # Manipulate water level, depending on where sedge meadows are located relative to the impoundments.

**Objective 2.3**

*Maintain Lowland Brush:* For the benefit of brush-associated marsh birds, maintain a minimum of 1,250 acres of lowland brush.

*Rationale:* Lowland brush is an important habitat for many native marsh birds. It adds habitat structure necessary for many marsh-edge species of sparrows, warblers, rails, etc.

*Strategies:*

- # Manipulate water levels to encourage shrub germination.
- # Develop a monitoring protocol to track long-term trends in diversity of this wetland type.

**Objective 2.4**

*Understanding the Refuge's Hydrology:* Develop a hydrologic study for the river wetland systems within 5 years of the CCP approval. Based on the outcome, identify and implement management actions necessary to maintain progress toward achieving habitat expectations. The hydrology study should result in an understanding of impoundment management and water movement between pools in relation to the ground water.

*Rationale:* Before the impoundments were put in place, a hydrological overview was done for Sherburne NWR and some guesses were made about the impact of the impoundment system on the ground water and the St. Francis River. The impoundments were put in place but there was no follow-up study to determine what impact they have. For the most part, the impoundments have been managed at high water levels and open water has dominated. Now the Refuge would like to consider returning to a more historical condition of the impoundments. The wetland technical group determined that before these manipulations could be conducted, a study was necessary.

*Strategies:*

- # Conduct research.
- # Based on the outcome of a hydrologic study, identify and implement management actions necessary to maintain progress toward achieving habitat expectations.

**Objective 2.5**

Promote an understanding of the watersheds surrounding and within the Refuge.

*Rationale:* Understanding the hydrology around and within the Refuge is an important step in understanding the context within which the Refuge sits. The hydrology within the Refuge's watershed and adjacent watersheds is interconnected. What happens in the watershed influences what happens on the Refuge, just as what happens on the Refuge influences the watershed. This understanding can lead to collaborative approaches to solve potential regional hydrologic issues such as water quality and watershed health.

*Strategies:*

- # Use existing databases to determine a reasonable goal for understanding the regional watershed.
- # Collaborate with other agencies in managing the watersheds.
- # Educate on the importance of regional watershed conservation.

**Objective 2.6**

*Dynamic Cattail Habitat Management:* For the benefit of marsh nesting birds, annually manage 2,500 acres of cattail marsh in a variety of heights, densities and water depths. Less than 70 percent of cattail is desirable on any one basin but this will be achieved through a natural, dynamic process, not as a static target. Maintain 20-40 percent of the cattail acreage with a VOR of 50-80 cm.

*Rationale:* Cattail creates important structure within a wetland that changes the microhabitat (chemical, temperature, and current) in a way that can benefit native invertebrate populations and form the critical basis of the food chain for many marsh nesting bird species. Cattail that is not managed correctly, can also tie up nutrients and cause a marsh to become less productive for marsh nesting birds.

*Strategies:*

- # Water level manipulation to flood cattail and if possible, burn openings in cattail beds where roots are compacted.
- # Encourage a healthy muskrat population to facilitate cattail control and to create cattail openings.

**Objective 2.7**

*Open Water Management in the Spring:* For the benefit of open water dependent breeding birds, provide open water in two pools or more annually, from mid-April to July, in those years that weather conditions allow.

*Rationale:* Some nesting species require open water for nesting. Birds in migration will have priority over breeding birds in water management decisions.

*Strategy:*

- # Manipulate water according to the *Annual Water Management Plan*.

**Objective 2.8**

*Open Water Management in the Fall:* Provide at least four pools with predominately open water annually from August through November, in those years that weather conditions allow.

*Rationale:* Open water is often used by migrating waterfowl, often providing necessary resting and roosting sites during fall migration. This kind of habitat also provides hunters with access to waterfowl during the fall waterfowl hunting season.

*Strategy:*

- # Manipulate water according to the *Annual Water Management Plan*.

**Objective 2.9**

*Fall Migrating Waterfowl and Other Seed-eating Migrants:* For the benefit of fall migrant waterfowl, from mid-July to mid-September, provide 50-150 acres of sparsely distributed (<20 percent cover), short native vegetation (<20 cm) flooded to depths ranging from moist soil to 12 cm of water.

*Rationale:* Waterfowl will pause on open water to rest during migration, but they need a food resource to stay. The abundant seeds of annual aquatic plants allowed to grow in moist soil and then flooded during migration provides a very necessary food resource for migrants, it also holds the birds in an area, which benefits local hunters during the waterfowl hunting season.

*Strategy:*

- # *Annual Water Management Plan* calls for at least two pools to be in drawdown during the year, then water will be returned in the fall.

**Objective 2.10**

*Wild Rice Management:* For the benefit of seed-eating fall migrants, manage the schedule to obtain 700 acres total across at least three basins of seasonal wetland habitat dominated by native annual plants (70 to 90 percent), including wild rice.

*Rationale:* Waterfowl will pause on open water to rest during migration, but they need a food resource to stay. The abundant seeds of annual aquatic plants allowed to grow provides a very necessary food resource for migrants, it also holds the birds in an area, which benefits local hunters during the waterfowl hunting season. Wild rice, which grows in many of the area lakes, will also provide excellent food for fall migrating waterfowl. The wild rice beds in this area of the country may have been originally augmented by Native Americans and were probably the reason this area was known as a great area for hunting.

*Strategies:*

- # Water level manipulation of pools (pools in drawdown change from year to year in accordance with the *Refuge Annual Water Management Plan*).
- # Active removal of beaver dams on Orrock and Buck Lakes.

**Objective 2.11**

*Spring Drawdown:* To benefit spring migrant shorebirds and pre-breeding dabbling ducks, manage impoundments to provide 30-50 acres annually of shallow water habitat characterized by sparsely distributed (<20 percent cover) short vegetation (<20 cm) flooded to depths ranging from moist to 12 cm in a way that would encourage invertebrate densities.

*Rationale:* Shorebirds are attracted to aquatic invertebrates, particularly aquatic midge larvae in the order Diptera (Chironomidae). These larvae, also known as blood worms, are detritivores and build rapidly to large numbers when a wetland is managed as an early successional, seasonal wetland. It takes several years to make the right conditions happen. It is important to allow annual vegetation to grow, and then drown the vegetation and allow it to decompose to build up the nutrient level in the water, which results in more midges in the wetland bottom. Midge often take several years to mature. They will remain out of reach for most shorebirds unless a second drawdown is timed for the migration period and the midge population is exposed. To make invertebrates available to shorebirds, begin a drawdown in the spring by April 15, continuing through June 15. Each drawdown requires 3 years of preparation.

*Strategies:*

- # Year 1: Manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year (could also increase nutrients by introducing hay).

- # Year 2: Then raise water to a level of 12 to 30 cm during the second year to drown the vegetation and encourage decomposition of vegetation.
- # Year 3: Finally, manage a slow drawdown beginning in April and continuing through June 15 of the third year.

**Objective 2.12** *Fall Drawdown:* For the benefit of fall migrating shorebirds provide 30-50 acres of sparsely vegetated (<20 percent cover), seasonal wetland habitat with water levels ranging from 12 cm to mudflat in slow drawdown from June 15 to August 30.

*Rationale:* The same rationale described under Objective 2.11 applies to this objective as well.

*Strategies:*

- # Year 1: Manage the wetland as a moist soil unit by encouraging germination of annual vegetation in the first year.
- # Year 2: Then raise water to a level of 12 to 30 cm during the second year to down the vegetation and encourage decomposition of vegetation.
- # Year 3: Finally, manage a slow drawdown beginning in June of the third year.

**Objective 2.13** *Manage Wetland Diversity:* Manage the impoundments to maximize wetland diversity within the capabilities of the system. Create wetlands that vary from temporary to permanent by varying the water regime. Focus on semi-permanent wetlands to provide optimal habitat for water-birds in migration.

*Rationale:* An impoundment system allows the manager to simulate a natural wetland complex by manipulating water in a variety of ways to increase the diversity of wetland types. At Sherburne NWR, water level manipulation has created many types of wetlands. We have a high number of semipermanent wetlands because, with correct water manipulation, these wetlands can be the most productive for water birds.

*Strategies;*

- # Manipulate water according to the *Annual Water Management Plan*.
- # Develop wetland/habitat allocation tracking system.

**Goal 3:**

A diversity of native migratory birds and other native wildlife reflects an emphasis on Service priority species appropriate to Refuge habitats.

**Objective 3.1** *RCP Species:* Within 15 years of CCP approval, 60 percent of the Region 3 RCP species associated with historically occurring habitats will be present on the Refuge.

*Rationale:* Region 3's Resource Conservation Priority (RCP) list includes rare and declining species, federally listed, and recreationally important species that are of high concern in the upper Midwest. The RCP list was developed to help prioritize management.

*Strategies:*

- # Monitor population trends (point counts, waterfowl surveys, breeding bird survey) according to the wildlife inventory plan.
- # Support research activities that are directed toward these species.

**Objective 3.2**

*Sandhill Cranes:* Provide roosting areas for up to 5,000 Sandhill Cranes. Public use is prohibited between September 1 and December 1. The area is characterized by 200 acres of shallow water (less than 46 cm) with 150 m buffer of open space surrounding the roost for a total roost and buffer area of 500 acres.

*Rationale:* Sandhill Cranes are neither endangered nor on the RCP list, but they are an important bird on the Refuge because they are native to the area and are enjoyed and valued by the viewing public. The Refuge provides an important roosting area during fall migration. Many people who come to the Refuge to enjoy wildlife can see these large, vocal birds and feel their trip to the Refuge was a success.

*Strategies:*

- # Water level management to provide this habitat somewhere within the Refuge.
- # Provide food resource off-Refuge by working with local land owners.

**Objective 3.3**

*Monitoring Plan:* Develop a new monitoring plan for wildlife within 5 years of CCP approval.

*Rationale:* Monitoring is a key element in determining if Refuge management is achieving its goals of providing habitat for key wildlife species.

*Strategies:*

- # Management changes will revolve around establishing “thresholds” based on long-term averages from a variety of sources (regional, Refuge based, literature, BBS, etc.). The initial thresholds will be established with the best available information and revised through the monitoring process.
- # Periodically, as identified in the inventory and monitoring plan, determine the variety and abundance of native, migratory birds and other native wildlife with an emphasis on Service priority species.
- # We will use the data we acquire through monitoring wildlife numbers as a “feedback” indicator of the appropriateness of our habitat objectives or our success at meeting habitat objectives (as stated in habitat goals).
- # Through adaptive management we will reevaluate habitat objectives and the effectiveness of strategies used to meet the objectives.

**Objective 3.4**

*Federal and State Endangered, Threatened and Candidate Species:* Annually, provide habitat for all Federal and State-listed species documented as of 2005 and that are associated with historically occurring habitats on the Refuge.

*Discussion:* Sherburne NWR is home to two wildlife species that are federally listed threatened species: the Bald Eagle and Gray Wolf. In 2004, seven Bald Eagle pairs nested on the Refuge. Almost 100 eagles have been produced since nesting eagles returned to the Refuge in 1983. Transient, individual gray wolves also frequent the Refuge. However, no established packs are known to use the Refuge.

In addition, several species listed by the State of Minnesota are also known to occur on the Refuge including the Henslow's Sparrow, Trumpeter Swan and Loggerhead Shrike. Many of the State-listed species are Regional Resource Conservation Priority species for the Service.

*Strategies:*

- # Endangered and threatened species will be protected to the maximum extent possible under all management actions discussed in this plan.
- # Adhere to "avoidance of adverse effects" stipulations listed in the Intra-Service Section 7 Biological Evaluation Form completed for the CCP and dated November 2005.
- # Support research activities that are directed toward these species.

**Objective 3.5**

Maintain deer population densities that are less than or equal to numbers sustainable by the habitat. Our present information indicates that a spring population of no more than 16 per square mile meets this objective.

*Rationale:* It is necessary to maintain the deer population at a healthy density. If the population exceeds a certain density, disease and starvation occur in the herd and the deer will damage the Refuge vegetation and habitat. A large deer herd also will spill onto neighboring suburban developments.

*Strategies:*

- # Control through annual hunt (See public use objectives).
- # Identify the deer densities that impact habitat.
- # Management hunt (if necessary).
- # Consider using alternative treatments in addition to hunting to control deer.
- # Monitor chronic wasting disease.
- # Develop a chronic wasting disease contingency plan.

**Objective 3.6**

Within 10 years support a study to determine the feasibility of reintroducing extirpated species, such as bison, elk or prairie butterflies, onto the Refuge as a part of the proposed habitat restoration efforts.

*Rationale:* The restoration of natural communities, such as oak savanna, goes beyond the re-establishment of the vegetative communities. Many animals play important roles within plant communities and contribute positively to their sustained health by performing such key functions as grazing and pollination. It is an important part of a habitat restoration effort to examine if animal species known to have been in a historic habitat could be reintroduced to again play these roles. Prior to any reintroduction, present day challenges and constraints need to be identified to determine the feasibility of such an action. Questions such as habitat availability, human safety, interactions with current wildlife populations, and the ability to replicate the historic timing and scale of the impact these animals had on the habitat are some of the issues that should be explored.

*Strategies:*

- # Research the literature.



- # Interview people who have experience managing and/or reintroducing these animals to identify successes, challenges, and potential constraints.
- # Perform small scale experimentation on the Refuge.
- # Collaborate with other agencies, organizations, and natural area managers with similar habitat types and reintroduction interests to examine portions of the problem on their areas.

**Goal 4:**

A complex of natural areas, corridors, and watershed conservation practices in the surrounding landscape complements Refuge habitat and wildlife goals.

**Objective 4.1**

*Landscape Conservation:* Participate in development of a plan to coordinate conservation of a complex of natural areas, corridors, and watersheds in the landscape surrounding the Refuge.

*Rationale:* As the land around the Refuge continues to develop into a suburban landscape, it will be important to augment Refuge habitat with greenways and other natural areas.

*Strategies:*

- # Coordinate a green infrastructure plan to ensure the preservation of a complex of natural areas, corridors and watershed conservation practices in the landscape surrounding the Refuge.
- # Within 2 years of plan approval, map natural and managed areas.
- # Obtain fundamental hydrologic data for the entire St. Francis watershed, the Snake River watershed (between the Refuge and Elk River), and sub-watersheds adjacent to the Refuge.
- # Identify potential corridors to facilitate wildlife movement between conservation areas.
- # Use existing programs such as green infrastructure and Partners for Fish and Wildlife Program and conservation easements.

**Objective 4.2**

*Functioning Watershed:* Determine what level of function can be returned to the Refuge’s hydrologic regime.

*Rationale:* The Refuge has a unique opportunity to restore the natural function of the St. Francis River. Most of the river occurs within the Refuge boundaries. Over time, this has resulted in a stream bed that is disconnected from much of the flood plain within the watershed. Returning the river to a more natural relationship to the floodplain will require time and research.

*Strategies:*

- # Facilitate completion of a watershed management plan emphasizing the entire St. Francis River and Snake River in partnership with local governments and landowners. Implement using the results of the hydrological study.
- # Review and consider existing plans and DNR stewardship plans.
- # Use the private lands program to restore wetlands and riverine habitats within the watersheds identified.

**Objective 4.3:** *Restore Wetlands on Private Lands:* Restore 400 wetlands off-Refuge, with priority given to those within the St. Francis River Watershed.

*Rationale:* The restoration of wetland on private lands buffers wetland loss throughout the region and it augments habitat provided to water birds on the Refuge. It creates valuable alliances with private land owners and other partners of the Service.

*Strategies:*

- # Use the Partners for Fish and Wildlife Program.
- # Use the standard approach to restoration including plugging ditches, breaking tile, and building dikes.
- # Exclude grazing from riverbanks.
- # Plant native aquatics.
- # Develop demonstration areas.
- # Encourage research into wildlife response to restoration.

**Objective 4.4** *Restore Native Uplands on Private Lands:* Restore 100 areas with priority given to areas within 15 miles of the Refuge.

*Rationale:* Many of the restored wetlands are enhanced by having native grasslands in the uplands surrounding the wetlands. This benefits nesting grassland and marsh species, particularly nesting waterfowl. In addition, oak savanna restoration in the landscape surrounding the Refuge can augment native habitat restoration on the Refuge.

*Strategies:*

- # Link upland and wetland restoration.
- # Follow Mississippi Headwaters/Tallgrass prairie ecosystem team's recommendation on species composition in restorations.
- # Annually, recommend to an average of three new private land-owner participants within the Sherburne Management District that they use prescribed burning to manage native grasslands and savanna.
- # Work with NGOs to buy development rights and then assist in restoration of larger blocks (250 acres) for oak savanna and prairie interspersed habitat.
- # Provide technical assistance.
- # Use permanent easements.
- # Encourage prairie and oak savanna plantings by private individuals.
- # Restoration of demonstration areas in conjunction with schools.

**Objective 4.5** *Encourage Native Habitat on Private Land Development:* The Refuge will coordinate with an average of two new land developments within the upper St. Francis watershed to encourage the inclusion of no more than 15 percent impervious surfacing within developed areas and include native habitat for wildlife within development plants.

*Rationale:* Suburban land development is common around the Refuge and many of the developers are open to the idea of green space because it increases the value of the new development both to them and the new owners of homes in the area. Working with the developers, the Refuge could encourage the planting of native species in planned green space.

*Strategies:*

- # Partnerships include Sherburne County Soil and Water Conservation District and Sherburne County Planning and Zoning.
- # Ensure habitats are connected to other habitats and use native plants.
- # Provide seed source.
- # Provide technical expertise and equipment.

**Objective 4.6** Monitor current land easements in the region surrounding the Refuge and visit all Refuge easements annually.

*Rationale:* Current Refuge easements are vulnerable to violations throughout the year from surrounding land use, off-road vehicle violations, draining, and other methods of destruction. Monitoring them is important to maintaining their contribution to the natural landscape surrounding the Refuge. In some cases, management of easements may contribute to the overall impact of the Refuge in maintaining the natural landscape. Active monitoring and management of the easements needs to be planned and included in the overall activities of the Private Lands Program.

*Strategies:*

- # Develop a database for easement monitoring.
- # Determine future direction of easement management.

**Goal 5:**

Visitors enjoy wildlife-dependent opportunities that further an appreciation of Refuge wildlife and habitats.

Hunting

**Objective 5.1** Increase hunting opportunities from the level offered in 2004.

*Rationale:* Hunting is an important and valuable activity on the Refuge and is one of the wildlife-dependent recreational uses approved by law in the 1997 Improvement Act.

*Strategies:*

- # Annually provide at least four blinds for hunters with disabilities for deer and waterfowl seasons.
- # Reserve blinds for exclusive use by hunters with disabilities on a first come/first serve basis.
- # Provide annual firearms deer hunt within the framework of the Minnesota State Department of Natural Resources (DNR) on at least 70 percent of the Refuge lands.
- # Continue small-game hunting opportunities as defined by state regulations on areas identified in the Refuge hunting brochure.

- # Add a spring turkey hunt for hunters with disabilities in designated blinds in specific areas.
- # Continue the youth waterfowl hunt.
- # Continue waterfowl hunting within the state framework on areas identified in the Refuge hunting brochure.
- # Continue archery deer hunting within the state framework on areas identified in the Refuge hunting brochure.
- # Develop operational definition of success and measures for hunting through a survey of hunter satisfaction. Include indicators directed toward recreational users with disabilities.

### Fishing

**Objective 5.2** Increase fishing opportunities from the level offered in 2004.

*Rationale:* Fishing is an important and valuable activity on the Refuge and is one of the wildlife-dependent recreational uses approved by law, when compatible with Refuge purposes, in the 1997 Improvement Act.

*Strategies:*

- # Provide an accessible fishing platform.
- # Provide fishing opportunities on St. Francis River at a minimum of four access points; reassess the program every 5 years.
- # Develop operational definition of success and measures for fishing through a survey of angler satisfaction. Include indicators directed toward recreational users with disabilities.
- # Provide opportunities for youth fishing.

### Wildlife Observation

**Objective 5.3** Increase wildlife observation opportunities from the level offered in 2004.

*Rationale:* Wildlife observation is an important and valuable activity on the Refuge and is one of the wildlife-dependent recreational uses approved by law, when compatible with Refuge purposes, in the 1997 Improvement Act.

*Strategies:*

- # Maintain a fully accessible trail (currently one-eighth mile) on the wildlife drive.
- # Maintain Refuge lands open for winter wildlife viewing.
- # Maintain four to six platforms to facilitate wildlife viewing, photography, information and education experiences.
- # Maintain a 7.3-mile wildlife drive (auto tour route) and 9 miles of hiking trails.
- # Develop an operational definition of success and measures for wildlife observation through a survey of visitor satisfaction. Include indicators directed toward recreational users with disabilities.
- # Develop additional hiking trails in conjunction with a new visitor center.
- # Construct an observation deck overlooking Rice Lake.

- # Provide a viewing station within the new visitor center that is linked to a remote camera for wildlife observation.
- # Work with local units of government on the development of regional trails that link to the Refuge.

### Wildlife Photography

**Objective 5.4** Continue opportunities for nature photography at the level offered in 2004.

*Rationale:* Nature photography is an important and valuable activity on the Refuge and is one of the wildlife-dependent recreational uses approved by law, when compatible with Refuge purposes, in the 1997 Improvement Act.

*Strategies:*

- # During the sanctuary time (spring and summer), photography will be restricted to the tour route and trails, but special use permits are possible. At other times of the year, nature photography is permitted with few restrictions.
- # Develop operational definition of success and measures for photography through a survey of photographers. Include indicators directed toward recreational users with disabilities.

### Environmental Education

**Objective 5.5** Target a 10 percent increase in participation in environmental education programs over present levels within 5 years of CCP approval.

*Rationale:* Environmental education is an important and valuable activity on the Refuge and is one of the wildlife-dependent recreational uses approved by law, when compatible with Refuge purposes, in the 1997 Improvement Act.

*Strategies:*

- # Provide facilities and a program for teacher-lead environmental education activities for area schools, and other Refuge visitors, with a message emphasis on migratory water birds, pre-settlement habitats, and wildlife management activities.
- # Provide a new visitor center to facilitate environmental education and interpretation.
- # Train volunteers to assist with environmental education programming.
- # Partner with the Department of Education at nearby universities and colleges to recruit student teachers to develop and lead environmental education programs.
- # Reach out to a variety of audiences (example, K-12, colleges, elderhostels, etc.).
- # Encourage partnerships with local schools.
- # Provide teacher workshops.
- # Increase the level of programming to increase use of the Refuge by schools and other community organizations.

**Objective 5.6** Annually, 70 percent of visitors and students participating in Refuge-sponsored environmental education understand and appreciate the management emphasis of migratory water birds, pre-settlement habitats and wildlife management activities.

*Rationale:* Environmental education must be evaluated to determine if it is effectively meeting the goals of the program. Without evaluation, it is impossible to know if understanding is actually increasing.

*Strategies:*

- # Develop operational definition of success and measures for environmental education. Include indicators directed toward participants with disabilities.

### Environmental Interpretation.

**Objective 5.7** Interpretation will emphasize wetlands and migratory birds, ecological processes, pre-settlement habitats, and the importance of wildlife management.

*Rationale:* Environmental interpretation is an important and valuable activity on the Refuge and is one of the wildlife-dependent recreational uses approved by law, when compatible with Refuge purposes, in the 1997 Improvement Act.

*Strategies:*

- # Annually provide programs, events, festivals and/or tours to interpret the Refuge and enhance visitor understanding of the Refuge and its mission.
- # Conduct at least 10 programs or events each year.
- # Provide six kiosks that help visitors interpret Refuge habitats, wildlife and wildlife regulations.
- # Provide for a changing demography and address new audiences about the issues raised with urban expansion.
- # Provide special programs and seminars for continuing education and train volunteers to act as roving interpreters.
- # Provide interpretive panels on hiking trails and the auto tour route.
- # Construct interpretive panels at fishing access points and high-use hunter parking areas.

**Objective 5.8** Eighty percent of visitors understand the Refuge mission, purpose, and management actions as assessed every 5 years.

*Rationale:* It is important to reach user groups so that they can better understand the Refuge management that is being conducted. Interpretation must be assessed to determine if it is effectively meeting the goals of the program. Without evaluation, it is impossible to know if understanding is increasing or if visitor expectations are being met.

*Strategies:*

- # Develop an operational definition of success and measures for environmental interpretation. Include indicators directed toward recreational users with disabilities.

- # Develop a survey instrument to measure success in meeting expectations of recreational user groups. The objective of the survey, implemented as outlined in the Visitor Services Plan, would be: 1) 80 percent of visitors understand the Refuge mission, purpose, and management actions as assessed every 5 years; and 2) Annually, 70 percent of visitors participating in Refuge-sponsored hunting and fishing understand and appreciate the management theme of ecological processes, migratory water birds, and pre-settlement habitats.

**Goal 6:**

Visitors and local citizens demonstrate a strong conservation ethic that leads to support of the Refuge, conservation of the surrounding landscape, and global environmental awareness.

**Objective 6.1**

*Community Outreach:* Increase awareness of Refuge management within surrounding areas by annually providing opportunities for at least 2,000 students to participate in programs, 20 teachers to participate in training programs, 600 people to volunteer at the Refuge, and 300 people to be members of a supporting friends group.

*Rationale:* It is critical to the mission of the Refuge that the neighbors and citizens in the surrounding landscape know about the Refuge and support it as a valuable and contributing part of the community.

*Strategies:*

- # Provide 10 programs, events and tours annually. These would include the Winterfest, Wildlife Festivals, Migratory Bird Day, Wildlife Film Festival, and guided bird and nature tours.
- # Offer training programs for teachers centered on the Refuge's place in the ecological landscape and the importance of habitat management.
- # Train volunteers to assist in Refuge programs
- # Support and cooperate with the Friends group.
- # Increase membership of Friends on the Refuge by 10 percent from 2004 levels.
- # Offer student programs centered on the Refuge's place in the landscape and the importance of management.
- # Participate in off-site community events.
- # Issue regular news releases.
- # Maintain a Refuge website with current information about Refuge management and events.
- # Increase community partnerships.
- # Support an active volunteer program.

**Objective 6.2**

*Community Awareness:* Sixty percent of neighbors, community leaders, and residents of nearby communities express an awareness of the Refuge's mission and the need for increased local conservation.

*Rationale:* Community awareness should be evaluated to determine if the Refuge programs designed to increase awareness are being effective.



*Strategies:*

- # Develop a community assessment survey and conduct the survey every 5 years to determine community awareness of the Refuge's mission and the importance of local conservation efforts.
- # Contract with a university to develop the assessment survey.
- # Increase partnerships with community businesses and organizations.

**Objective 6.3**

*Provide Technical Assistance:* Ninety-five percent of the residents within the eight-county area around the Refuge designated as Sherburne Management District (Figure 22) who seek technical assistance receive a response within 1 week of their request and feel good about their experience with the Service.

*Rationale:* When the public comes to the Refuge with a question, it is important that they receive assistance and information that is useful in a timely and thoughtful way. Some requests may even require on-the-ground assistance from Refuge staff. These requests should be honored within the budget constraints of the Refuge.

*Strategies:*

- # Provide technical assistance or information to inquiring private landowners in the Sherburne Management District within annual budget constraints.
- # Inform residents within the Sherburne Management District about the Partners for Fish and Wildlife Program through one or more formats such as radio addresses, brochures, news releases, talks to community organizations and the Refuge website.

**Objective 6.4**

*Private Landowner Contacts:* Make 20 contacts with private landowners each year in the St. Francis River watershed to provide technical restoration assistance. The message should focus on wetland loss and impacts of changing land use on the regional hydrograph.

*Rationale:* One of the best ways to be helpful in the community is to provide on-the-ground technical assistance and aid for restoration projects on private land. The Refuge will make an effort to actively contact private landowners and talk with them about available assistance.

*Strategies:*

- # Provide technical assistance and information to inquiring private landowners in the St. Francis River watershed within the annual budget constraints.
- # Inform residents within the St. Francis River watershed about the Partners for Fish and Wildlife Program through one or more formats such as radio addresses, brochures, news releases, talks to community organizations and the Refuge website.

**Goal 7:**

The cultural resources and cultural history of the Refuge are valued and preserved, and connect Refuge staff, visitors, and the community to the area's past.

**Objective 7.1**

Ensure archeological and cultural values are described, identified, and taken into consideration prior to implementing undertakings. (The intent of this statement is to cover Section 106 of the National Historic Preservation Act and Section 7(e)(2) of the FWS Improvement Act.)

**Figure 22: Refuge Management District, Sherburne NWR**



*Rationale:* The historic and pre-historic artifacts on the Refuge are limited and irreplaceable national treasures. Many of the sites have been identified but not researched.

*Strategies:*

- # Initiate a Cultural Resources Management Plan within 3 years of CCP approval that incorporates all existing surveys and investigations and identifies future needs. Develop a step-down plan for surveying lands to identify archeological resources and for developing a preservation program. (The intent of this statement is to meet the requirements of Section 14 of the Archaeological Resources Protection Act and Section 110(a)(2) of the National Historic Preservation Act.)
- # Prepare a museum property Scope of Collections Statement for the Refuge. (The intent of this statement is to meet the requirements of the DOI Departmental Manual, Part 411.)
- # Develop an oral cultural history to preserve the “community memory” about the area.

**Objective 7.2**     *Cultural Resources Appreciation:* Seventy percent of visitors will understand and appreciate the cultural history of the Refuge.

*Rationale:* The interest and depth of a natural landscape is enhanced by an understanding of its history. An effective program that increases the understanding of this history by visitors to the Refuge will increase their sense of the Refuge's value. This effort should be evaluated to make sure it is successful in achieving the goals of increased appreciation.

*Strategies:*

- # Incorporate cultural history messages into programs, exhibits and other media with an emphasis on use of the Refuge landscape throughout time.