

# Chapter 4: Management Direction

## 4.1 Planned Refuge Programs

### 4.1.1 Introduction

Managing a national wildlife refuge demands that we chart a long-term course that will ensure the health and persistence of wildlife and habitat species. There may be too many variables to plot a course into the future that is as precise as a road map, but we can at least note a few landmarks to steer by. Through this comprehensive conservation plan, which has been developed with the participation of the State of Missouri and other partners, and with participation by neighbors and other interested people, we have defined goals that will guide Squaw Creek NWR for the next 15 years.



*Frank Durbian*

Section 4.2 details goals for the Refuge, the objectives we have identified for achieving those goals, and the strategies by which we mean to achieve our objectives. In this section, we provide a brief overview of our plans for Squaw Creek NWR.

### 4.1.2 Habitat

In considering the Refuge's future, we are mindful that the Refuge was established to provide a resting, breeding and feeding ground for migratory birds and other wildlife. We intend to accomplish this by providing a diversity of habitats, with particular emphasis on wetlands. We will maintain uplands that create diverse habitats. We will manage forest land to benefit migratory songbirds and to benefit threatened and endangered species, other migratory birds, and indigenous species. We will work with farm program cooperators to convert cropland to grassland or woodlands. By continuing our work with private landowners using existing programs, we will contribute to reducing erosion and sedimentation and improving the quality of surface runoff waters.

### 4.1.3 Fish and Wildlife

We will learn more about annual peak populations of wildlife using the Refuge so that we better understand species' needs and the Refuge's ability to meet those needs. We will maintain waterfowl use day levels at a minimum of 5 million, however we will assist in international efforts to reduce the mid-continent population of Lesser Snow Geese. This will include reducing cropland on the Refuge as well as offering a spring Snow Goose hunt. We will better manage deer populations to improve the quality of Refuge habitat. We will seek Refuge designation as a Western Hemispheric Shorebird

Reserve Network, which would contribute to funding initiatives and gain international recognition of the Refuge and its work to conserve indigenous species. We will maintain bottomland cottonwood forest areas in an effort to support Bald Eagles during fall and winter migration periods. We will maintain habitat that is critical to the Eastern Massassauga rattlesnake and Least Bittern.

#### 4.1.4 Wildlife-dependent Recreation, Environmental Education and Interpretation

Our programs will inspire people to care about Squaw Creek NWR, natural resources, and the environment. Toward that end, we will focus on improving the quality of the visit. To accomplish this, we will design and implement interactive programs that meet Service standards and bring existing facilities up to Service standards. We will improve our orientation maps and signage. We appreciate traditional Refuge visitors and want them to continue coming to Squaw Creek NWR, and we will reach out to diverse groups of people who are not traditional Refuge visitors.



George Scheil

Volunteers play a critical role at the Refuge, and we want to strengthen our relationships with volunteers (and through them, the community) by drawing more people to contribute their time and talent to the Refuge. We will work to strengthen our relationship with Friends of Squaw Creek National Wildlife Refuge.

#### 4.1.5 Avoidance of Impacts to Listed Species

To assure that listed species will not be adversely affected, proposed species are not jeopardized, or critical habitat is not adversely modified, we will observe the following guidelines as we implement the Squaw Creek NWR CCP.

##### **Bald Eagle** (*Haliaeetus leucocephalus*)

No disturbance will take place during critical periods within protective zones as described in the 1983 Northern States Bald Eagle Recovery Plan, Appendix E, Management Guidelines for Breeding Areas.

##### **Eastern Massassauga Rattlesnake** (*Sistrurus catenatus catenatus*)

Although not currently listed, the Eastern Massassauga rattlesnake is a candidate for listing. As the CCP is implemented, the Refuge will seek opportunities for conservation of this species on and off the Refuge. We will use Johnson et al., 2000, The Eastern Massassauga Rattlesnake: A Handbook for Land Managers, USFWS, Ft. Snelling, Minnesota, and the results of current research efforts to guide our conservation efforts.

##### **Piping Plover** (*Charadrius melodus*)

The Piping Plover is a rare transient on the Refuge and is not observed annually. They are generally seen during the spring migration but do not nest on the Refuge. If any birds were to attempt to nest, the location would be secured and free from disturbance.

#### 4.1.6 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 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."

The land is a tremendous force in carbon sequestration. Terrestrial biomes of all sorts – grasslands, forests, wetlands, tundra, perpetual ice and desert – are effective both in preventing carbon emission and acting as a biological "scrubber" of atmospheric carbon monoxide. The Department of Energy report's conclusions noted that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere.

Preserving natural habitat for wildlife is the heart of any long range plan for national wildlife refuges. The actions proposed in this comprehensive conservation plan would conserve or restore land and water, and would thus enhance carbon sequestration. This in turn contributes positively to efforts to mitigate human-induced global climate changes.

## 4.2 Goals, Objectives and Strategies

The following goals for habitat, wildlife and people are general statements of what we want to accomplish in the next 15 years.

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 listed under each objective specify the activities that will be pursued to realize an objective. The strategies may be refined or amended as specific tasks are completed or new research and information come to light.

### Goal 1: Habitat

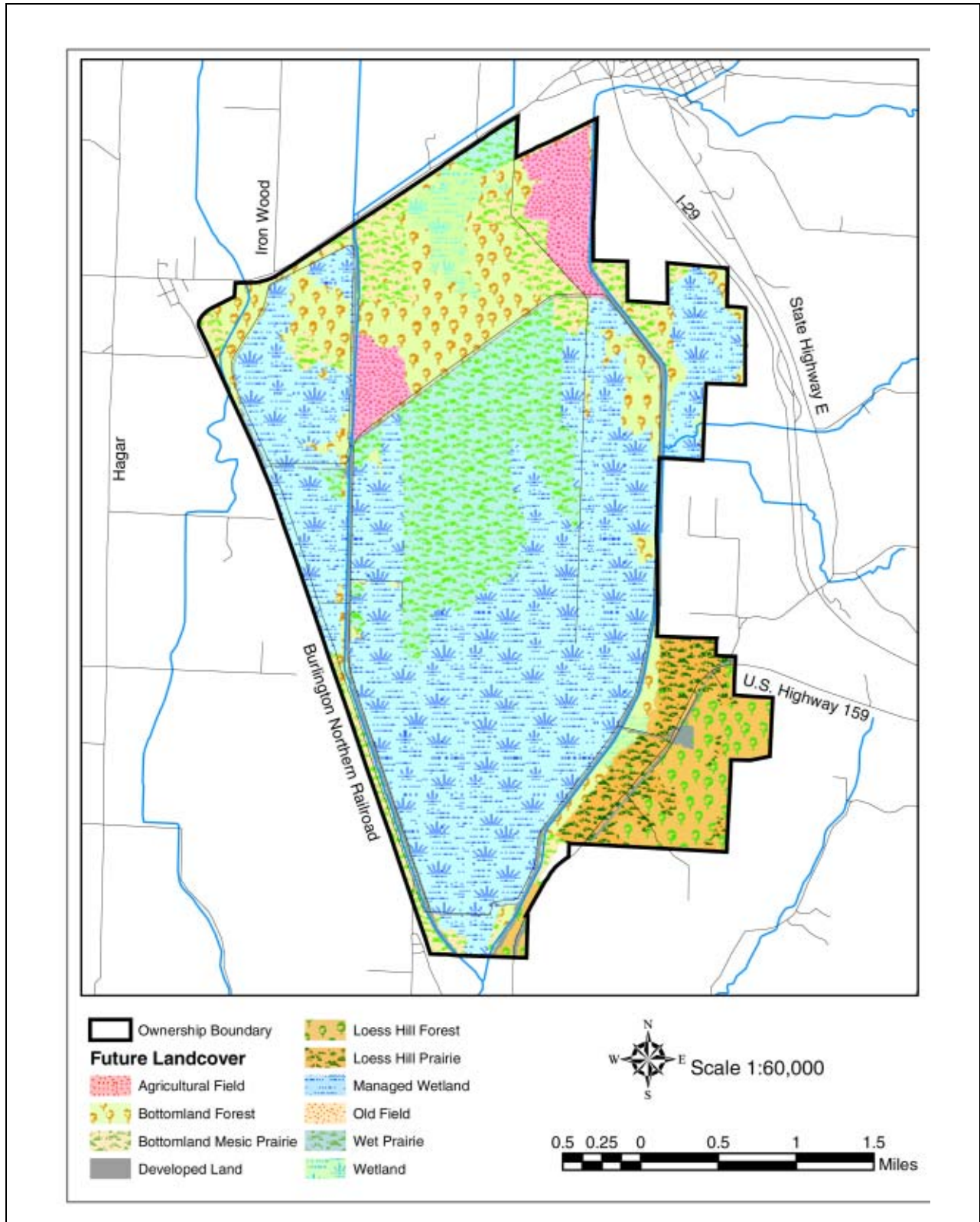
Manage a diversity of habitat to benefit threatened and endangered species, waterfowl, other migratory birds, and indigenous species in Lower Missouri River floodplain ecosystem and the Central Tallgrass Prairie ecosystem.

*Rationale:* Squaw Creek NWR was established in 1935 to provide a resting, breeding and feeding ground for migratory birds and other wildlife. A diversity of habitats will be maintained in optimum condition with particular emphasis on wetland enhancement to meet the primary Refuge purpose (Figure 12). The wetland diversity will include a mosaic of mudflats, shallow water, moist soil, flooded timber and deep water permanent marshes to support a large variety of marsh, water and shore birds with special emphasis on spring and fall habitat for migrating waterfowl. The upland will include the maintenance of native warm and cool season grasses, brushland, timber and croplands, to achieve a diverse mosaic of habitats rather than monotypic stands. These habitats will be managed to attract and support Federal and State listed endangered, threatened, and candidate species. Utilize existing programs to encourage private landowners to improve soil and water conservation management that will result in reduced soil erosion and sedimentation and improved quality of surface runoff waters.

**1.1. Objective:** Wetlands: Manage 3,452 acres of seasonally flooded impoundments that will be manipulated to provide open water, exposed shoreline and mudflats, and shallow wetlands traditionally preferred by migratory birds and other wetland-associated wildlife species.

*Rationale:* The Refuge is an important stopover during the spring and fall migration for marsh, water and shorebirds. Managed water impoundments on the Refuge help to offset the ever diminishing availability of wetland habitat along the Missouri River floodplain.

Figure 12: Future Desired Land Cover, Squaw Creek NWR



*Strategies:*

1. Manage water levels in Eagle Pool (900 acres) and Pelican Pool (600 acres) primarily for resting and roosting migrating waterfowl, by maintaining elevations at approximately 852.0 MSL during the fall and spring migratory periods. Start recharging pools no later than October 1 to achieve full pool level by November 15. Other species to benefit from this management action are Least Bittern, Pied-billed Grebe and Common Moorhen.
2. Provide for open water habitat in Eagle and Pelican pools by mechanical or chemical treatment or by burning to control American lotus, river bulrush, and cattail when vegetative surface area coverage exceeds 80 percent. Yearly vegetation monitoring will be conducted to assess status of problem vegetation.
3. Maintain a minimum of 15 percent of cattail stands; use summer drawdowns to encourage regrowth of cattail on Eagle and Pelican pools for nesting species such as Least Bittern, Yellow-headed Blackbird, and Marsh Wren.
4. Maintain minimum winter depths of 12 to 18 inches in Eagle and Pelican pools for muskrat survival to assure open water areas (muskrat eat-out areas) will be available for roosting and resting waterfowl.
5. Drawdown water in 40 percent of the remaining wetland impoundments annually to encourage growth of shallow water and moist-soil plants to benefit waterfowl and provide mudflats and exposed shoreline to benefit shorebirds.
6. Allow water levels to fluctuate naturally in the remaining 60 percent of wetland impoundments for the benefit of species requiring standing water such as waterfowl broods, water birds, reptiles, amphibians, and muskrats.
7. On a 5-year cycle, mechanically or chemically treat or prescribe burn a minimum of 300 acres each year to maintain early successional stage, reduce undesirable plants, encourage preferred seed producing plants, create additional shoreline and mudflat habitat, and provide open water.
8. Davis Creek moist soil unit No. 1 (28 acres) and Cattail Triangle (14 acres) will be permanently managed as seasonal mudflat and open shallow water habitat specifically for spring and fall migrating shorebirds. This will be accomplished annually by early spring drawdown, summer mechanical manipulation, and late summer flooding.
9. Install water control outlet structures on Snow Goose Unit C into Squaw Creek to enhance water and habitat management capabilities.
10. Construct a bridge across the north end of Davis Creek to provide access to Bluff Pool for water management, wildlife surveys, and prescribed burning. The present access east of Davis Creek is through private land or along the top slopes of the creek which is not accessible during wet weather. (RONS Project No. 99018)



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11. Repair the east dike of Mallard Marsh and Pintail Pool along Squaw Creek using material from the ditch. During high water regimes, silt-laden water continues to overtop the east dike in both pools in several locations, adversely affecting the long-term health of these marshes.
12. During the next 15 years, the inlet water control structures on Eagle Pool and Pelican Pool and outlet structures on Pelican Pool need to be replaced. In addition, the Eagle Pool radial gates, built in the late 1930's, are deteriorating and need to be replaced. (MMS Project No. 03012)
13. Remove excess silt from moist soil units and pools to improve the wetlands. Soil will be used to repair and to improve pool dikes and refuge roads.
14. Add seasonal tractor operator to enhance and to improve management of wetland and moist soil program (.5 FTE). (RONS Project No. 99015)
15. Place dead trees in wetland areas to provide resting and sunning areas for turtles and water snakes.
16. Conduct a study of the water supply to the Mallard Marsh pump as well as the hydrologic connection of the Loess Hills watershed to the Refuge to determine if acquisition and management of adjacent lands would increase the amount of available water and improve water management on the Refuge.

**1.2. Objective:** Wet Prairie: Conserve and enhance the largest remnant wet prairie in Missouri by preserving and maintaining the integrity of at least 1,077 acres of wet prairie through elimination of non-native species and restoration of associated natural functioning systems (e.g. hydrolic systems, fire, etc.).

*Rationale:* Squaw Creek's wet prairie contains the largest meta population of the Eastern Massassauga rattlesnake in Missouri. This snake is a State-listed endangered species and is being considered as a federally listed species. Other species benefitting from a healthy wet prairie are Sedge Wrens, rail species, and Short-eared Owls. In 1936 there were approximately 3,000 acres wet prairie on the Refuge. By 2003, 1,077 acres of wet prairie remained on the Refuge.

*Strategies:*

1. Conduct small mammal, invertebrate, reptile, and nongame bird surveys to assess diversity and usage of wet prairie.
2. Annually inventory and monitor wet prairie vegetation for species composition and successional changes to determine future management regimes.
3. Utilize a seasonal rotational prescribed burning program in the wet prairie to reduce exotic invasive species and woody encroachment and promote native grass and forb production.
4. Monitoring will be conducted to determine the effects of seasonal burning on wet prairie vegetative communities, invasive species, and Massassauga populations.
5. Efforts will be made to minimize any adverse effect of the prescribed burning program on the Massassauga population and other wetland species. This may be accomplished by burning smaller segments of the wet prairie during spring and summer months and mowing certain areas before burning. Section 7 consultations will be conducted as necessary for prescribed burning on designated wet prairie units.
6. Maintain current disced fire breaks and initiate additional mowed (hayed) firebreaks to improve seasonal prescribed burning opportunities and prevent

wildfires from consuming the entire wet prairie area, which would cause detrimental effects on the Eastern Massassauga rattlesnake and breeding bird populations.

7. Add a full-time prescribed fire specialist to implement and to advance the prescribed fire program.
8. Employ chemical applications to control invasive and exotic species such as honey locust and reed canarygrass.
9. Assess pre- and post-treatment conditions to evaluate treatment success of prescribed burns, chemical applications and rotational haying.
10. Restore prairie cordgrass south of Pintail Pool, the northeast corner of Pintail Pool and the triangle area in the northeast corner of Snow Goose Pool, Unit A.

**1.3 Objective:** Bottomland Mesic Prairie: Manage 508 acres of bottomland mesic prairie habitat to provide quality nesting cover for nongame migratory birds (dickcissels, grasshopper sparrows, field sparrows, and sedge wrens) as well as nesting and wintering cover for upland gamebird species, breeding waterfowl (mallards, blue wing teal, and shovelers), and other associated wildlife species, by maintaining, enhancing, and restoring grasslands to a mixture of warm and cool season native grasses. This habitat will be managed to maximize native vegetation abundance, minimize fragmentation and maximize the minimum patch size for area-dependant species.

*Rationale:* Bottomland mesic prairie is not commonly found off-Refuge due to habitat modifications.

*Strategies:*

1. Conduct small mammal, invertebrate, reptile and nongame bird surveys to assess diversity and usage of bottomland mesic prairie.
2. Utilize a seasonal rotational prescribed burning program in the bottomland prairie to reduce exotic invasive species and woody encroachment and promote native grass and forb production.
3. Monitoring will be conducted to determine the effects of seasonal burning on bottomland mesic prairie vegetative communities, wildlife species, and invasive species.
4. Maintain current fire breaks and initiate additional mowed (hayed) fire breaks where necessary to improve seasonal prescribed burning opportunities and prevent wildfires.
5. Add full-time prescribed fire specialist to implement and to advance the prescribed fire program.
6. Employ chemical applications to control invasive and exotic species such as honey locust and reed canarygrass.
7. Assess pre- and post-treatment conditions to evaluate treatment success of chemical applications and rotational haying.
8. Convert 200 acres of agricultural cropland and 59 acres of old field to 259 acres of native bottomland mesic prairie by 2015.
9. Utilize basic farming practices in grasslands restoration to control invasive species and to prepare seedbed for effective native seed establishment.

10. Plant native forbs in existing grassland areas after prescribed burns and include forbs in future grassland restoration efforts.

**1.4 Objective:** Loess Hills Prairie: Manage 299 acres of Loess Hill prairie habitat to provide quality nesting cover for nongame migratory birds and other associated wildlife species by maintaining, enhancing and restoring grasslands to a mixture of warm and cool season native grasses. This habitat will be managed to maximize native vegetation abundance, minimize fragmentation and maximize minimum patch size for area-dependant species.

*Rationale:* The Refuge currently contains 221 acres of Loess Hill prairie habitat, which is a rare and unique ecotype. There is also the potential to convert 78 acres of agricultural land to Loess Hill prairie. Preservation and management of this eco-type is important as it is threatened by conversion to agriculture, urbanization and succession.

*Strategies:*

1. Continue loess bluff grassland bird monitoring programs, especially for Region 3 Resource conservation Priority species.
2. Inventory loess bluff plant species to guide preservation and management of Missouri Species of Conservation Concern such as low milk vetch, hairy grama, downy painted cup, nine-anther dalea, skeleton plant and small soapweed yucca.
3. Conduct surveys for small mammals, reptile, amphibians and invertebrates.
4. Continue to restore native warm season grasses and forbs in the loess bluff hills. Hand-cut invading tree species and brush on the steep slopes. Utilize chemical applications on invading plant species such as roughleafed dogwood, honey locust, tree of heaven, and Illinois garlic mustard.
5. Convert 78 acres of agricultural land (Munkers Tract) to native loess hill prairie by 2006.
6. Utilize a seasonal rotational prescribed burning program for all upland grassland areas to reduce exotic invasive species and woody encroachment, promote native grass and forb production leaving a minimum of 60 percent of grassland for nesting and winter cover each year.
7. Plant native forbs such as liatris, purple cone flowers, rattlesnake master, wild indigo, and lead plants in existing grassland areas after prescribed burns and include forbs in future grassland restoration efforts. When available, local ecotypes seeds (within 100 miles of the Refuge) will be used.
8. Maximize grassland blocks and minimize fragmentation and edge effect by removing fence/tree rows where appropriate.
9. Implement a vegetative monitoring program to evaluate the effects of all management options including prescribed burning, haying, mowing and chemical treatment on invasive species and native grass and forb communities. (RONS Project No. 02002)
10. Add full-time prescribed fire specialist to implement and to advance the prescribed fire program.

**1.5 Objective:** Loess Hill Forest: Manage 378 acres of Loess Hills forest for the benefit of associated plant and wildlife species.



*Rationale:* The Refuge contains 378 acres of Loess Hill forest habitat, which is a rare and unique ecotype. Preservation and management of this eco-type is important as it is threatened by conversion to agriculture, urbanization and succession to other habitat types.

*Strategies:*

1. Conduct plant, small mammal, invertebrate, reptile, and nongame bird surveys to assess diversity and usage of loess hill forest.
2. Conduct a forest inventory.
3. Map distribution of Illinois garlic mustard to aid evaluation of control efforts. (RONS Project No. 99007)

**1.6 Objective:** Bottomland Forest: Manage the 1,000 acres of bottomland forest to provide optimum nesting, resting, and feeding habitats during breeding and migrational periods for migratory waterfowl and songbirds and to benefit threatened and endangered species, and other indigenous species. This habitat will be managed to maximize native vegetation abundance, minimize fragmentation and maximize the minimum patch size for area-dependant species.

*Rationale:* A number of bottomland forest-dependent, migratory songbirds are rare and declining as a result of insufficient or fragmented habitat. Conservation and management of suitable habitat are principal strategies for attaining more abundant populations of these birds. Wood Ducks and Hooded Mergansers also utilize woodland habitat.

*Strategies:*

1. Flood bottomlands within Davis Creek moist soil units 3, 4 and 5 during the spring and fall waterfowl migrations for use by Mallards, Wood Ducks and other waterfowl species.
2. Move wood duck nesting structures from open water areas and ditches to bottomland and upland woodland sites and annually maintain structures.
3. Complete a forest resources inventory to determine quality and quantity of woodlands. This will be accomplished utilizing federal as well as state expertise. The data will aid in determining management alternatives.
4. Study the causes for the loss of bottomland forests understory that is adversely affecting woodland birds and other wildlife. Investigate potential measures to restore the bottomland forest understory and tree regeneration.
5. Map distribution of Illinois garlic mustard and reed canarygrass to aid evaluation of control efforts.
6. Utilize prescribed burning to reduce invasive exotic species and encourage growth of tree saplings to restore a woodland understory.

**1.7 Objective:** Croplands and Old Fields: Implement a long range plan to convert 279 acres of the 579 existing cropland acres and 59 acres of existing old field to mesic bottomland prairie and Loess Hill prairie. The reduction will be accomplished by 2015 through attrition of current cooperators.

*Rationale:* Croplands attract wildlife concentrations that enhance opportunities for wildlife observation and photography. However, natural habitats and food sources

contribute more to overall Refuge biological objectives for wildlife. Conversion of cropland to other uses is costly and requires several seasons to implement, thus limiting the number of acres that can be converted to an average 25 acres annually.

*Strategies:*

1. Monitor utilization of croplands by all wildlife species to assess habitat benefits/costs of maintaining some Refuge acreage in croplands.
2. Continue annual cooperative farming agreements with local farmers to provide share-crop grain for wildlife.
3. Implement phased reductions and complete by 2015.
4. Continue a 2-year crop rotation.
5. Convert the 78 acres of croplands on the Munkres tract to Loess Hill prairie by 2006, containing a mixture of warm season native grasses such as little bluestem and sideoats grama that are preferred by nongame birds (Grasshopper Sparrows, Field Sparrows, and Bob-o-links) and forbs such as liatris, purple cone flowers, rattlesnake master, wild indigo, and lead plants. Remove the fence adjacent to the headquarters grassland unit.
6. Convert the 200 acres of cropland and 59 acres of old field to bottomland mesic prairie by 2015, containing a mixture of warm season native grasses such as little bluestem and sideoats grama, which are preferred by nongame birds (Grasshopper Sparrows, Field Sparrows and Bobolinks) and native forbs.

- 1.8. Objective:** Exotic, Invasive, and Nuisance Species: Control and reduce the presence of exotic, invasive, and nuisance species of plants and animals on the Refuge. Non-native species will not exceed 2003 density or distribution levels.

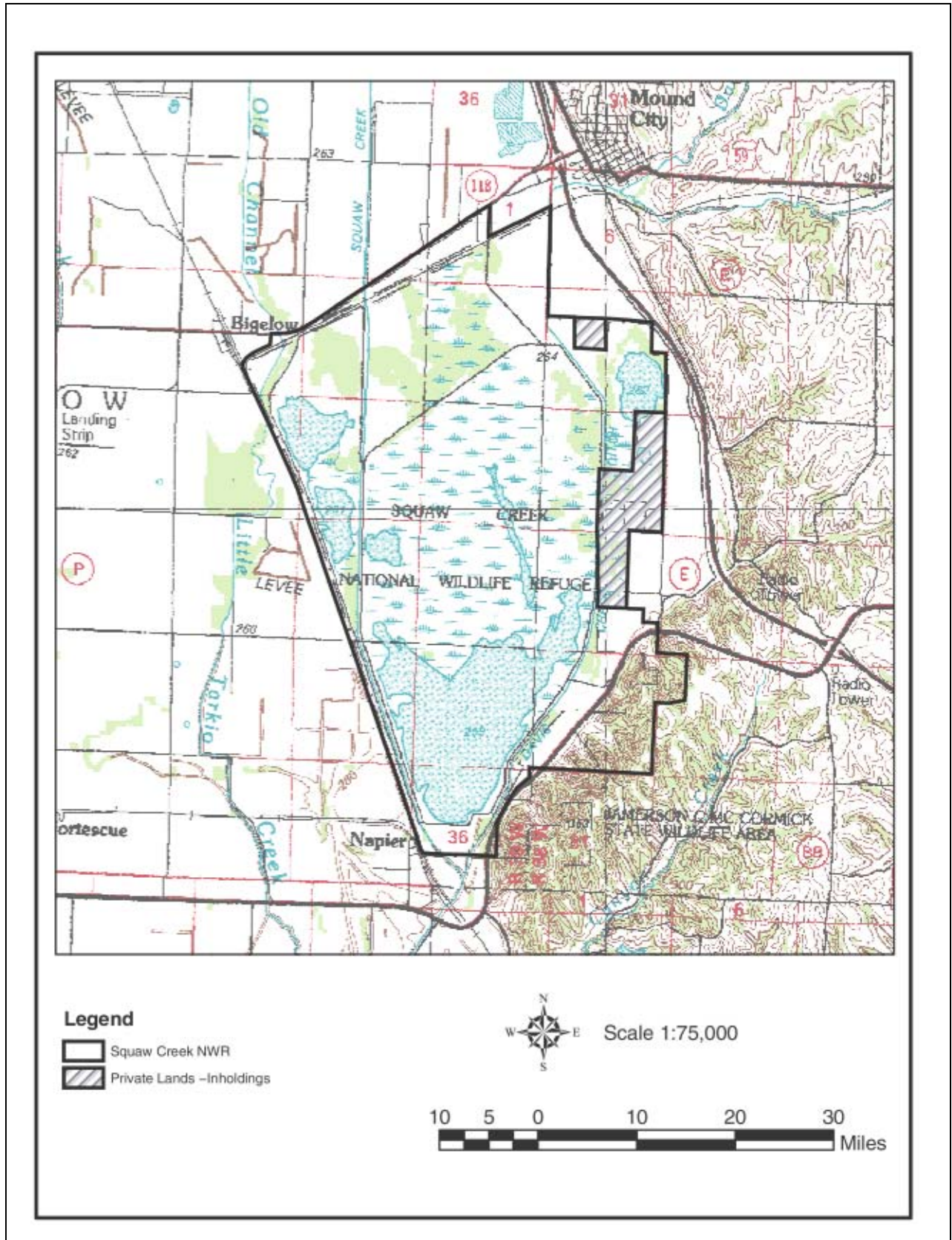
*Rationale:* Control of exotic plants is a long-term challenge. Methods used will depend on particular species, severity of impact and overall circumstances.

*Strategies:*

1. Develop a plot or grid system for assessing the magnitude of the problem using GIS technology and design a monitoring protocol incorporating means of measuring or estimating infestations. (RONS Project No. 99011)
2. Use appropriate integrated pest management techniques such as prescribed burning, herbicides, mechanical and biological control techniques.
3. Involve volunteers, including members from Audubon Societies, Friends groups, students and Scouts in control efforts of Illinois garlic mustard.
4. Continue active monitoring to be able to detect invasions and to take appropriate control measures.
5. Utilize short-term farming to eliminate invasive species in grassland restoration efforts.
6. Continue monitoring of gypsy moth traps.

- 1.9 Objective:** Land Acquisition: Working with willing sellers, acquire up to 400 acres in fee title of existing and restorable wetlands within the authorized Refuge boundaries (Figure 13).

Figure 13: Existing and Authorized Refuge Boundary



*Rationale:* Completion of the authorized boundaries will provide additional wildlife habitat and reduce total miles of boundaries to maintain.

*Strategies:*

1. Initiate action to identify willing sellers and to proceed with getting the acquisition proposal included in the Land Acquisition Priority System.
2. Prioritize acquisition of wetland and prairie habitat types.

### **Private Lands**

*Rationale:* Excessive sedimentation and poor water quality is a major challenge to the maintenance and management of Refuge wetlands and moist soil units. To deal with these issues in the watershed, existing programs will be used to encourage private landowners to improve soil and water conservation management. Spillways and ditches will be maintained to prevent flood damage and siltation. We will continue to work with the Natural Resource and Conservation Service, Holt County Soil and Water Conservation District, the Geological Survey and local upstream private landowners in Squaw, Davis and Porter Creek watersheds to reduce soil erosion and to improve water quality, particularly as it affects the Refuge.

**1.10 Objective:** Watershed Improvement: Reduce sedimentation from soil erosion and improve water quality on Squaw Creek NWR from private lands in the 60,000-acre upstream watershed using conservation practices fostering improved soil and water uses. By 2010, approximately 100 percent of the goals established in the Agricultural Non-Point Source Pollution (AgNPS) project in Squaw Creek will be accomplished, including erosion practices, water quality, riparian conservation and nutrient management.

*Rationale:* Although Squaw Creek was established with the knowledge that sedimentation was a problem, its frequency of occurrence and magnitude were greater than expected. In order for the Refuge wetlands to survive in to the future, work has to be accomplished in the 60,000-acre upstream watershed to reduce flood events and to improve water quality.

*Strategies:*

1. Continue to work (through Partners for Fish and Wildlife cost sharing) with the Holt County Soil and Water Conservation District and Natural Resources and Conservation Service to improve water quality and to reduce peak flows entering Squaw Creek.
2. Continue to provide financial incentives to private landowners through the above partners to implement conservation measures within the Squaw and Davis Creek watershed.
3. Monitor water quality and quantity entering the Refuge in both Squaw and Davis Creeks in cooperation with the U.S. Geological Survey.
4. Look for opportunities to purchase land from willing sellers as it becomes available within the authorized Refuge boundaries. (See Strategy 1.10).

### **Refuge Wildlife Management District**

*Rationale:* Refuge staff will continue to manage and conserve the 15-county Refuge Wildlife Management District to develop, improve, and maintain the wetland and riparian habitats within the management district to benefit a broad spectrum of both

game and non-game migratory birds and other resident wildlife species and to maintain riparian corridors, wetlands and upland habitats for erosion control and wildlife values. These areas are not open to public use.

**1.11 Objective:** Wildlife Management District: Develop, improve, and maintain native riparian, wetland, and grassland habitats consistent with the existing dominant vegetative structure (non-agricultural crop), contributing to soil and water conservation within the Management District and also benefitting a broad spectrum of both game and non-game migratory birds and other resident wildlife species.

*Rationale:* A number of grassland-dependent, migratory songbirds are rare or declining as a result of insufficient or fragmented habitat. Conserving, restoring and managing suitable habitat is one of the principal strategies for attaining more abundant populations of these birds. Therefore habitat restoration and resource conservation will be aggressively pursued on the fee title and easement lands within the Refuge Wildlife Management District.



*Frank Durbian*

*Strategies:*

1. Actively manage all established native grasslands through a rotation of prescribed burning, mowing, haying, flash grazing or chemical treatments for control of invasive woody species and for maintaining quality grassland habitat.
2. Work with the easement owners to convert former cropland areas, with suitable soil types, to native warm and cool season grasses. This may require the use of short-term farming to eliminate invasive species and to prepare the seed bed for native grass seeding.
3. Monitor grasslands to formulate a yearly strategy of management activities to benefit Region 3 Conservation Priority Species.
4. Develop or restore all suitable wetland and riparian sites on easement properties.
5. Work with property owners to educate them of moist soil benefits and to accomplish management and maintenance requirements of the wetlands and riparian corridors on their easements.
6. Fence riparian areas as necessary to prevent damage from cattle.
7. Survey easement and fee title lands on the Kier, Shonk, Christensen, Harris, Woody, Landes, Orndorff, and Riley properties to delineate boundaries to protect the land from trespass and other unauthorized uses. (RONS Project No. 99001)
8. Document violations on easement and fee title wetlands and riparian corridors and request assistance from zone officers and Missouri Department of Conservation state officers.
9. Take an active role in the private lands program (Partners) whenever possible, particularly in the floodplain and Loess Hills. Assist the Natural Resource and Conservation Service in WRP evaluations.

#### **4.2.2 Goal 2: Wildlife**

Conserve species indigenous to the Refuge, the Lower Missouri River Ecosystem, and the Central Tallgrass Prairie Ecosystem with emphasis on those species identified in the Service's Fish and Wildlife Resource Conservation Priorities.

**2.1 Objective:** Regional Shorebird Designation: designation of Squaw Creek National Wildlife Refuge as a regional shorebird site of the Western Hemispheric Shorebird Reserve Network (WHSRN) by 2005.

*Rationale:* The WHSRN designation will support funding initiatives, obtains international recognition of the Refuge, emphasizing the value of conserving the indigenous species. The designation is a measure of success in meeting the habitat needs of shorebirds.

*Strategies:*

1. Conduct fall and spring migration season surveys to document shorebird use and abundance and to determine if the Refuge will qualify for the designation.
2. After data collection, complete nomination form with applicable data and forward to the Regional Director for approval and submission to WHSRN for designation.

**2.2 Objective:** Population Counts: Obtain annual peak population counts and use days for Bald Eagles, Snow Geese, other waterfowl, and other indicator species using procedures outlined in the Wildlife Inventory Plan.

*Rationale:* The population surveys will help staff document priority use habitats, monitor for disease, provide information of interest to the public and other agencies, evaluate the success in habitat management to meet species needs, and to document presence or absence of less common species.

*Strategies:*

1. Utilize the most efficient, state-of-the-art technologies and survey methods available. (RONS Project 00008)
2. Maintain a high level of disease monitoring of waterfowl during the spring and fall migrations and readiness to deal with a major disease outbreak.
3. Monitor any encroachment by non-native wildlife and plant species to be able to effectively implement control measures.
4. Document the utilization of different habitats by indicator species to better predict effects of future natural and induced habitat changes on populations.
5. Monitor marsh and water bird nesting.
6. Continue inventory of Refuge reptiles, amphibians, fish and plants in order to document known species for determining long-term monitoring, habitat preservation and management.
7. Continue and increase grassland bird monitoring, especially for Region 3 Resource Conservation Priority species, such as the Grasshopper Sparrow, Henslow's Sparrow and Dickcissel.
8. Document the utilization of Wood Duck and Eastern Bluebird boxes.

**2.3 Objective:** Waterfowl Use Days: Maintain annual waterfowl use day levels of a minimum of 5 million by providing adequate habitat as discussed under the habitat goal and based on a 5- year running average of waterfowl data, excluding Snow Geese.

*Rationale:* The Refuge provides valuable waterfowl migration habitat consistent with the Refuge purpose. Due to habitat loss throughout the flyway, it is important that Refuges maintain or increase their ability to support waterfowl.

*Strategies:*

1. Monitor arrivals and concentration build-ups in accordance with the Wildlife Inventory Plan, with the specific intent to witness and record annual peak numbers and date of occurrence of special interest species.
2. Monitor waterfowl activity during migration periods in order to evaluate the use of various habitat types.
3. Monitor waterfowl concentration for indication of disease and stress and be prepared to implement the Disease Plan.
4. When waterfowl concentration exceeds objective levels to the extent the welfare of the waterfowl is at risk, such as in the control of disease outbreaks, implement disturbance measures that result in concentration reductions.
5. Record population data in a consistent format that enables comparisons of actual populations and trends with stated objectives.

**2.4 Objective:** Reduction of Snow Geese: Actively assist international efforts to reduce the mid-continent population of Snow Geese by at least 5 percent each year until the Arctic Goose Working Group reduction goal has been achieved.

*Rationale:* The Arctic Goose Habitat Working Group has determined that the 1998 base population of 3 million should be reduced by 50 percent. Enhanced food supplies and winter survival have led to a mid-continent Snow Goose population increasing 5 percent annually in recent years. Their numbers now far exceed the carrying capacity of their summer breeding range in the Arctic tundra of northern Canada.

Consequently, the birds are causing extensive, long-term damage to tundra vegetation and soils, taking a toll on the entire critical roosting area during the fall as well as spring migrations. Geese leave the Refuge in the morning and evening each day to feed on private agricultural fields, thereby allowing hunting opportunities in and around Northwest Missouri and Northeast Kansas. Squaw Creek NWR typically harbors an average peak population of 250,000 to 350,000 snow geese. Short of draining the Refuge wetlands, which would negatively impact other species, there is little the Refuge can do to actively reduce Snow Goose use of the Refuge. Reduction of some habitats attractive to the geese and facilitating increased hunting opportunities will allow the Refuge to participate in the effort to reduce Snow Geese populations as outlined by the Arctic Goose Working Group.

*Strategies:*

1. Within 1 year of completion of this CCP, Refuge staff will initiate a managed spring snow goose hunt.
2. Reduce cropland acreage from 579 acres to approximately 300 acres by 2015.
3. Discourage Snow Geese from utilizing Refuge croplands in the spring by disking stubble fields in late winter or early spring or by strategically manipulating Refuge shares on field edges.

4. Continue to provide open water night time roosting areas in Eagle and Pelican pools for Snow Geese. Snow Geese fly out in the morning and evening each day to feed off-Refuge. As a result, the Refuge acts as a magnet for birds in Northwest Missouri and Northeast Kansas yet provides hunting opportunities as birds leave the Refuge twice per day to feed.
5. Increase the effort to obtain Snow Goose neck collar readings during the spring and fall migrations to assist in determining the status and the movement of birds.

**2.5 Objective:** White-tailed Deer Management: Manage the size of the white-tailed deer herd on the Refuge through controlled hunts to reduce a Refuge white-tailed deer herd at a fall relative density of 20 to 25 deer per square mile.

*Rationale:* Hunting is one of the six compatible, wildlife-dependent recreational uses. Accurate density is difficult to determine because the population fluctuates both seasonally and annually. Current high deer densities negatively impact habitats, such as understory vegetation in the bottomland forests. This negatively impacts other species of interest.

*Strategies:*

1. Continue to monitor the size of the herd through annual spotlight surveys in cooperation with universities and other State and federal agencies.
2. Monitor for signs of habitat damage such as browse lines, vegetative conditions, and crop depredation on Refuge lands.
3. Monitor health of herd using standard techniques at the Refuge check station in cooperation with universities and other State and federal agencies.
4. Continue muzzleloading firearm deer hunts by issuing permits commensurate with the need to control population size while providing a quality recreational experience.
5. Initiate a research study to determine the effects of browse damage by white-tailed deer on the woodland understory that could impact migratory birds and other wildlife and recommend potential restoration measures.

#### **Species of Special Concern**

*Rationale:* The Service's Region 3 has identified Fish and Wildlife Resource Conservation Priorities, including species indigenous to the Refuge and the Lower Missouri River Ecosystem. These species and their habitats will be actively conserved, restored, and managed on Service lands managed by the Refuge staff.

**2.6 Objective:** Bald Eagle: Maintain the bottomland cottonwood forest areas and isolated mature cottonwood stands that provide roosting and nesting sites and that exist in 2005 and continue to provide habitat that maximizes Bald Eagle use days during fall and winter migration periods.

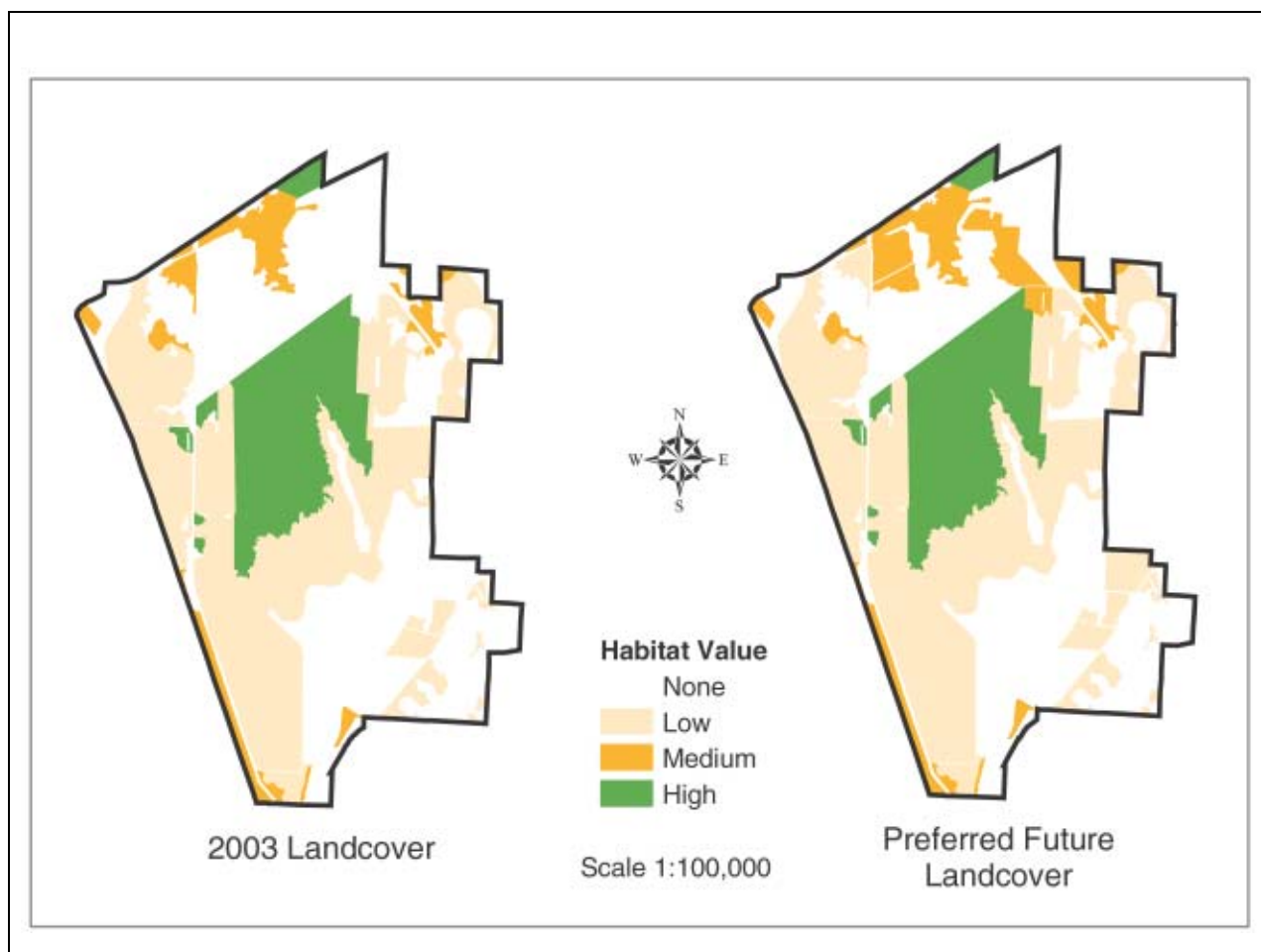
*Rationale:* Bald Eagle populations peak at 200-plus birds during fall and winter migration periods. At least one pair has attempted to nest on the Refuge since 1997; there was one successful nest in 1998 and again in 2001.

*Strategies:*

1. Manage riparian cottonwood forests to ensure sustained stands of mature roost and nest trees. Protect live trees from beaver damage with wire shields.



**Figure 14: Eastern Massassauga Rattlesnake Landcover, Squaw Creek NWR**



2. Develop designated regeneration sites that will allow flooding and other treatments to encourage seedling development.
3. Manage public access to assure that breeding and nesting habitat is undisturbed.

**2.7 Objective:** Eastern Massassauga Rattlesnake: Maintain existing wet prairie habitat of 1,077 acres and increase bottomland mesic prairie by 217 acres for a total of 508 acres (Figure 14). This will enhance the habitat used by the Eastern Massassauga rattlesnakes on Squaw Creek NWR (see objective 1.3 regarding increasing the habitat acreage). The population numbers and habitat use will be monitored to assess the response to the habitat manipulation.

*Rationale:* The Refuge supports one of only three remaining massassauga populations in Missouri, out of 13 historical populations in the state.

*Strategies:*

1. Continue to participate in studies and research projects.
2. Continue to monitor local population status and responses to habitat manipulation such as prescribed burns and water management.

3. Participate in cooperative studies to determine the current range of Eastern Massasauga rattlesnake to determine if acquisition of adjacent lands would benefit the species.

**2.8 Objective:** Least Bittern: By providing hemi-marsh cattail habitat suitable for nesting, the Refuge will benefit Least Bitterns, a species that is ranked as an “imperiled” species by the State of Missouri. The population distribution and numbers will be monitored through surveys and other research.

*Rationale:* Even though the Region 3 Fish and Wildlife Resource Conservation Priorities list does not include the Least Bittern in the Lower Missouri River ecosystem as a species of special concern, it is ranked as ‘imperiled’ by the State of Missouri. Studies on the Refuge indicate that more than 90 percent of Least Bittern nests are found in cattail stands, which are diminishing with the loss of wetland habitat. The Refuge includes one of the largest nesting sites for this species in the Midwest.

*Strategies:*

1. Maintain the presence of cattail stands. (See Objective 1.2).
2. Continue to monitor Least Bittern nesting activity.

**2.9 Objective:** Passerine Species: The Refuge will support and follow the recommendations listed in Region 3’s Resource Conservation Priorities for the rare and declining passerine species identified in Appendix I. Management interest will focus upon species for which the Refuge is or was within their primary range.

*Rationale:* Many passerine species identified in the Region’s Resource Conservation Priorities have suffered population declines due to habitat loss.

*Strategies:*

1. Refuge staff will collect biological data when applicable from routine censuses and monitoring activities. (See the strategy under Objective 2.2.)
2. Habitat critical for the rare and declining species identified in Appendix I will be conserved and restored. (See Objective 1.4)
3. When possible, the Refuge staff will support partners in cooperative conservation actions to benefit passerine species.
4. The Refuge staff will encourage and support efforts to educate the public about rare and declining species.

**2.10 Objective:** State of Missouri species of concern, such as long-tailed weasels and Franklin’s ground squirrels, will be reported to Missouri Department of Conservation staff when observed on or near the Refuge.

*Rationale:* Reporting rare species sightings to Missouri Department of Conservation staff will assist that agency in tracking the distribution and abundance of these species.

*Strategy:*

1. Report any observation of these species, including the date and location of the observation, to the Department of Conservation.

### 4.2.3 Goal 3: People

Visitors, nearby residents and other stakeholders will enjoy wildlife-dependent recreation and education; appreciate the natural resources and ecological processes and cultural resources of Squaw Creek NWR; help achieve the objectives of the Refuge; and support the Service's mission.

*Rationale:* The 1991 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (page 58 of that document) provides data that indicate 16 percent (160,000) of the 1 million people living within a 100-mile radius of the Refuge are potential non-consumptive visitors. Approximately 130,000 people now visit the Refuge annually. Some of these visitors may only visit the Refuge once in a lifetime, while others are repeat or even frequent visitors. We want to provide dynamic programs, displays, interactive facilities, wildlife viewing, and printed materials that will encourage every visitor to share their experience with others and to make return visits. We also want visitors of all abilities to feel welcome and to enjoy a safe visit to an area that they recognize as a national wildlife refuge.

**3.1 Objective:** Interpretation: Design, fund and implement interpretive programs and facilities that meet Service standards and that will attract and accommodate up to 130,000 visitors annually.

*Rationale:* Environmental interpretation raises public awareness of the reasons to conserve and manage natural resources.

*Strategies:*

1. Develop clear Refuge interpretive themes related to key resource issues that will guide the creation of exhibits, signs, brochures and programs.
2. Advocate interpretive program funding in accordance with RONS Project No. 00009.
3. Replace auto tour leaflet and trail leaflets with interpretive signs and sound posts that incorporate an interpretive theme and that meet FWS sign standards. RONS Project No. 97003
4. Continue the development of interpretive aids for the Callow Memorial Trail.
5. Explore the possibility of extending the Loess Bluff Trail along the bluffs, making it a loop trail that connects to the Callow Memorial Trail. Install interpretive panels covering prairie and fire themes at the shelter at the peak of the Loess Bluff Trail.
6. Prepare new interpretive leaflets specifically for the following: mammals, reptiles and amphibians; the Loess Bluff Trail; and the history and work of the Civilian Conservation Corps on the Refuge in the 1930s.
7. Update all existing leaflets to current Service graphic standards. RONS Project No. 99016
8. Contract with an exhibit design and production firm to develop a concept plan for the visitor center/headquarters.
9. Remove the picnic tables and grills near the headquarters and create an accessible amphitheater in their place. Form a planning team to design the new facility.
10. Update the Refuge orientation video and add closed captioning.

**3.2 Objective:** Environmental Education: Offer environmental education programs, materials and facilities that meet Service standards and accommodate up to 6,000 students annually. Evaluate the effectiveness of the environmental education program by 2013.

*Rationale:* Environmental education raises public awareness of the reasons to conserve and manage natural resources.

*Strategies:*

1. Contact schools to alert them to Refuge facilities, resources and educational opportunities by means of fliers, letters or personal contacts with individual teachers.
2. Conduct annual teacher workshops to demonstrate various environmental education activities teachers can use on the Refuge during the school year; sample lesson plans will be used to augment the workshop demonstrations.
3. Encourage teachers to recommend the Refuge environmental education program to their colleagues.
4. Develop accessible, Refuge-specific environmental education activities that are linked to local and state education standards. Solicit active involvement from local teachers. Develop a teacher's manual for school visits consisting of a pre-visit planning guide and pre-visit and post-visit activities.
5. Expand the outdoor classroom facilities by adding a boardwalk with a learning station into a marsh area so school children can experience the importance of wetlands and wildlife habitats. The learning station will encourage participants to collect water samples and discover the dynamics of aquatic life. RONS Project No. 99017
6. Add a seasonal clerk to staff the visitor contact station desk during the peak public use periods (fall and spring migrations) to greet visitors and school groups and assist the Park Ranger in giving programs (0.3 FTE). RONS Project Nos. 00009 and 02001
7. Recruit and train volunteers to conduct activities and to give an introduction to school groups when they visit the Refuge.

**3.3. Objective:** Wildlife Observation and Photography: Maintain, improve, and develop to Service standards facilities and programs to encourage more interactive visitor participation resulting in a higher quality outdoor experience. This includes the existing 10-mile circular auto tour route, the 2-mile Mallard Marsh Road, the three walking trails and, by 2013, an extension of the Callow Memorial Trail to form a looped trail with the Loess Bluff Trail and a one-quarter-mile boardwalk to a marsh.

*Rationale:* Well maintained service facilities and quality programs help create a positive visitor experience, increasing the likelihood that the Refuge's conservation message will be appreciated and understood.

*Strategies:*

1. Upgrade the surface of the auto tour route by raising and resurfacing approximately 7,900 feet along Davis Creek, which continues to be overtopped by flood water from Davis Creek. MMS Project No. 96242
2. Develop one or more accessible wildlife observation blinds to be used by an increasing number of photographers and by the general public.
3. Study, develop and construct an accessible boardwalk by 2015 that will permit visitors to experience the marsh by foot. (Same project as 3.2.6. above) RONS Project No. 99017

4. Replace the deteriorated black top surface in the headquarters entrance road, the visitor parking lot, staff parking lot and maintenance courtyard. MMS Project No. 98151
5. Maintain the auto tour route and public use signs so visitors can explore the Refuge safely and easily. MMS Project No. 01014 and RONS Project No. 97003
6. Maintain walking trails so that they are free of debris and litter and are safe for visitors.
7. Seal the blacktop surface of the Callow Memorial Trail and complete the extension of the gravel walk out to the grasslands as well as complete a looped trail from the Loess Bluff Trail to the Callow Trail by 2010.
8. Maintain the gravel and wood chip walking surface on the Loess Bluff Trail and provide a 6-foot-wide path for walking. Continue to ensure rock steps and railing are secure and steps clean of debris.
9. Maintain the walking surface of the Eagle Overlook Trail and regularly inspect the observation tower for wasp nests and loose steps. Install a kiosk at the trail entrance.
10. Provide a shorter alternate tour route loop within the existing Wild Goose interpretive loop. Change signs and all maps.
11. Create a two-way road between the beginning of the auto tour and the Eagle Pool hiking trail. Create an area for vehicles (including large vehicles) to turn around near the hiking trail. Create a parking lot with an accessible space at the trailhead. Install appropriate traffic signs and wayfinding signs and change the Refuge maps accordingly.
12. Create several pull-off areas on the tour route to allow passing and to allow short-term parking for viewing wildlife.
13. At overlooks, provide a quality photo of the optimum view (e.g., concentrations of geese, fall foliage) so that visitors with low vision can examine the view on a sign. With a good photo, all visitors will be able to see the optimum view even when conditions are not optimal (for instance, the weather is poor, it is outside of migration season, etc.). At the Loess Bluff trailhead, provide a quality photo of the view from the bluff top for use by visitors with mobility disabilities.
14. On a kiosk at each trailhead, provide a simple map of each trail and information about what visitors can expect to see on the trail at different times of the year. If the trail is long, or if there are loops and intersections (e.g., extended Bluff Trail), provide additional maps indicating “You Are Here,” direction to trailhead and distance to trailhead, as appropriate.
15. Improve the surface of the Eagle Pool hiking trail to FWS accessibility standards and add accessible benches.



*Frank Durbian*

**3.4 Objective:** Hunting and Fishing: Provide quality recreational hunting opportunities for up to 135 deer hunters per season. Continue to allow bank fishing at legal public access points throughout the Refuge.

*Rationale:* More than 135 deer hunters will increase hunter complaints/conflicts and likely increase hunter density to unsafe levels. Additional hunting opportunities will be provided by allowing the take of multiple deer by individual hunters according to the herd reduction needs. Incentives may also be offered, such as requiring hunters to take two antlerless deer before they can take one buck.

*Strategies:*

1. Continue measuring the quality of the deer hunt through 1) informal interviews with hunters and/or responses to questionnaire developed to facilitate feedback, 2) number of participating hunters, and 3) annual harvest rate.
2. Continue to manage the deer hunt to minimize conflicts with other uses and resources.
3. Continue to work with the Missouri Department of Conservation regarding deer hunting regulations and harvest quotas.
4. Continue to permit public fishing at legal public access points.
5. Inform the public when snagging of rough fish is permitted.
6. Provide at least one accessible deer hunting blind (visually screened from auto tour route) with signage and a parking space. Establish a reservation system so that the blind or blinds are available to disabled hunters if needed and available to all hunters if not needed by hunters with disabilities. Advise prospective hunters about the availability of an accessible blind through prehunt information materials. Plant a vegetation screen or remove the blind after the hunt season. The blind will be available during the regular hunting season.
7. Update the Refuge's Fishing Plan.

**3.5 Objective:** Mushroom Gathering: Allow opportunities for mushroom gathering in selected areas.

*Rationale:* Mushroom gathering is minimal most years depending on the size of the crop. However, there is a demand for gathering mushrooms in the Refuge bluffs particularly during the spring turkey hunt that occurs on adjacent Missouri Department of Conservation lands. During this 40-day period, mushroom gatherers can pick mushrooms on the Refuge without the conflict of turkey hunting. In addition, the attraction of gathering mushrooms leads to public enjoyment of getting outside and into the woods.

*Strategies:*

1. Allow morel mushroom gathering in the loess bluffs from April 10 to May 20 annually.
2. Patrol areas closed to mushroom picking during gathering season.

**3.6 Objective:** Public Information: By 2025, 60 percent of the people within 100 miles of the Refuge will be aware of the Refuge, its mission, its facilities and scheduled events. We will emphasize reaching diverse groups of people who are not part of the traditional Refuge audience.

*Rationale:* A public that is aware of the mission of Squaw Creek NWR and the National Wildlife Refuge System will more likely support management efforts of the Refuge and of the National Wildlife Refuge System.

*Strategies:*

1. Implement additional means of publicizing the Refuge using various media, including electronic technologies and personal computers.
2. Ask visitors how they heard about the Refuge as a means of evaluating the success of publicity efforts.
3. Provide 24-hour telephone information to visitors with weekly updates of upcoming events and waterfowl numbers.
4. Create and keep current an accessible Refuge Internet website.
5. Reinstigate the public service announcement slide show on the movie theaters in St. Joseph and expand to other theaters in the surrounding region.
6. Explore the possibility of utilizing highway billboards to increase visibility of Squaw Creek NWR and the Refuge System.
7. Continue to participate in the Oregon Fall Festival parade, the Apple Blossom Parade, and the Mound City Fourth of July Parade, and expand to parades in other surrounding communities.
8. Maintain a current list of newspapers, radio and television station addresses and distribute a minimum of 35 Squaw Creek Digest news releases annually. Increase coverage to more news outlets.
9. Cultivate relationships with reporters, which can help interest them in covering the Refuge.
10. Report significant events to the Regional FWS public affairs staff promptly so they may become involved or provide follow-up information.
11. Report activities via the Accomplishment Report System so that information about events, activities and accomplishments can be disseminated to appropriate Congressional representatives.
12. Continue coordination with the St. Joseph Visitors and Convention Bureau in promoting Squaw Creek NWR.
13. Develop or obtain educational materials such as brochures and audio-visuals for dissemination to visitors.
14. Continue to participate in the local Boy Scouts of America Council to build interest in natural resource conservation ethics and careers.
16. Participate in “career day” programs in area schools and colleges to encourage a broad cross section of ethnic backgrounds to support and be involved in natural resource conservation.
17. Create a standard Refuge slide show that incorporates FWS, Refuge System and Refuge themes for use by staff and volunteers. Incorporate closed captioning.
18. Work with the Missouri DOT to improve the Bank Swallow wayside.

**3.7 Objective:** Volunteers: Increase the number of volunteer hours to 7,500 by 2013, with a 5 percent annual increase thereafter, with volunteers serving both in the Visitor Contact Station and around the Refuge as interpretive and educational guides and in supervised habitat management projects.

*Rationale:* A dedicated corps of volunteers can significantly improve various Refuge programs as well as foster interaction with the surrounding community and provide an additional pillar of civic support and pride.

*Strategies:*

1. Increase volunteer recruitment efforts through web sites, news releases, public service ads, movie screen promotions and outreach to civic and educational groups.
2. Be actively involved with and continue to encourage members of the Burroughs and Midland Empire Audubon societies, both of which have officially adopted Squaw Creek NWR, to increase their volunteer efforts.
3. Provide temporary housing, when available, for volunteers.

**Objective 3.8:** Friends of Squaw Creek NWR: Maintain and enhance a close working relationship with Friends of Squaw Creek NWR that helps foster common goals supporting the Refuge mission.

*Rationale:* Refuge Friends groups increase community understanding of Refuge resource management issues as well as providing significant support in dealing with issues.

*Strategy:*

1. Continue to support the Friends of Squaw Creek, which incorporated in 2000. Be actively involved by attending Board of Directors' meetings and providing advice and assistance.

**3.9 Objective:** Governmental Agencies and Non-governmental Organizations: To increase awareness of and support for the Refuge, increase the level of active cooperation with non-governmental organizations (NGOs) and governmental agencies on different aspects of on-Refuge and off-Refuge management and educational efforts, both in terms of the number of NGOs and the level of effort. The 2003 level of involvement with NGOs and governmental agencies (see Chapter 5, Partnerships) will be maintained, but additional efforts will be made to share Refuge information with these agencies and organizations during routine interactions with them.

*Rationale:* Partnerships will disseminate Refuge information and key messages more broadly and effectively than if the Refuge were to work alone.

*Strategies:*

1. Continue to work with the Natural Resources Conservation Service, Holt County Soil and Water Conservation District and the U.S. Geological Survey to reduce sedimentation in the Refuge's 60,000-acre upstream watershed (see 2.10. 1.). RONS Project No. 97006
2. Continue to work with the Burroughs and Midland Empire Audubon societies.
3. Increase activity with the St. Joseph Visitor and Convention Bureau in promoting the Refuge and activities.
4. Increase activity and partnership with the Mound City Chamber of Commerce, Kiwanis and other local groups in the community.
5. Actively look for partnering opportunities with other regional conservation groups, service organizations and educational institutions.



**3.10 Objective:** Research: Actively encourage and provide technical assistance and logistical support to qualified researchers to support ongoing cooperative investigations of long-term management importance to the Refuge or that supports other compatible projects.

*Rationale:* By facilitating, encouraging and supporting research project on the Refuge, and by determining research needs on the Refuge, we can address management issues of long-term importance such as endangered species, sedimentation, water quality, biodiversity, and visitor satisfaction and appreciation of the Refuge.

*Strategies:*

1. Cooperate with the U. S. Geological Survey on its project to quantify stream flow and sediment entering the Refuge.
2. Solicit assistance from additional researchers and partners interested in the long-term viability of the Refuge wetlands (i.e. Ducks Unlimited, National Fish and Wildlife Foundation).
3. Continue to work with the Missouri Western State College staff and students and encourage interest in white-tailed deer, grassland birds and other potential research projects.
4. Continue research on the Eastern Massassauga rattlesnake. Experimental summer prescribed burning on small acreages will be conducted, and the Refuge biologist will use a Global Positioning System to record Massassauga hibernacula and movements.
5. Promote other potential research opportunities in a number of other forums and media, including the Squaw Creek NWR website, conferences and presentations to college and university faculty/student meetings.
6. Provide temporary housing (when available) for researchers conducting projects on the Refuge.

**3.11 Objective:** Cultural Resources: Evaluate and preserve archeological and historic resources.

*Rationale:* The Archaeological Resources Protection Act of 1979 expands upon the Antiquities Act to protect all archeological sites more than 100 years old on Federal land, and to ensure that archeological investigations on Federal land are performed in the public interest by qualified persons.

*Strategies:*

1. Contract an archeological survey to identify and/or to preserve any potential Native American sites on new land acquisitions.
2. Determine status of buildings that are considered good examples of an early 1900s farmstead on Munkre's property. RONS Project No. 99002

**3.12 Objective:** Health and Safety: Ensure the health and safety of visitors, volunteers, and employees, and conserve the natural resources and physical property of the Refuge. Strive for zero accidents for visitors and no accidents resulting in loss of work for employees.

*Rationale:* Refuge staff need a safe and healthy environment in which to perform their duties. Refuge visitors also need a safe environment to fully appreciate and enjoy their time at the Refuge.

*Strategies:*

1. Work with the zone officer and state conservation agents to provide adequate law enforcement presence.
2. Add a new electric gate at the main entrance and an emergency telephone for visitors to use if they are locked in after the gate closes. RONS Project No. 03003
3. Complete a boundary survey on Munkre's tract to determine property lines between four adjacent property landowners. The land was homesteaded in the mid-1850s and remained with the same family for the past 150 years. The assumed boundary line follows a deteriorated fence line. Well defined property lines will ensure that adjacent property rights are protected. (RONS Project No. 99002)
4. Provide routine maintenance and inspect annually all public use and Refuge facilities.
5. Promptly replace, upgrade or temporarily close any facility that, through damage or long-term wear and tear, compromises public safety.
6. Review and revise annually Maintenance Management System proposals to reflect current and future needs.
7. Administer and monitor required permits, licenses and inspections annually under the Federal Facility Compliance Act and U.S. Fish and Wildlife Service Policy.
8. Revise station safety plan and ensure that safety procedures, personal protective equipment and supplies are in place and kept current. Regularly update emergency information.
9. Conduct regular safety meetings covering a variety of pertinent topics.
10. Refresh staff in CPR (4 hours every 2 years) and first aid techniques and ensure employees receive all other required safety training and physical exams.

**Objective 3.13:** Welcome and Orient Visitors: Provide visitors with a welcoming, comfortable experience through adequate guidance that does not detract from appreciating nature.

*Rationale:* In order to have an enjoyable experience, visitors need clear wayfinding and visitor services information that is logically and conveniently located.

*Strategies:*

1. In brochures and at appropriate locations, provide enough information for visitors to evaluate whether they want to travel to a particular site.
2. Enhance the kiosks at the headquarters, the first observation deck and the Mallard Marsh entrance.
3. Revise and implement the station sign plan.
4. Indicate the location of restrooms on every Refuge map.
5. Install all information and wayfinding signs and sign mounts following FWS Sign Handbook format and standards.
6. Install wayfinding signs at intersections that indicate distance and directions to features of interest, the visitor center, local towns, etc. as appropriate to aid first-time visitors. Install site identification signs (e.g., "Eagle Pool Trail") that can

easily be read from within vehicles. Place a directional sign at the intersection between the U.S. 159 and the Headquarters indicating a right turn to reach Headquarters for arriving visitors.

7. Orient visitors with a “You Are Here” mark on all outdoor maps.
8. In brochures and on kiosks, inform visitors of what there is to see, when and where to see it, how to see it (i.e., viewing tips similar to those of the Forest Service) at Headquarters and on the auto tour route.
9. At each kiosk, display a Fish & Wildlife Service shield and inform visitors of the Refuge regulations and hours, visitor center/office hours, the Refuge telephone number, and permitted and prohibited activities. Provide a map of the Refuge that indicates visitor facilities, closed areas, features of interest and accessible facilities.
10. With signs and/or brochures, inform visitors about the National Wildlife Refuge System and the role of Squaw Creek NWR at the auto tour route and at Headquarters.
11. Include a statement in Refuge publications encouraging visitors to call and inform the Refuge before visiting if they have special needs due to disability.
12. At headquarters, provide orientation publications upon request in alternate formats for visitors with visual disabilities.
13. Upgrade all orientation to be accessible to visitors with visual disabilities following guidelines in the FWS Sign Handbook, the FWS Accessibility Guidelines or both.
14. Inform visitors at each hiking trailhead about the length of the trail and the difficulty for people with mobility disabilities (i.e. condition of trail, availability of benches and shade, maximum running slope, average cross slope, surface material).
15. Identify and remove items that detract from the naturalness and aesthetic quality of the tour route experience. Remove excessive traffic signage, unnecessary gates, posts, reflective markers, etc. Remove or screen (with vegetation) stored items, stockpiles and equipment in view from auto tour route and from the Headquarters overlook.
16. On the auto tour route, create pedestrian places (landscaped and out of traffic) and parking at interpretive signs so that visitors can safely read the signs.
17. Create an attractive pedestrian-oriented place at the beginning of the auto tour that will encourage visitors to park and leave their vehicles to read information at a kiosk.
18. Clarify the information about when tour route gates may be closed before sunset or eliminate signs that conflict with the posted closing time.
19. At the beginning of the auto tour route, provide information about the approximate time required to drive the complete tour route. Note whether or not there are rest rooms on the route.
20. At the beginning of the auto tour route, provide information regarding the suitability of the route for large vehicles such as recreation vehicles and buses.
21. Develop an accessible Refuge web site that includes information similar to the items found on Refuge kiosks.