

# Chapter 4 Management Direction

## Current Refuge Programs

The Ottawa Refuge Complex is managed as a haven for wildlife, fish, plants and people. The administration of the refuges for this purpose can often become quite complex. The Refuge program is heavily influenced by the maintenance needs for the water impoundment infrastructure. Natural forces such as the fluctuation of Lake Erie water levels, wind events and erosion ensure a constant need for maintenance of roads, dikes and pumps and the skilled staff to complete the work. In addition, Refuge managers need to understand the effects of their habitat actions on fish and wildlife. Refuge biologists inventory and monitor local and migrant wildlife and fish populations and provide advice to managers. Finally, all staff members are involved in providing the public with environmental education and wildlife-dependent recreational opportunities.



Photo by Sharon Cummings

## Staffing and Budget

The ultimate success of the Ottawa National Wildlife Refuge Complex, including Cedar Point National Wildlife Refuge and West Sister Island National Wildlife Refuge, in carrying out its mission depends on its staffing patterns and funding levels. Current staffing patterns and funding are described in Table 2.

The Refuge is supported by the Regional Office (Region 3) in Fort Snelling, Minnesota, an Ecological Services Field Office in Reynoldsburg, Ohio, a Fisheries Resources Office in Alpena, Michigan, a Private Lands Office in East Lansing, Michigan, a Law Enforcement Office in Sandusky, Ohio, and the National Office in Washington D.C.

## Habitat Management

Management of Refuge habitats involves a variety of tools and techniques used to control and enhance habitat conditions. The primary objective of habitat management is to provide fish and wildlife with a variety of habitats within the Refuge to meet the needs of a diversity of species for resting, nesting and feeding.



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**Table 2: Current Staffing**

Refuge Manager	GS-0485-13	1 FTE (Full-time Equivalent)
Refuge Operations Specialist	GS-0485-11	2 FTE
Biologist	GS-0486-11	1 FTE
Park Ranger (Public Use)	GS-0025-9	1 FTE
Wildlife Biologist (Private Lands)	GS-0485-9	1 FTE
Fisheries Biologist	GS-0482-7	1 FTE
Administrative Technician	GS-0303-7	1 FTE
Engineering Eq. Operator	WG-5716-10	1 FTE
Engineering Eq. Operator	WG-5716-8	1 FTE
Maintenance Worker	WG-4749-8	1 FTE
Tractor Operator	WG-5705-6	2 TFT (Temporary Full-time)
Student Trainee (Biology)	GS-0499	3 Students, Career Experience Program
Biological Science Aid	GS-0404-3	Student Temporary Exp. Program
Annual Staff Costs (including benefits and temporary staff:		\$585,400
Annual Operation/Maintenance Costs (Utilities, Training; Travel; Maintenance)		\$155,440
Partners for Fish and Wildlife Habitat Restoration		\$75,000
1999 Total Annual Costs:		\$815,840

### Upland Management

Ottawa National Wildlife Refuge Complex has very little true upland habitat. Nearly all the soil types on the Refuge are hydric (wetland) soils, due to the once vast marsh system that covered much of northwest Ohio. Those areas of the Refuge that tend to be dry are made up of tiled farm fields that were converted from wetlands prior to establishment of the Refuge. Many of these fields are currently farmed and will be allowed to revert to natural successional stages as the farming program is phased out. The gradual phase out of farming will create a range of successional stages over a 5-10 year period. Management of these areas will primarily consist of the control of invasive and noxious weeds (i.e. thistle) during successional progression from herbaceous plants to woody vegetation. Weed control measures will promote tree seedling growth and prevent spread of noxious species to nearby private crop fields.

### Wetland Management

Managed wetland impoundments (units) are the primary habitat type encountered at the Ottawa National Wildlife Refuge Complex. Refuge wetlands are managed to provide high quality food and cover for migrating waterfowl, shorebirds, wading birds, and other wetland-dependent wildlife species. Permanent and semi-permanent marshes of cattails, bulrush, and other emergent vegetation as well as a variety of submergent vegetation provides habitat for a variety of species. These areas also provide foods in the form of seeds, roots, tubers, and aquatic invertebrates. Management is directed at keeping these marshes in a highly productive state by simulating the natural cycle of water level changes which in turn stimulates good aquatic vegetation growth and a variety of plant and animal species within these marshes. Marshes are managed to provide a mixture of open water,



submergent and emergent vegetation communities. A mixture of communities provides diverse habitat, which wildlife need for feeding and resting as well as courtship and reproduction.

Photo by Sharon Cummings



Water levels in impoundments are managed in different ways at certain times of the year. Water levels are lowered, or “drawn down,” during the growing season to stimulate plant germination and growth and to concentrate invertebrates populations. Water levels are raised during the fall to encourage use of the impoundments by waterfowl. Specific water level plans for individual impoundments depend on conditions within the unit. Units that have reduced vegetation growth may be completely drained during the growing season to germinate seeds and encourage new vegetation growth. Excessive or undesirable vegetation in a unit may require high water levels throughout the growing season to reduce the growth of vegetation and increase open water areas. Habitat diversity is encouraged through rotational management of the wetland complex. In any given year, some units will be drawn down while other units are maintained at higher levels.

Seasonal manipulation of water levels simulates the natural fluctuations that occur in wetlands connected to Lake Erie. The majority of the wetlands at Ottawa National Wildlife Refuge are diked wetlands with no direct connection to the lake. Diking of wetlands is done in an effort to protect wetlands from the rapid water level changes and wave action associated with Lake Erie. These actions can uproot wetland vegetation and scour soils, decreasing the habitat quality of the wetland. However, the dikes, prohibit the entry of fish into the marshes for spawning and reduce the exchange of nutrients between a marsh and the lake, two important functions of coastal wetlands.

### **Invasive Plant Species**

Invasive species of current concern on Ottawa National Wildlife Refuge in order of priority are: purple loosestrife (*Lythrum salicaria*), gypsy moths (*Lymantria dispar*), reed canary grass (*Phalaris canariensis*), phragmites (*Phragmites australis/communis*) and flowering rush (*Butomus umbellatus*). The species are prioritized based on the immediate threat each poses to natural diversity of habitats on the Refuge. An integrated pest management system is in place on Ottawa and consists of mechanical, biological and chemical treatments of species.

A complete Integrated Pest Management program to combat invasives will be included in the Habitat Management Plan that supports this CCP.

### **Metzger Marsh – A Wetland Management Case Study**

Metzger Marsh is a 650-acre Lake Erie coastal wetland jointly managed by Ottawa National Wildlife Refuge and the Ohio Division of Wildlife (ODOW). Until the 1970s, the marsh was protected from Lake Erie by a naturally occurring barrier beach that deflected waves due to storm events and reduced the effects lake level fluctuations on the marsh, but allowed water



and nutrient exchange and fish access for spawning. High Lake Erie water levels in the 1970s eroded the barrier beach and exposed Metzger Marsh to the full impact of Lake Erie.

Over the following years, waves and rapid water level changes reduced wetland vegetation in Metzger Marsh to scattered clumps of cattails. In the early 1990s a decision was made by the U.S. Fish and Wildlife Service and the ODOW to build a dike to protect Metzger Marsh and reestablish vegetation and management capabilities. With the help of many partners, and a permit from the Army Corps of Engineers, a 7,700-foot dike was constructed across the mouth of Metzger Marsh. This dike was different from others in the area because it was built with a connection to Lake Erie.

Conditions of the Corps of Engineers permit required a fish passage structure to be installed in the dike to allow Lake Erie fish to enter and exit the marsh for feeding, spawning and protection. During the first years after construction, the gates on the structure were closed and water levels drawn down to allow wetland vegetation to reestablish in the marsh. Regrowth of vegetation was extremely successful and an emergent wetland community returned to Metzger Marsh. In March 1999, the gates were opened to Lake Erie and will be left open for four years, as required by the permit. Water levels within the marsh will rise and fall with Lake Erie level changes as they did when the barrier beach was present. Fish passage and nutrient flow will resume.

During the 4 years of free water flow, scientific studies conducted by Federal, State and university researchers will monitor vegetation changes in the marsh, fish passage through the structure, nutrient flow, and many other factors. Information collected and analyzed during this period will help to establish management strategies after the 4-year cycle is complete. Metzger Marsh will be jointly managed by Ottawa National Wildlife Refuge and ODOW's Magee Marsh Wildlife Management Area.

## Private Lands

The Ottawa National Wildlife Refuge's Partners for Fish and Wildlife Program assists private landowners with the improvement or restoration of wildlife habitat on their land. Technical assistance, contracting, cost-share assistance and actual earth work is provided to private landowners in 13 counties in Michigan and Ohio.

The Partners for Fish and Wildlife program helps landowners to make their lands better places for wildlife. To accomplish this, the program relies on partnerships with conservation groups, businesses, and individuals. Because of the involvement of our partners, many projects can be completed at little or no cost to the landowner. Since the start of the program in 1987, thousands of acres of wildlife habitat have been restored or enhanced by the Ottawa National Wildlife Refuge Private Lands Program.

As a part of the Ottawa National Wildlife Refuge, the Partners for Fish and Wildlife program will continue to expand and diversify. At current funding



levels, we will strive to complete between 40-50 restorations per year encompassing around 200 acres. As the program continues to grow, the need for additional Private Lands staff will also increase. Budget increases will also be necessary to keep up with the interest from private landowners.

The program is expected to expand into other areas of Michigan and Ohio. In addition to widening its geographical coverage, the program will begin to expand the types of restorations performed and reestablish a wide variety of habitats including native warm season grasses, reforestation projects, and riparian corridor restorations. Wetland restorations will remain the main focus of the program, but these new habitat projects will help the Partners for Fish and Wildlife Program benefit a greater diversity of fish and wildlife species.

## Fish and Wildlife Monitoring

The Ottawa Refuge Complex currently engages in a wide variety of natural resource monitoring and research projects. The studies, surveys and inventories provide valuable information used to make Refuge management decisions and to support statewide and national conservation efforts. Staff biologists are involved in the following ongoing projects to monitor fish, wildlife and their habitats:

Photo by Sharon Cummings



### Waterfowl

Migratory waterfowl numbers are monitored during the months of September through April. Aerial counts are conducted twice monthly by the ODOW, and Refuge staff perform comparison ground counts during the same time periods.

### Marsh Birds, Shorebirds and Wading Birds

Marsh birds are surveyed using protocols of the ODOW and Long Point Bird Observatory in Canada. Virginia rails, sora rails, moorhens, and least and American bitterns are counted throughout the Refuge each year. In addition, a study was initiated in 1993 by the Black Swamp Bird Observatory to relate shorebird use and needs to water management regimes on the Refuge. Two common tern nesting platforms are located on the Refuge in the Crane Creek estuary. The platforms were used by 40 nesting tern pairs in 1999 that produced 47 fledglings.

West Sister Island contains the largest heron/egret rookery on the U.S. side of the Great Lakes and the mainland Refuge is a critical feeding area. One or two annual nest counts are conducted between June and July to inventory active nests at the West Sister colony.

### Passerine/Neotropical Migrants (Songbirds)

Neotropical and other passerine migrants are monitored each spring and fall by the Black Swamp Bird Observatory through a combination of point counts and mist net stations located on three units of the Refuge. A Monitoring Avian Productivity and Survivorship site is located on the Navarre Division



of Ottawa National Wildlife Refuge. In addition, monitoring is conducted within select Refuge units using area search protocols designed to evaluate the effects of habitat management actions.

### **Raptors (Hawks, Owls and Eagles)**

Midwinter bald eagle and peregrine falcon counts are conducted each year in cooperation with ODOW. Eagle nests on the Refuge are monitored annually by trained volunteer observers. In addition, the Black Swamp Bird Observatory conducts raptor migration counts just outside the west and east boundaries of the Ottawa Unit.

### **Fish**

In 1998, a comprehensive fish species inventory study was initiated. The purpose is to identify and quantify species composition and the health of the aquatic ecosystem. As of spring 1999, 47 species from 17 families have been identified on Ottawa National Wildlife Refuge. A temporal fish community exists within areas of the Refuge, primarily Crane Creek and Metzger Marsh, that still maintain a connection with Lake Erie. Information being gathered will document fish movements into and out of Refuge wetland areas for spawning, nursery, and protective habitats.

### **Amphibian/Reptile Surveys**

Amphibian call surveys are conducted each spring on Ottawa, Cedar Point and Darby divisions to determine relative abundance of each species. Reptile surveys are conducted each spring and summer through the use of coverboard arrays.

### **Invertebrates**

With the assistance of Refuge staff, the U.S. Geological Survey in Ann Arbor, Michigan, conducts an ongoing study to monitor the survival and propagation of clams in conjunction with fish community monitoring in Crane Creek, Pool 3 and Metzger Marsh. Gypsy moth traps are placed throughout the Refuge each year. A recent increase in catch rates indicate that significant impact to forest resources may be expected in the future. In addition, a lepidopteran (butterflies and moths) and odonate (dragonflies, damselflies, etc.) species list is being compiled for the Refuge Complex and a voucher collection is being assembled. To date, the collection contains 34 lepidopteran, 11 odonate and two moth species.

### **White-tailed Deer**

Two or three spotlight surveys are conducted each fall to determine the number of deer using the Refuge prior to the annual hunt. When possible, a second set of surveys is conducted immediately after the hunt to evaluate the immediate impacts of disturbance and hunting pressure.

### **Muskrat**

Muskrat numbers are monitored annually through hut survey counts and qualitative assessments of emergent vegetation.



Photo by Sharon Cummings



## Habitat Monitoring

### Purple Loosestrife and Biological Control Monitoring

The Refuge is surveyed each year to evaluate the spread of purple loosestrife. This information is used to dispatch volunteers for eradication programs and direct staff in chemical applications. Monitoring of biological control (beetle) effectiveness continues at release sites.

### Artificial Nesting Structure Monitoring

Volunteers monitor and maintain elevated nest boxes for wrens, bluebirds, tree swallows and wood ducks on a weekly basis during the breeding season (April-July). Nesting success is also monitored by ODOW on two common tern artificial nesting platforms in the Crane Creek estuary.

### Tree Restoration

In 1994, more than 12,000 tree seedlings were planted at three locations within the Ottawa Division. Because of excessive browsing by deer, by 1998 only one of those planting sites still contained young trees. A simple monitoring scheme is used to keep track of those survivors.

### Aquatic Habitat Monitoring

A baseline inventory study of aquatic vegetation, invertebrates, nutrients, and water quality was initiated in 1998.

## Wildlife-dependent Recreation, Environmental Education and Interpretation

The Ottawa Refuge Complex accommodates all six priority wildlife-dependent recreational uses as identified in the Refuge Improvement Act of 1997. A major feature of the Ottawa Refuge Complex is the often spectacular opportunity for wildlife observation, especially bird watching. The Refuge complex has been listed in many "Top Ten" birding locations in the past few years. The Refuge bird checklist provides information on 273 species of regular visitors, including seasonal occurrences, which improves the likelihood of viewing a specific species during a visit. Birders visiting the Refuge especially enjoy viewing migrating warblers, waterfowl, shorebirds, and seeing resident bald eagles. Approximately 120,000 visitors each year enjoy Ottawa's fish and wildlife resources and participate in wildlife observation and photography, hunting, fishing, environmental education and interpretation. The economic benefit for local communities from birding ecotourism was estimated at \$5.6 million in 1993-1994 (Kerlinger 1994). The Refuge is uniquely positioned to attract more visitors as a daily average of 10,000 vehicles pass by on State Highway 2 (Ohio Department of Transportation, 1997).



Photo by Sharon Cummings



The Refuge offers more than 7 miles of hiking trails that travel through diverse habitat types. Refuge staff and volunteers offer interpretive talks and hikes throughout the year. These cover a variety of subjects including breeding birds, bald eagles, reptiles, plants and marsh management techniques. Interpretive signs are located throughout the trail system and cover many of the same topics. A recently renovated footbridge will be used to expand the trail system to include additional habitat types.

Environmental education is a priority program at Ottawa National Wildlife Refuge. Teacher workshops are held to demonstrate field trip methods to teachers and encourage teachers to include environmental education in their classrooms. Field trips to the Refuge are limited by staff availability and a lack of indoor facilities. Wetland studies, water quality, wildlife and soils are common topics on trips to the Refuge. The Refuge is less than a 1-hour drive from many school systems, including Toledo and its surrounding communities. However, access is limited for these students by a lack of school system funding for transportation. Despite these limitations the Refuge hosts approximately 1,200 students each year.

Hunting and fishing opportunities are also provided on the Ottawa Refuge. In cooperation with the Ohio Department of Natural Resources, Division of Wildlife, the Refuge conducts waterfowl and deer hunt programs each fall. The hunts are carefully controlled and limited permits are distributed through a lottery-style drawing. In 1999, 840 hunters received permits to hunt waterfowl on the Ottawa Refuge and 168 deer hunting permits were issued in January 2000. In general, game fish habitats and populations are limited on the Ottawa Refuge Complex. However, a public fishing area is available seasonally at the Cedar Point Refuge.

## Outreach

Through off-site exhibits and presentations to the general public, local clubs, organizations and students, Refuge staff and volunteers reach approximately 4,000 people annually. These events focus on teaching the public about the National Wildlife Refuge System and the importance of Lake Erie coastal marshes. Each year, the Refuge and several partners host a festival in conjunction with International Migratory Bird Day. Additional students are reached through the Federal Junior Duck Stamp Contest. The Refuge receives approximately 1,000 entries each year from students across the state.

## Archaeological and Cultural Resources

The Refuge Manager considers potential impacts of management activities on historic properties, archaeological sites, traditional cultural properties, sacred sites, human remains and cultural materials. Prior to ground disturbing activities the Refuge Manager informs the Regional Historic Preservation Officer in a timely manner to allow analysis, evaluation, consultation and mitigation as necessary.



The Refuge does not have a museum or museum collections (e.g. art, ethnography, history, documents, artifacts). To date, no archaeological materials have been collected from Refuge lands. Archaeological investigations and collecting are performed only in the public interest by qualified archaeologists working under an Archaeological Resources Protection Act permit issued by the Regional Director. Refuge staff members take steps to prevent unauthorized collecting by the public, employees and government contractors. Violations are reported to the Regional Historic Preservation Officer.

## Wilderness Suitability

West Sister Island was designated as a Federal wilderness in 1975. As part of the CCP process, we reviewed lands within the legislative boundaries of the Ottawa and Cedar Point National Wildlife Refuges for wilderness suitability. No lands were found suitable for designation as wilderness as defined in the Wilderness Act of 1964. No existing Refuge units contain 5,000 contiguous, roadless acres. In addition, land within the Refuge units has been substantially altered by humans, either through agriculture or water impoundment construction.

## Goals, Objectives and Strategies

Goals, objectives and strategies were developed for Ottawa National Wildlife Refuge, Cedar Point National Wildlife Refuge and West Sister Island National Wildlife Refuge with participation by members of the public, wildlife managers and scientists.

The following pages describe the goals established for major management areas, objectives for achieving those goals, and the specific strategies that will be employed by Refuge staff. The goals are organized into three broad categories: wildlife, habitat and people. This mirrors the organization of the 1999 Service publication "*Fulfilling the Promise*," which presents a vision for the National Wildlife Refuge System.

Each of the three national wildlife refuges that make up the Ottawa Refuge Complex are presented individually even though they share many similar goals.



# Ottawa National Wildlife Refuge

## Goals:

*Wildlife:* Maintain native wildlife populations in balance with the habitat available while decreasing and limiting exotic plant and animal species. Surveys based on sound scientific methods for fish and wildlife populations will be conducted to determine viable habitat prescriptions to enhance the attractiveness of the Refuge for optimum numbers of species and peak populations.

*Habitat:* Restore functional components of the Lake Erie marsh ecosystem, which includes marshes, wooded wetlands, estuary, and *scrub/shrub* to provide benefits to endangered species, waterfowl, shorebirds, migratory songbirds, colonial waterbirds, fish, and other species of concern.



Photo by Sharon Cummings

*People:* Provide public outreach and wildlife-dependent recreational opportunities to a diverse audience by offering a variety of quality educational and recreational activities when they are compatible with wildlife needs. This will promote understanding, appreciation, and support for the Ottawa National Wildlife Refuge Complex and the entire National Wildlife Refuge System.

## Wildlife Goals, Objectives and Strategies

### Wildlife Goal 1:

Maintain native wildlife populations in balance with the habitat available while decreasing and limiting exotic plant and animal species. Surveys based on sound scientific methods for fish and wildlife populations will be conducted to determine viable habitat prescriptions to enhance the attractiveness of the Refuge for optimum numbers of species and peak populations.

### Wildlife Objective 1

Identify key fish and wildlife populations currently using the Ottawa National Wildlife Refuge Complex and determine appropriate monitoring protocols to track their status.

#### *Strategies:*

- Conduct surveys to establish presence/absence of plant and animal species.
- Conduct an extensive literature review and continue consulting local and regional experts within the Service and other cooperating agencies to establish sound monitoring protocols.

### Wildlife Objective 2

Monitor key species, including waterfowl, songbirds, shorebirds, raptors, waterbirds, fish, and other species of concern, to understand relative population levels, population trends and responses to management.



*Strategies:*

- Complete the Fish and Wildlife Inventory and Monitoring plan by September 30, 2000.
- Through partnerships or Refuge staffing, continue the Monitoring Avian Productivity and Survivorship and bird banding programs.
- Use protocols and data analysis procedures approved by the Service to monitor amphibians, reptiles, fish, marsh birds, shorebirds, songbirds, raptors, and mammals. Include modified protocols as part of the Long Point Bird Observatory program to meet Great Lakes Ecosystem objectives.
- Establish and implement a Geographic Information System by obtaining basic Refuge layers and inputting new and existing fish and wildlife survey data.
- Initiate research in cooperation with universities, non-profit organizations and other agencies to gain comprehensive information, analysis and understanding about fish and wildlife populations and distribution.
- Whenever possible, publish and give presentations on the results of research and other monitoring done on Refuge. Encourage cooperators to do the same.

**Wildlife Objective 3**

Artificial nesting structures for wildlife production will be maintained to supplement production until natural cavities or secure nesting habitats are as available as the artificial nesting structures.

*Strategies:*

- Inventory and maintain the existing wood duck nest boxes (50) using Refuge volunteer programs.
- A minimum of two tern platforms will be monitored and maintained within the Crane Creek estuary or Pool 1.
- The current number of bluebird and tree swallow nest boxes (103) will be maintained and monitored to provide these species with adequate nesting habitat.
- Raccoons and other mammals may become a nuisance, particularly in regard to artificial nesting structures, and their control will be addressed individually through the Refuge trapping program. No quantifiable reduction level will be pre-determined for these species.

**Habitat Goals, Objectives and Strategies**

**Habitat Goal 1:**

Restore functional components of the Lake Erie marsh ecosystem, which includes marshes, wooded wetlands, estuary, and scrub/shrub to provide benefits to endangered species, waterfowl, songbirds, colonial waterbirds, shorebirds, fish, and other species of concern.



*Discussion:* The following habitat objectives were determined by:

- Considering the existing uplands and water impoundment capabilities;
- Evaluating the seasonal and life requirements of several key wildlife and fish species;
- Adjusting the habitat quantity based on a regime that benefits the highest number of trust and regional resource priority species.

The Refuge staff wildlife biologist and regional planners sought the assistance of two ecologists from the Biological Resources Division of the U.S. Geological Survey in Fort Collins, Colorado for this exercise. We diagrammed the marsh habitat requirements of several key migratory bird species in terms of timing, vegetative cover and water depth (Table 3). A similar exercise was completed for wooded wetland, scrub/shrub and estuary habitats.

Three additional species of migratory birds – the king rail, green heron and common tern – were evaluated for compatibility of water depth and cover requirements. We determined that the highest number of trust and regional resource priority species would benefit from four types of managed water impoundments. These marsh types became the first four habitat objectives. The individual unit drawdown rotation schedule will be identified in a revised Water Management Plan, or annual work plan, by 2001. Figures 7 and 8 present one possible scenario for the desired future habitat conditions on the Ottawa Refuge Complex. Water impoundments will be managed on a rotational basis and environmental factors will always play a role in specific pool management. However, the maps represent one possible way that a Refuge Manager could meet the habitat objectives described in this CCP.

**Table 3 Habitat Requirements for Three Marsh-dependent Migratory Bird Species**

Species	Habitat Needed	Time	Type of Cover	Open Water Depth	Primary Food
Black Duck	Migration Wintering	Oct.- April	Emergent vegetation and open water	12 inches to 3 feet	Emergent plant seeds
Virginia Rail	Nesting	April-May	Dense, tall (>1m) vegetation with interspersed openings	<12 inches	Invertebrates
	Brood rearing	May-Oct.	Dense, tall (>1m) vegetation with interspersed openings	≤ 8 inches	Invertebrates
Least Bittern	Nesting	April-June	Dense vegetation	3 inches to 18 inches	Small fish and invertebrates
	Brood rearing	June-Sept.	Dense vegetation	3 inches to 18 inches	Small fish and invertebrates



Figure 7: Future Habitat Conditions on Ottawa National Wildlife Refuge

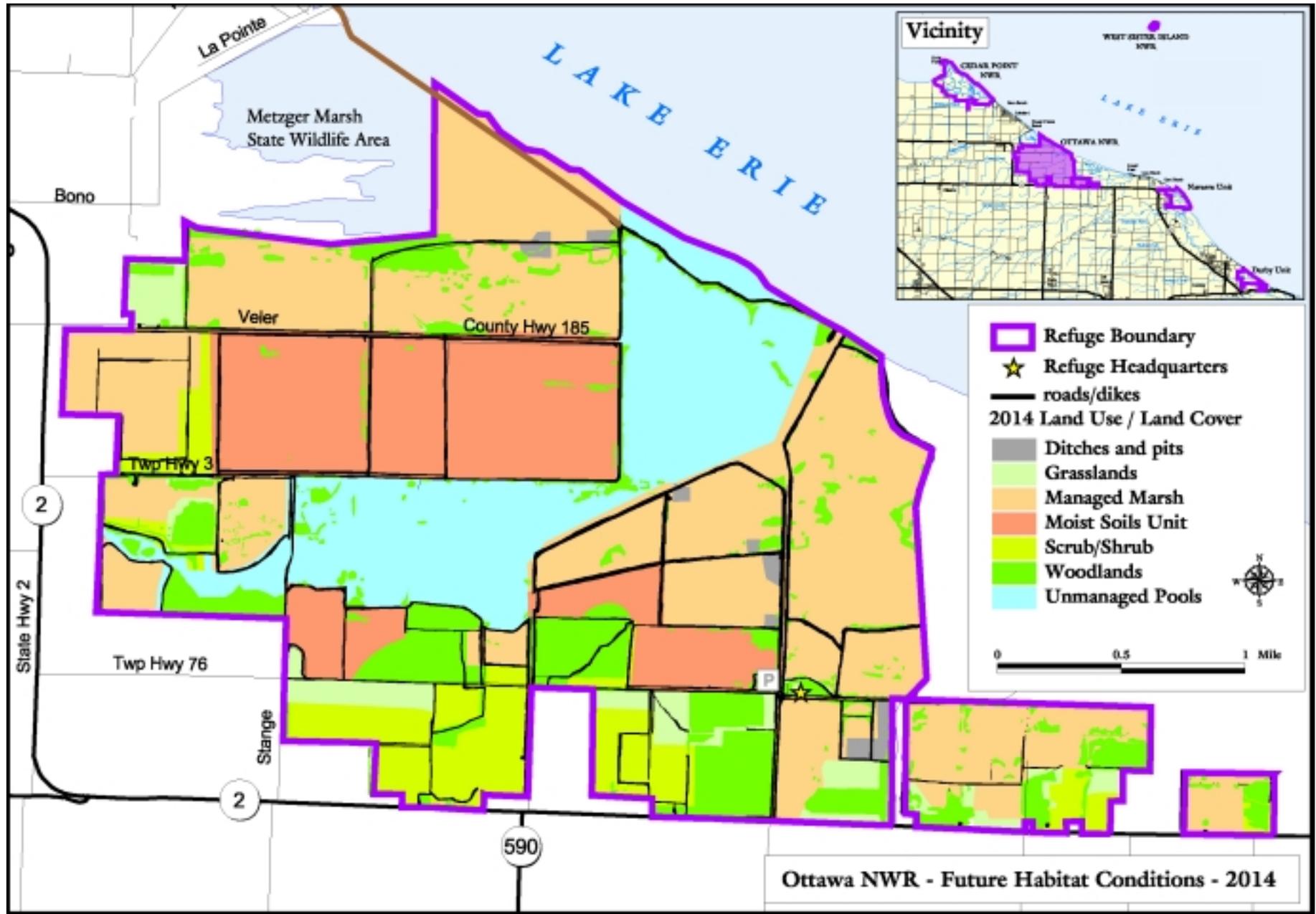
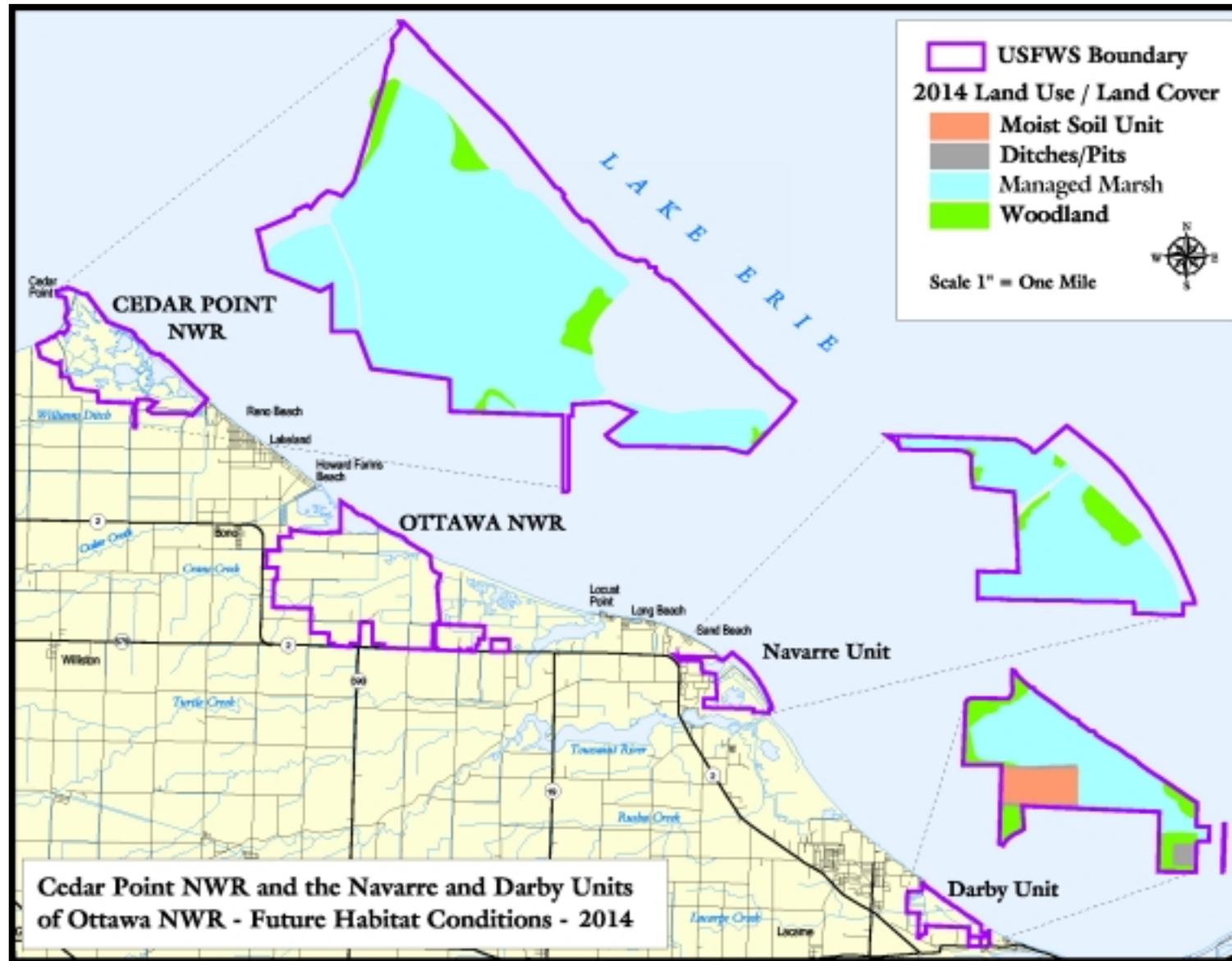


Figure 8: Future Habitat conditions on Cedar Point National Wildlife Refuge, Navarre Unit



### **Habitat Objective 1**

Provide 1,000-1,500 acres of marsh, on a 5-year average basis, with 60 percent open water, variable water depths of 8 inches to 3 feet, and submergent vegetation to provide foraging habitat for black ducks, herons, trumpeter swans and other migratory birds.

#### *Strategies:*

- Drawdown 60 percent of available *managed marsh* acres in the spring to the desired depth.
- Muskrat populations will be maintained at a beneficial level through the Refuge trapping program. Muskrats will be trapped from units when they have consumed 30 percent or more of the emergent wetland vegetation or begin to cause damage to the dike system.
- Control purple loosestrife as necessary through chemical and biological means.
- Rough fish populations, including carp and round gobies, will be controlled in units with excessive emergent vegetation damage. At such times, consider stocking of predators like largemouth bass and/or northern pike when water conditions allow.
- Monitor the spread of round gobies in units with Lake Erie water sources.

### **Habitat Objective 2**

Provide 300 to 500 acres of marsh, on a 5-year average basis, with 60 percent dense emergent vegetation, consisting of old growth cattail and bullrush, and shallow water (3 inches to 12 inches) to provide foraging and nesting habitat for Virginia rails, least bitterns and other birds.

#### *Strategies:*

- Drawdown 20 percent of available managed marsh acres in the spring to the desired depth.
- Control purple loosestrife as necessary through chemical and biological means.
- Control muskrat and carp abundance using aforementioned techniques.

### **Habitat Objective 3**

Provide 300 to 500 acres of marsh, on a 5-year average basis, with 60 percent emergent vegetation (not dense), shallow water (3 inches to 12 inches) for nesting king rails, foraging herons and other birds with similar requirements.

#### *Strategy:*

- Evaluate the use of prescribed fire to reduce dense or dead vegetation, recycle nutrients, and promote rapid emergent growth prior to re-flooding.

### **Habitat Objective 4**

Provide 50 to 300 acres annually of very shallow water areas (less than 3 inches) for shorebird foraging.



*Strategy:*

- Water level manipulations in appropriate units will be timed to coincide with peak shorebird migration periods.

**Habitat Objective 5**

Provide 300 to 500 acres of annual production, on a 5-year average basis, of early successional plant communities to encourage seed production on high quality, natural waterfowl food plants.

*Strategies:*

- Draw down suitable areas and manipulate soil, as necessary, to encourage the growth of nutsedge, smartweed, and other high quality food plants for fall flooding.
- Control exotic and other undesirable plant species by manipulating water levels or physical removal to maximize waterfowl food production during drawdown cycles.

**Habitat Objective 6**

Provide 500 to 1,000 acres annually of deep, open water habitats with a width greater than 100 meters to provide habitat for nesting common terns, foraging herons, mussel beds and nursery habitats for walleye and yellow perch that use Lake Erie during part of their life cycle. At least 25 percent of open water areas will be 3 feet or more in depth.

*Strategies:*

- Maintain existing Crane Creek estuary at current size pending further environmental study.

*Discussion:* The confluence of Crane Creek was divided into several managed marsh impoundments prior to its inclusion in the Refuge. Prior to Refuge ownership, the interior dikes had deteriorated due to lack of maintenance and an open water estuary developed. The remnants of the original dike system are still visible. The water level near the mouth of Crane Creek is now controlled not only by flow from upstream but also the rise and fall of Lake Erie water levels.

It has been proposed that the Refuge re-build the former dike system and manage the Crane Creek area for waterfowl. However, there may be a greater benefit to fish, invertebrates, terns and other species by maintaining the open water link to Lake Erie. The open estuary may prove very important for fish spawning and nutrient exchange. Ongoing studies at the nearby Metzger Marsh project may soon help determine the relative efficiency and habitat values of these open waters.

- Study the impacts of proposed Crane Creek estuary conversion to a managed water impoundment. Completion of ongoing Metzger Marsh fish passage studies in 2003 will shed light on the relative value of open Lake Erie estuaries to fish and other aquatic species.



### **Habitat Objective 7**

Provide 400 to 700 acres of woodlands/wooded wetlands for resting habitat for migrant songbirds such as warblers, natural cavities for wood ducks, squirrels and others, perch/nest trees for bald eagles, and natural habitat for salamanders, wood frogs, toads and reptiles.

#### *Strategies:*

- Allow high areas within wetland units to become vegetated with willow and other water-tolerant tree and shrub species. Manage water levels according to lower areas within units.
- Monitor and maintain hydrologic regime in present wooded wetlands to ensure continuation of wetland characteristics and functions.
- Allow natural successional processes to progress to mature woodland stage in abandoned farm areas and suitable areas adjacent to present wooded sites.
- Where possible, promote the maintenance of standing dead trees as roosting sites and potential cavity nest sites.
- Decrease the Refuge white-tailed deer population through the hunt program to reduce browsing damage to young trees and to protect the woodland herbaceous layer. The January-February deer count will be 7 to 15 deer per square mile of upland and shallow wetland habitat by 2010.

### **Habitat Objective 8**

Scrub/shrub habitats will be increased to 600 acres to provide breeding habitat for woodcock, resting and nesting habitat for songbirds, and increase small mammal populations for hawks, owls and other predators.

#### *Strategies:*

- Where possible, promote scrub/shrub habitat as corridors across large open expanses, i.e. remnant dikes and higher portions of wetland areas.
- Cooperative farming program will be gradually phased out by 2006. Public and scientific opinion indicates that more natural habitat is preferred to cropland on Ottawa National Wildlife Refuge.
- Allow natural successional processes to progress to shrub stage in abandoned farming areas and suitable areas adjacent to present wooded sites. Grass seeding, noxious weed control and shrub planting will be required on some sites to facilitate restoration.

### **Habitat Objective 9**

Maintain the integrity of the dike system to allow for management of water levels within impoundment units by providing safe Refuge vehicle passage and preventing erosion of dikes.

*Discussion:* Dike mowing, and possible negative impacts to nesting songbirds, has been a subject of some discussion among refuge managers, biologists and bird watchers. The primary purpose of the dike system is to create water impoundments that can be managed to benefit a large array of migra-



**Habitat Management on Future Acquired Lands:** The Ottawa Refuge Complex is authorized to acquire up to 5,000 acres of critical wetland habitats within a portion of four counties adjacent to Lake Erie. Since 1998, the Service has received \$1.5 million in appropriations from Congress for this purpose. Several parcels of land, at various locations, are being purchased from willing sellers and will be subsequently managed by the Refuge. Depending on available funding, land acquisition could continue throughout the life of this plan.

Specific habitat prescriptions on each new Refuge property will be decided on a case-by-case basis. Existing upland habitats and/or wetland restoration potential varies with each acquired parcel. Portions of many parcels are low-lying agriculture fields with active drainage facilities. Hydrologic planning, including elevation surveys, will be necessary before these historic wetlands can be restored and managed. In the short-term, existing fields may need to remain in a planted crop or grass cover to prevent takeover by noxious weeds. However, the Service is committed to preparing a habitat restoration plan for each parcel within 1 year of acquisition. The restored habitats will be designed to complement the objectives outlined in this CCP.

tory birds and aquatic wildlife. The dike system represents a significant public monetary investment and protecting these earthen structures from erosion is a very important, and often costly, function of Refuge operations. Vehicle passage along these dike roads is fundamental to efficient Refuge management and public safety. Shrubs and trees growing on dike slopes complicate maintenance of the rock armor placed for erosion protection. The activity of burrowing animals such as woodchucks and muskrats also hastens erosion of the dikes.

The dikes do provide narrow strips of upland habitat surrounded by large wetland complexes. This habitat is attractive to some ground and shrub-nesting songbird species. However, the dikes also serve as travel corridors and foraging areas for predators such as raccoon, mink and coyotes. The dikes may act as “traps” for nesting songbirds and nesting success would be lower than if the birds were dispersed in natural habitat.

The dikes are not an original habitat type found within the Lake Erie coastal marsh ecosystem. It may be best to manage them as artificial structures and reduce their attractiveness to nesting birds. For these reasons, the Refuge will continue to mow the dikes on an as-needed basis. Vegetation cutting and frequent vehicle passage will discourage birds from nesting along the dikes. However, brush and tree removal along the slopes will occur primarily from late summer throughout the winter months. The delayed timing of this work will allow shrub nesting birds a chance to complete the nesting cycle.

*Strategies:*

- Dike tops will be mowed throughout the growing season to discourage brush growth and facilitate safe Refuge vehicle passage. Brush and tree removal will occur from late summer throughout the winter months. Dike repairs will be scheduled for summer months in conjunction with water management plans.
- Dike and channel slopes will be maintained to minimize erosion. All resloped areas will be constructed with filter fabric underlying rock for increased erosion protection.
- Explore installation of additional interior dikes in large units (i.e., MSU-3 and Pool 9) to allow better marsh and water management.



- Rodent control will be implemented when dike integrity is compromised by burrowing activity.

## People Goals, Objectives and Strategies

### People Goal 1:

Provide wildlife-dependent recreation to a diverse audience by offering a variety of quality wildlife observation, wildlife photography, environmental education, interpretation, hunting and fishing opportunities<sup>2</sup> when these uses are compatible with wildlife needs. This will promote understanding, appreciation, enjoyment and support for the Ottawa National Wildlife Refuge Complex and the entire National Wildlife Refuge System.

### People Objective 1 (Environmental Education and Interpretation)

Make visitor contacts more effective to increase people's awareness of the Refuge, its programs, and the National Wildlife Refuge System. Visitors will know that the trails go through diverse habitats, have a general idea of the type of wildlife on the Refuge, and recognize the importance of undisturbed areas and management activities on the Refuge.

#### *Strategies:*

- Construct a visitor education center. The visitor education center will provide a Refuge focal point and primary point of visitor contact.

*Discussion:* Representing Ohio's only lands within the National Wildlife Refuge System, the Ottawa Refuge Complex is uniquely positioned to play a key role in environmental education for the region. A visitor education center would expose more people to the Service and the Refuge System. A visitor education center would also dramatically increase support by current partners and friends of the Refuge System.

- Have a staff or volunteer contact visitors upon their arrival to share priority Refuge messages.
- Maintain the 1998 level of off-site public contacts (4,500) to allow staff to increase on-site contacts with groups and individuals.
- Create programs to encourage visitation at times other than peak bird migration.
- Extend the trail system to pass through more diverse habitat areas. Increase interpretive stations to better inform the public.
- Increase the frequency of auto-tour route openings beyond the current one or two events a year. Examine the feasibility of weekend openings up to once per month.

<sup>2</sup> People Objectives 1-5 are based on the six priority wildlife-dependent recreational uses identified in the Refuge Improvement Act of 1997.



### **People Objective 2 (Environmental Education)**

Provide environmental education opportunities to a diverse audience.

#### *Strategies:*

- Increase environmental education staffing to provide quality programs at the visitor education center.
- Provide off-Refuge programs to reach a diverse audience.
- Encourage teacher workshops to promote educator-lead field trips. This can also be used to increase local school system awareness of Refuge facilities.

### **People Objective 3 (Wildlife Observation and Photography)**

Assure that visitors have ample opportunities to observe Ottawa's waterfowl, shorebirds, songbirds, and other migratory birds during the key migration periods.

#### *Strategies:*

- Provide a paved visitor parking lot, a quarter-mile-long trail and restroom facilities that are fully accessible.
- Develop one (or two) new accessible observation platform with spotting scopes and improved interpretive signs along dike trails.
- Coordinate birding festivals with ODOW and local communities.
- Develop a system of remote video camera feeds into the visitor center so visitors can witness bird migration use on Cedar Point as well as other Refuge marshes not accessible to visitors.

### **People Objective 4 (Hunting)**

Provide quality hunting opportunities for recreational purposes while maintaining non-hunting Refuge areas for undisturbed wildlife use.

#### *Strategies:*

- Provide no fewer than 12 waterfowl hunting blinds located on the periphery of the Refuge.
- Conduct an annual survey to assess whether hunters consider the hunt a quality experience. Continue to cooperate with the ODOW during the Refuge waterfowl hunt.
- Explore the option of an early and/or late goose hunt to reduce resident Canada goose populations to a manageable level and to protect vulnerable Southern James Bay Canada goose populations.
- Provide a wheelchair-accessible blind in a suitable habitat for waterfowl.
- Explore opening some units to archery deer hunting where and when waterfowl disturbance will be minimal.
- Provide wheelchair-accessible blinds in suitable deer hunting units. If sufficient interest is shown, a hunting program for disabled people will be established.



- If primitive weapons hunts do not sufficiently control deer populations, the feasibility of a controlled shotgun hunt held during the state deer season will be explored. Hunt areas and timing will be established to minimize waterfowl disturbance.

### **People Objective 5 (Fishing)**

Provide quality fishing opportunities.

#### *Strategy:*

- Expand public opportunities for fishing in limited areas of the Refuge. Opportunities for fishing outreach will be provided during seasonal events.

### **People Objective 6**

Improve visitor comfort while on the Refuge.

#### *Strategies:*

- Improve the visitor toilet facilities.
- Provide a resting area with drinking water, tables and benches along walking trails.

### **People Goal 2:**

Protect the cultural, historic and prehistoric features of the Ottawa National Wildlife Refuge.

### **Objective**

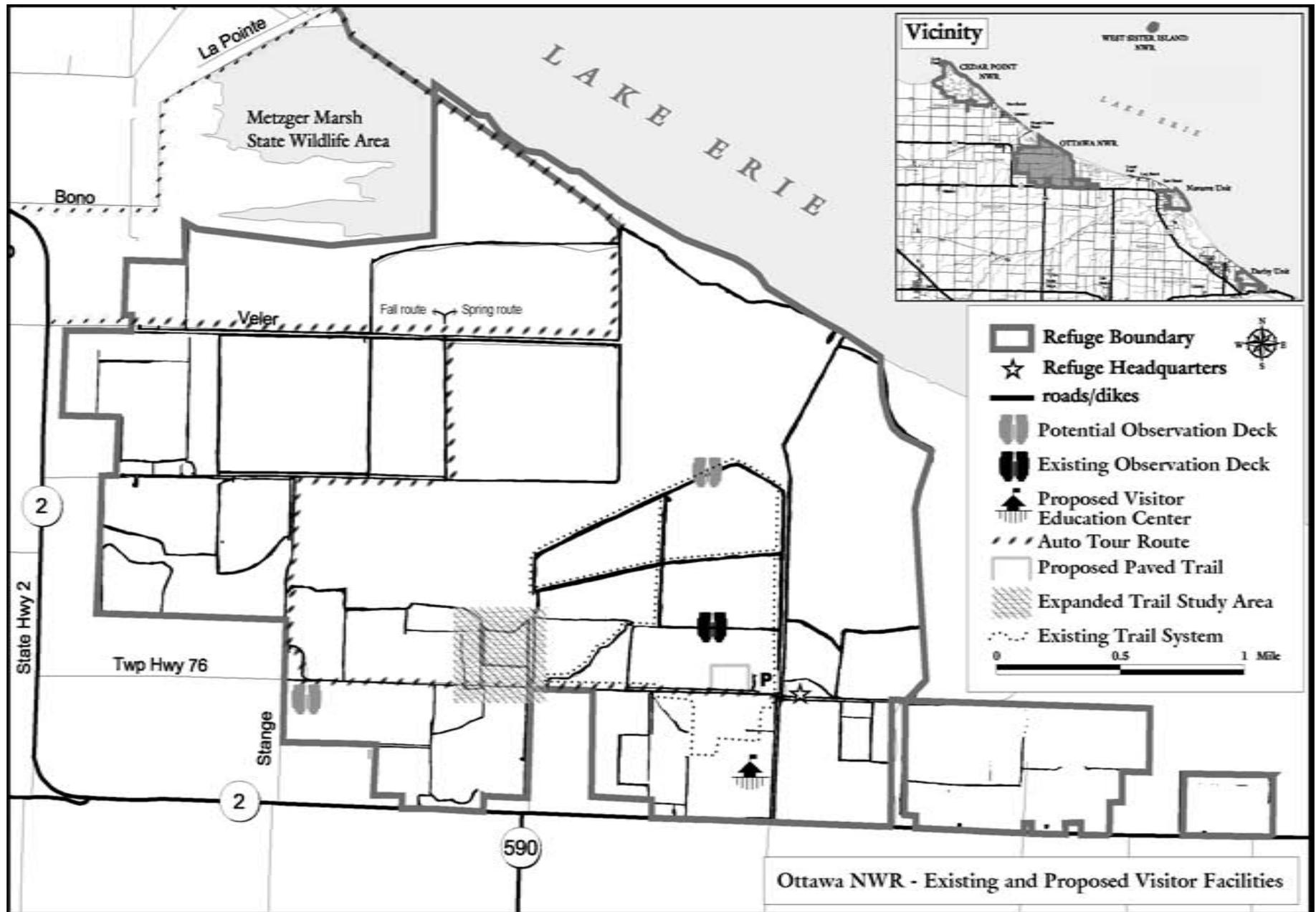
Actively manage cultural and archaeological sites found within units of the Ottawa Refuge.

#### *Strategies:*

- Establish a plan to fulfill requirements of Section 14 of the Archaeological Resources Protection Act for surveying lands to identify archaeological resources; and Section 110(a)(2) of the National Historic Preservation Act for a preservation program. The overview study identified a number of research questions to guide future investigations on the Refuge.
- Notify the Regional Historic Preservation Officer early in the planning process for each construction action and upon receiving requests for archaeological investigations on Refuge lands.



Figure 9: Public Use Facilities



# Cedar Point National Wildlife Refuge

## Wildlife Goals, Objectives and Strategies

Photo by Sharon Cummings



### Wildlife Goal 1:

Maintain native wildlife populations in balance with the habitat available while decreasing and limiting exotic plant and animal species. Surveys based on sound scientific methods for fish and wildlife populations will be conducted to determine viable habitat prescriptions to enhance the attractiveness of the Refuge for optimum numbers of species and peak populations.

### Wildlife Objective 1

Identify key fish and wildlife species currently using the Cedar

Point National Wildlife Refuge and determine appropriate monitoring protocols to track their population status.

#### Strategies:

- Conduct surveys to establish the presence/absence of plant and animal species.
- Conduct extensive literature review and continue consulting local and regional experts within the Service and other cooperating agencies to establish sound monitoring protocols.

### Wildlife Objective 2:

Monitor key species, including waterfowl, songbirds, shorebirds, colonial waterbirds, fish, and other species of concern to understand relative population levels, population trends and responses to management.

#### Strategies:

- Complete the Fish and Wildlife Inventory and Monitoring Plan by September 30, 2000.
- Use protocols and data analysis procedures approved by the U.S. Fish and Wildlife Service to monitor amphibians, reptiles, marsh birds, songbirds and mammals. Include modified protocols as part of the Long Point Bird Observatory program to meet Great Lakes Ecosystem objectives.
- Initiate research in cooperation with universities, non-profit organizations and other agencies to gain comprehensive information, analysis and understanding about wildlife populations and distribution.



- Whenever possible, publish and give presentations on the results of research and other monitoring done on Refuge. Encourage cooperators to do the same.

## Habitat Goals, Objectives and Strategies

### Habitat Goal 1:

Restore functional components of the Lake Erie marsh ecosystem that includes marshes, wet meadow, wooded wetlands and scrub/shrub to provide benefits to endangered species, waterfowl, songbirds, shorebirds, colonial waterbirds, fish, and other species of concern.

### Habitat Objective 1

Maintain 1,670 acres (current status) of marsh with the variable water depths and vegetation attributes as they existed in 1999.

#### *Strategies:*

- Identify the pool drawdown rotation schedule in a revised Water Management Plan, or annual work plan, by 2001.
- Actively manage carp and muskrat populations to maintain vegetation/open water balance.
- Control purple loosestrife as necessary through chemical and biological means.
- The spread of round gobies should be monitored in units with Lake Erie water sources.

### Habitat Objective 2

Wooded wetlands will be maintained at the current level (80 acres) to provide perch sites for bald eagles, habitat for migrating songbirds and natural nesting habitat for wood ducks and other cavity-nesting species.

#### *Strategy:*

- Monitor and maintain hydrologic regime in present wooded wetlands to ensure continuation of wetland characteristics and functions.

### Habitat Objective 3

Maintain the integrity of the dike system to allow for water management in the units by providing safe Refuge vehicle passage and preventing erosion of dikes.

#### *Strategies:*

- Dike tops will be mowed throughout the growing season to discourage brush growth and facilitate safe passage for Refuge vehicles. Brush and tree removal will occur from late summer throughout the winter months. Dike repairs will be scheduled for summer months in conjunction with water management plans.
- Dike and channel slopes will be maintained to minimize erosion. All resloped areas will be constructed with filter fabric underlaying rock erosion protection.



- Rebuild dikes in Pool 2 to prevent the loss of existing trees and to prevent flooding on private property.
- Rodent control will be implemented when dike integrity is compromised by burrowing activity.

## People Goals, Objectives and Strategies

### People Goal 1:

Provide public outreach and wildlife-dependent recreational opportunities to a diverse audience by offering quality educational and recreational activities where compatible with wildlife needs. This will promote understanding, appreciation, and support for Cedar Point National Wildlife Refuge, the Ottawa National Wildlife Refuge Complex and the National Wildlife Refuge System.

### People Objective 1 (Environmental Education)

Establish Cedar Point National Wildlife Refuge's identity as part of the Ottawa National Wildlife Refuge Complex.

#### *Strategies:*

- Educate Refuge visitors about Cedar Point National Wildlife Refuge through interpretive displays.
- During staff-visitor contacts, Cedar Point National Wildlife Refuge will be discussed as part of the Ottawa National Wildlife Refuge Complex.

### People Objective 2 (Environmental Education and Interpretation)

Foster understanding, appreciation and support for Cedar Point National Wildlife Refuge and for the preservation of inviolate areas for migrating, resting and nesting birds.

*Discussion:* The Cedar Point Refuge is managed as a migratory bird resting and feeding area. Most of the Refuge consists of one large managed marsh unit and public access is necessarily limited to seasonal use of an adjacent road-accessible fishing pond. The 2,500 acres of contiguous marsh is extremely important to waterfowl during migration. Vehicles or pedestrians passing along the dike will often send hundreds of birds into the air. The increased public use of the rest of the Lake Erie shoreline makes this Refuge invaluable to birds before and after flights across Lake Erie. During the late winter and early spring, eagle nesting activity at the north point closes the dike road to all Refuge activities (including dike maintenance) for 2-3 months.

The open period for the sole public use facility at Cedar Point, the seasonal fishing access, was recently expanded from June 1-September 1 to May 1-October 1 to allow additional fishing opportunities.

#### *Strategies:*

- Develop an information packet for distribution to off-Refuge contacts.



- In all off-Refuge presentations, include information about Cedar Point National Wildlife Refuge and the need to prevent disturbance of birds using the Refuge.

### **People Objective 3 (Fishing)**

Provide quality fishing opportunities to a diverse audience.

#### *Strategies:*

- Install and maintain accessible fishing piers.
- Expand the fishing season to include spring and fall, when fish are more active (note: a May and October expansion is proposed for 2000).
- Monitor and maintain harvestable fish populations in units that are open to fishing.

### **People Goal 2:**

Protect the cultural, historic and prehistoric features of the Cedar Point National Wildlife Refuge.

### **Objective**

Actively manage cultural and archaeological sites found within units of the Cedar Point Refuge.

#### *Strategies:*

- Establish a plan to fulfill requirements of Section 14 of the Archaeological Resources Protection Act for surveying lands to identify archaeological resources; and Section 110(a)(2) of the National Historic Preservation Act for a preservation program. The overview study identified a number of research questions to guide future investigations on the Refuge.
- Notify the Regional Historic Preservation Officer early in the planning process for each construction action and upon receiving requests for archaeological investigations on Refuge lands.



# West Sister Island National Wildlife Refuge

## Wildlife Goals, Objectives and Strategies

### Wildlife Goal 1:

Preserve and protect the largest wading bird colony within the Great Lakes ecosystem in accordance with the national wilderness designation.

### Wildlife Objective 1

Limit disturbance of heron, egret and cormorant nesting colonies.

#### Strategies:

- Improve and maintain boundary signs.
- Monitor research activities to ensure compliance with research permits.
- Increase law enforcement patrols to West Sister Island.

### Wildlife Objective 2

Increase scientific knowledge of the value of West Sister Island to wildlife.

#### Strategies:

- Issue special use permits for research that contributes to the Refuge objectives for West Sister Island.
- Encourage detailed study of black-crowned night herons to determine causes of a continued population decline.

## Habitat Goals, Objectives and Strategies

### Habitat Goal 1:

Provide habitat conditions favorable to colonial nesting wading birds without compromising the wilderness integrity.

### Habitat Objective 1

Maintain nesting habitat for approximately 1,000 great blue herons, 800 great egrets, 500 black-crowned night herons and 1,500 double crested cormorants (1998 population levels).



Photo by Sharon Cummings

*Discussion:* The West Sister Island lighthouse was built in 1847 and was maintained year-round by keepers employed by the United States Coast Guard until the light was automated in 1937. Trees were cut for firewood and domestic livestock grazed the land, which kept at least half the island in a grass/shrub stage. The grass/shrub stage was ideal for black-crowned night heron nesting and other herons and egrets that had traditionally nested on the island. In fact, the island was designated a migratory bird refuge in 1937 to protect the heron rookery found



there. After the lighthouse was automated, the open areas of the deserted island slowly reverted to mature trees through natural succession. The mature stand of trees is not as desirable to black-crowned night herons, favoring instead the egrets, herons and double-crested cormorants. Black-crowned night herons began a slow decline on the island. Black-crowned night herons are also declining throughout Ohio and they are listed as a State threatened species.

Local wildlife scientists believe that habitat manipulation could restore the shrub type habitat historically found on the island. Therefore, in cooperation with ODOW, an experiment was initiated in 1998 to clear cut 1 acre of trees each year. The trees are being cut at a 4-foot height to encourage re-sprouting and produce a shrub stage within 1 to 2 years of cutting. Hand saws are used to retain the integrity of the wilderness designation on the island. This experiment will continue for 5 years, at which time heron use of the cut areas will be evaluated. If the habitat experiment is successful after 5 years, and if an increase in black-crowned night heron nesting occurs, the Refuge may opt to continue the manipulation. If the experiment is not successful and there is no increase in black-crowned night heron nesting, then all cutting activity will cease.

*Strategies:*

- Continue to cut 1-acre blocks of forest annually in an experimental manipulation of vegetation to create a range of successional stages to benefit the black-crowned night herons.
- Monitor the vegetation growth annually (after fledging in the colonies) to ensure that the desired vegetational stage is being achieved.
- Monitor the bird populations and nesting success annually during the nesting season (April through July).
- Determine necessary habitat management techniques to provide suitable black-crowned night heron habitat.
- Conduct an initial baseline comprehensive vegetation study to determine the existing vegetative communities.
- Monitor long-term vegetative changes on West Sister Island by sampling every 4 to 5 years.

## People Goals, Objectives and Strategies

*Discussion:* West Sister Island was designated as a Federal wilderness in 1975 primarily because of its value as a heron and egret rookery. The island is managed to minimize human disturbance to the nesting birds and remains closed to the public. The CCP planning team discussed the possibility of opening the island for day visits during non-nesting time periods. The group concluded that, although wilderness qualities may not be compromised by limited public use during the off-season, the year-round closure should be retained for a number of reasons.



The island is remote with surrounding shoals and lacks safe boat landing sites. Weather during the non-nesting season in fall, winter and early spring would compound the safety issue. Aside from the colonial nesting waterbirds, the island does not receive a high amount of regular use by other migratory birds. Wildlife viewing opportunities would be limited outside of the summer months. The island has a dense vegetative cover, including some rare plants and large stands of poison ivy. Large areas around the rookeries are covered with bird droppings and carcasses. Overnight camping and destruction of vegetation, although prohibited, would most likely occur if the island were opened to the public. The necessary increase in law enforcement activity would place an added burden on limited Refuge staff and resources. Public safety and law enforcement would be major concerns if public visitation was promoted on the island.

**People Goal 1:**

Provide public education opportunities that promote understanding, appreciation and support for the Lake Erie Islands, the West Sister wilderness status, and the need to preserve inviolate areas for colonial nesting birds.

**People Objective 1 (Environmental Education)**

Establish West Sister Island's identity as part of the Ottawa National Wildlife Refuge Complex.

*Strategies:*

- Educate Refuge visitors about West Sister Island National Wildlife Refuge through interpretive displays at onshore facilities.
- During staff-visitor contacts, West Sister Island National Wildlife Refuge will be discussed as part of the Ottawa National Wildlife Refuge Complex.

**People Objective 2 (Environmental Education and Interpretation)**

All off-Refuge outreach contacts will understand, appreciate and support the Lake Erie Islands, the West Sister Island wilderness status and the need to preserve inviolate areas for colonial nesting birds.

*Strategies:*

- Develop an information packet for distribution to off-Refuge contacts.
- In all off-Refuge presentations, include information about West Sister Island, its wilderness status, and the need to prevent disturbance of the breeding colonies.

**People Goal 2:**

Protect the cultural, historic and prehistoric features of West Sister Island National Wildlife Refuge.

**Objective**

Actively manage cultural and archaeological sites found on West Sister Island Refuge.



*Strategies:*

- Establish a plan to fulfill requirements of Section 14 of the Archaeological Resources Protection Act for surveying lands to identify archaeological resources; and Section 110(a)(2) of the National Historic Preservation Act for a preservation program. The overview study identified a number of research questions to guide future investigations on the Refuge.
- Notify the Regional Historic Preservation Officer upon receiving requests for archaeological investigations on Refuge lands.

**People Goal 3:**

Protect the wilderness character of West Sister Island.

**Objective**

Maintain natural qualities of the island through limited human presence and disturbance.

*Strategies:*

- Continue periodic law enforcement visits in cooperation with the U.S. Coast Guard. Evidence of public closure violations will increase frequency and timing of visits.
- Update the 1981 Wilderness Management Plan.

