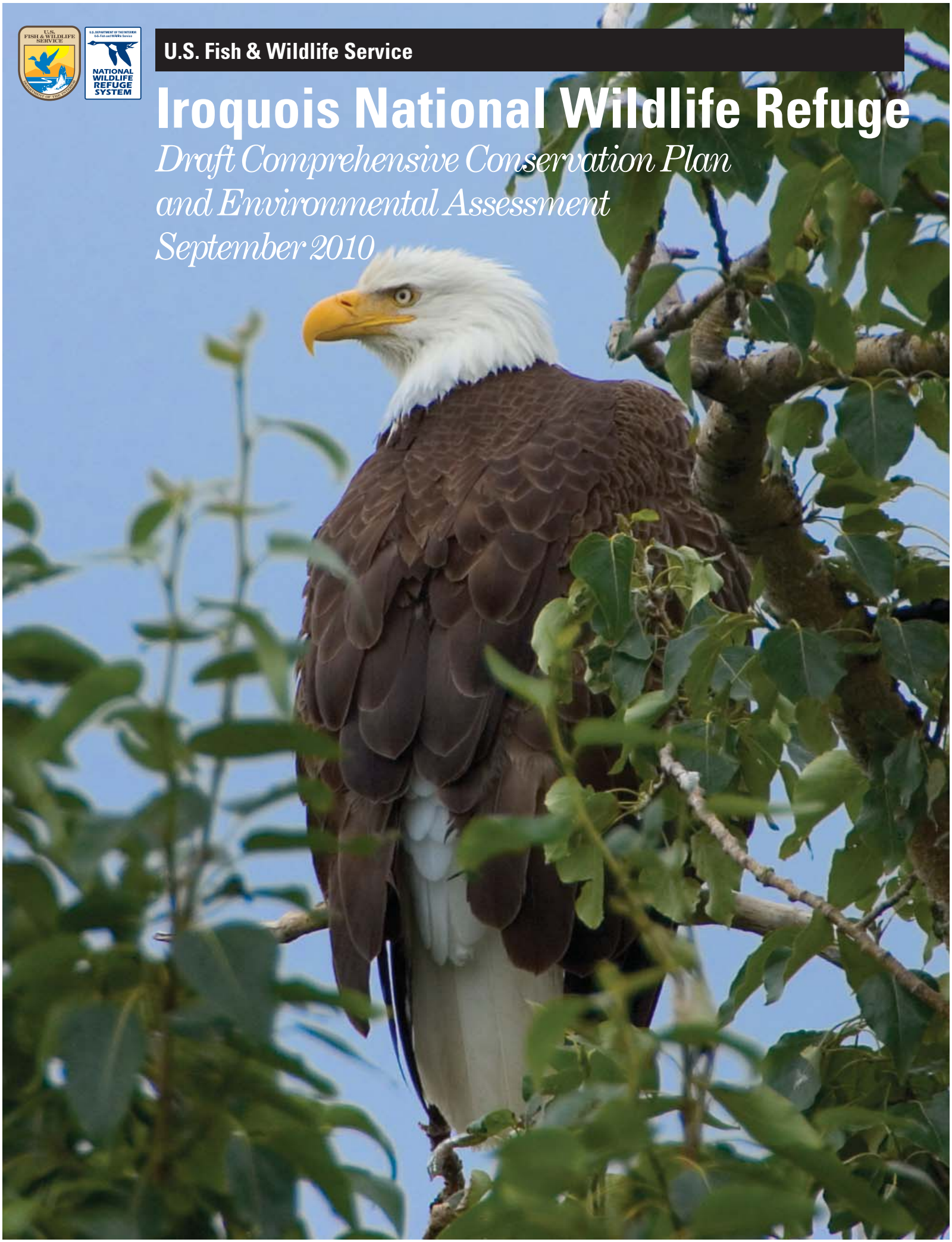
U.S. Fish & Wildlife Service

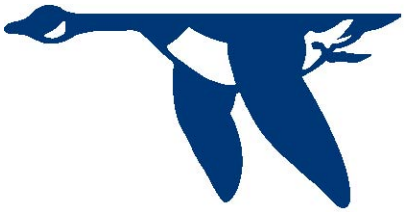
Iroquois National Wildlife Refuge

Draft Comprehensive Conservation Plan and Environmental Assessment

September 2010



Bald Eagle
Steve Hillebrand/USFWS



This blue goose, designed by J.N. "Ding" Darling, has become the symbol of the National Wildlife Refuge System.

The *U.S. Fish and Wildlife Service* is the principal Federal agency responsible for conserving, protecting, and enhancing fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The Service manages the 150-million acre National Wildlife Refuge System comprised of more than 550 national wildlife refuges and thousands of waterfowl production areas. It also operates 69 national fish hatcheries and 81 ecological services field stations. The agency enforces Federal wildlife laws, manages migratory bird populations, restores nationally significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Federal Assistance Program which distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state wildlife agencies.

Comprehensive Conservation Plans provide long term guidance for management decisions and set forth goals, objectives, and strategies needed to accomplish refuge purposes and identify the Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.

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Refuge Vision Statement

Iroquois National Wildlife Refuge, known locally as part of the "Alabama Swamps" will be the ecological "puzzle piece" for western New York by creating and maintaining unsurpassed habitats including wetlands, grasslands, shrublands, and forests for migratory birds and other wildlife. By encouraging compatible wildlife dependent recreation and working with partners, a deep understanding and appreciation for the Refuge's ecological integrity will be fostered in its visitors, regardless of generational, economic, or social boundaries. Through these efforts, future generations will cherish Iroquois National Wildlife Refuge's interconnectivity to the much larger National Wildlife Refuge System.

Iroquois National Wildlife Refuge

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Abstract

Type of Action: Administrative

Lead Agency: U. S. Department of the Interior, Fish and Wildlife Service

Responsible Official: Marvin Moriarty, Regional Director, Region 5, Northeast

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Three alternatives are described and compared for the 10,828-acre Iroquois National Wildlife Refuge. The three alternatives are:

Alternative A: Current Management: This alternative is the No Action alternative required by the National Environmental Policy Act. Selection of this alternative would maintain the status quo; there would be no change in current management practices. This alternative serves as the baseline from which to compare the other alternatives.

Alternative B: The Service's Proposed Action: This alternative is the one we propose as the best way to manage this refuge over the next 15 years. It includes the array of management actions that, in our professional judgment, works best toward achieving the refuge purposes, our vision and goals, and the goals of other State and regional conservation plans. We also believe it most effectively addresses the key issues raised during the planning process. Under Alternative B, refuge habitat management would focus on decreasing habitat fragmentation and restoring native habitats.

Alternative C: Natural Systems: Refuge management under Alternative C would focus on restoration of natural ecosystem processes and functions. Habitat management would target a more natural state and emphasize restoration of native habitats.

Chapters

Chapters (cont'd)

Appendixes

Appendixes (cont'd)

Figures, Tables and Maps

List of Figures

List of Tables

Figures, Tables and Maps (cont'd)

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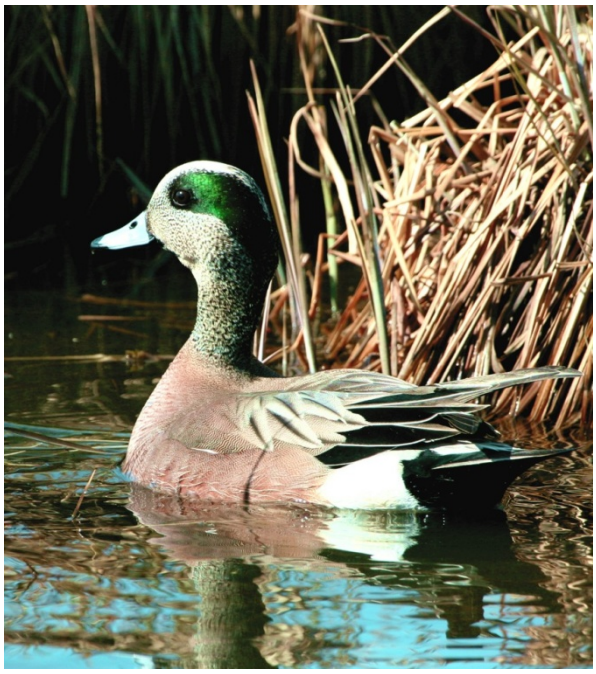
List of Maps

Figures, Tables and Maps (cont'd)

List of Maps (cont'd)

Chapter 1



Donna Dewhurst/USFWS

American Widgeon Drake

The Purpose of and Need for Action

- Introduction
- The Purpose of and Need for the Proposed Action
- Project Area
- The Service, Policies, and Legal Mandates
- Refuge Establishment, History and Purpose
- Refuge Vision Statement
- Refuge Goals
- The Comprehensive Conservation Planning Process

Chapter 1
The Purpose of and Need for Action

Introduction

This draft Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) for Iroquois National Wildlife Refuge (Iroquois NWR, the Refuge) combines two documents required by federal law: The CCP is a requirement of the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 6688dd, et seq.; Refuge Improvement Act). An EA is a requirement of the National Environmental Policy Act of 1969 (NEPA). The CCP will serve as a guide for the Refuge's management over the next 15 years.

The CCP is divided into five chapters with seven supporting appendices. This chapter introduces the purpose and need for the development of the CCP and EA and sets the stage for Chapters 2 through 4. This chapter includes

- an explanation of the purpose and need for preparing a CCP/EA for Iroquois NWR;
- a description of the purposes for which the Refuge was established;
- an overview of the U.S. Fish and Wildlife Service (USFWS, the Service), its national and regional mandates, and policies that influenced this document;
- the vision and goals for Iroquois NWR;
- an explanation of the planning process and how it is used to develop this document; and
- issues and concerns addressed during the planning process.

Chapter 2, "Alternatives and Proposed Action," presents three management alternatives including the Service-proposed action and provides an analysis of the different strategies in terms of their ability to meet the Refuge's goals and objectives and respond to the key issues identified at the end of Chapter 1.

Chapter 3, "Description of the Affected Environment," describes the physical, biological, and human environment of the Refuge.

Chapter 4, "Environmental Consequence," evaluates the foreseeable consequences of implementing each of the three management alternatives.

Chapter 5, "Consultation and Coordination" describes the use, purpose and value of public and partner involvement throughout the planning process and identifies key individuals involved in preparation of this document.

This document also includes a glossary of terms, a list of commonly used acronyms and abbreviations and a bibliography.

Purpose and Need for Action

Our aim is to develop a CCP that best meets the Refuge's primary purpose, goals and objectives; contributes to the mission of the National Wildlife Refuge System (NWRS, the Refuge System); abides by USFWS policies and mandates; addresses key issues; and responds to public concerns.

NEPA requires that a thorough analysis be made of a range of alternatives, including the proposed action and no action. We analyze the socioeconomic, biological, physical and cultural consequences of implementing each alternative. This draft CCP/EA evaluates three alternatives that represent different ways to achieve all or most of the CCP criteria mentioned above. All three alternatives were created with the potential to become fully developed into a final CCP.

Partner and public involvement is vital to the process of developing a CCP that will successfully guide management of Iroquois NWR for the next 15 years. The CCP is developed to provide

- a clear vision of the desired future conditions of Refuge habitat, wildlife populations, visitor services, staffing, and facilities;
- clear communication regarding Refuge management actions to state agencies, Refuge neighbors, visitors and partners;
- assurance that Refuge management reflects the policies, legal mandates and the mission of the NWRS;
- assurance that current and future public use is compatible with the primary purpose of the Refuge;
- long-term continuity in Refuge management; and
- guidance for staffing, operating and maintenance, and annual budget requests.

The National Wildlife Refuge System Improvement Act of 1997 (Improvement Act; Public Law105–57; 111 Stat. 1282) requires that all national wildlife refuges have a CCP completed by 2012 to help fulfill the mission of the Refuge System.

A CCP will benefit Iroquois NWR for multiple reasons: First, it will provide the Refuge with an updated master plan to ensure fulfillment of its obligations in light of the dramatic changes in environmental, economic, and social conditions since the Refuge was first established. Second, it will prepare the Refuge to better respond to concerns regarding future industries (quarries and wind farms) that may establish in local towns and have an impact on the Refuge's environment and wildlife. Third, it will allow the Refuge to address issues identified during the planning process by the public, partners, other agencies and Refuge staff that could adversely affect fish, wildlife, and plant populations on Refuge lands.

Once completed, the CCP will be reviewed, evaluated and subsequently updated at least every 15 years in accordance with the Refuge Improvement Act and Service planning policy (602 FWS 1, 3, and 4).

Project Area

Iroquois NWR was established in 1958 and encompasses 10,828 acres of open water, emergent marsh, forested wetland, upland forest, grassland, and shrubland habitats. The Refuge lies within the rural towns of Alabama in Genesee County and Shelby in Orleans County in the Oak Orchard Creek Watershed on the Lake Plains of western New York (Map 1-1 and 1-2). Oak Orchard Creek enters the Refuge from the east, meanders northwest, and exits to the north, eventually emptying into Lake Ontario. The Refuge is approximately 25 miles west of Lake Erie and twenty miles south of Lake Ontario. NYS Route 63 runs through the center of the Refuge, bisecting it from east to west. Iroquois NWR, in combination with neighboring State Wildlife Management Areas, forms the 19,000-acre Tonawanda-Iroquois-Oak Orchard

Wetland Complex (Map 1-3); this complex is one of the largest contiguous blocks of natural habitat in western NY and includes some of the most productive inland wildlife habitat in the eastern United States.

USFWS

Egret in wetland at Iroquois NWR

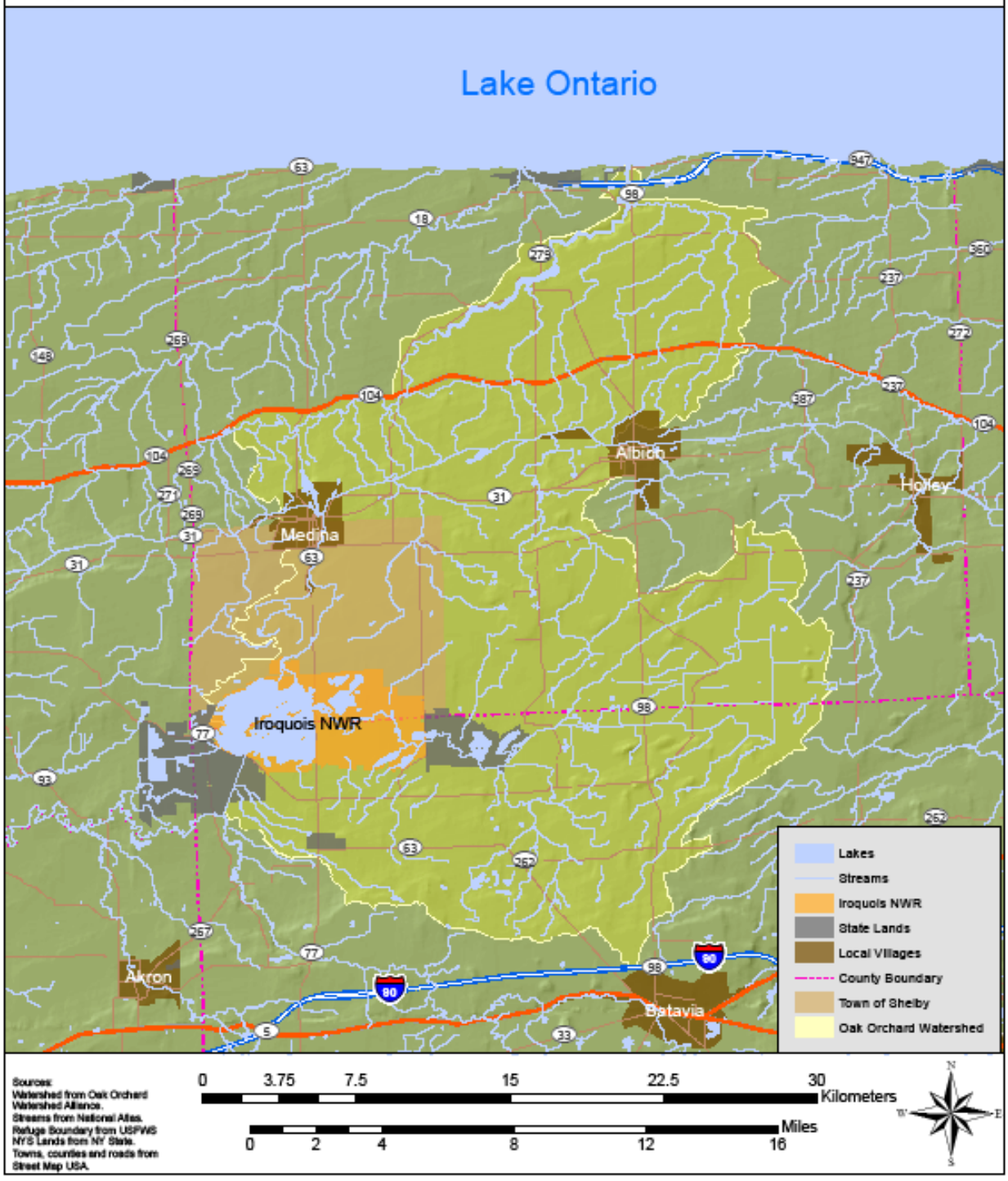
Map 1-1

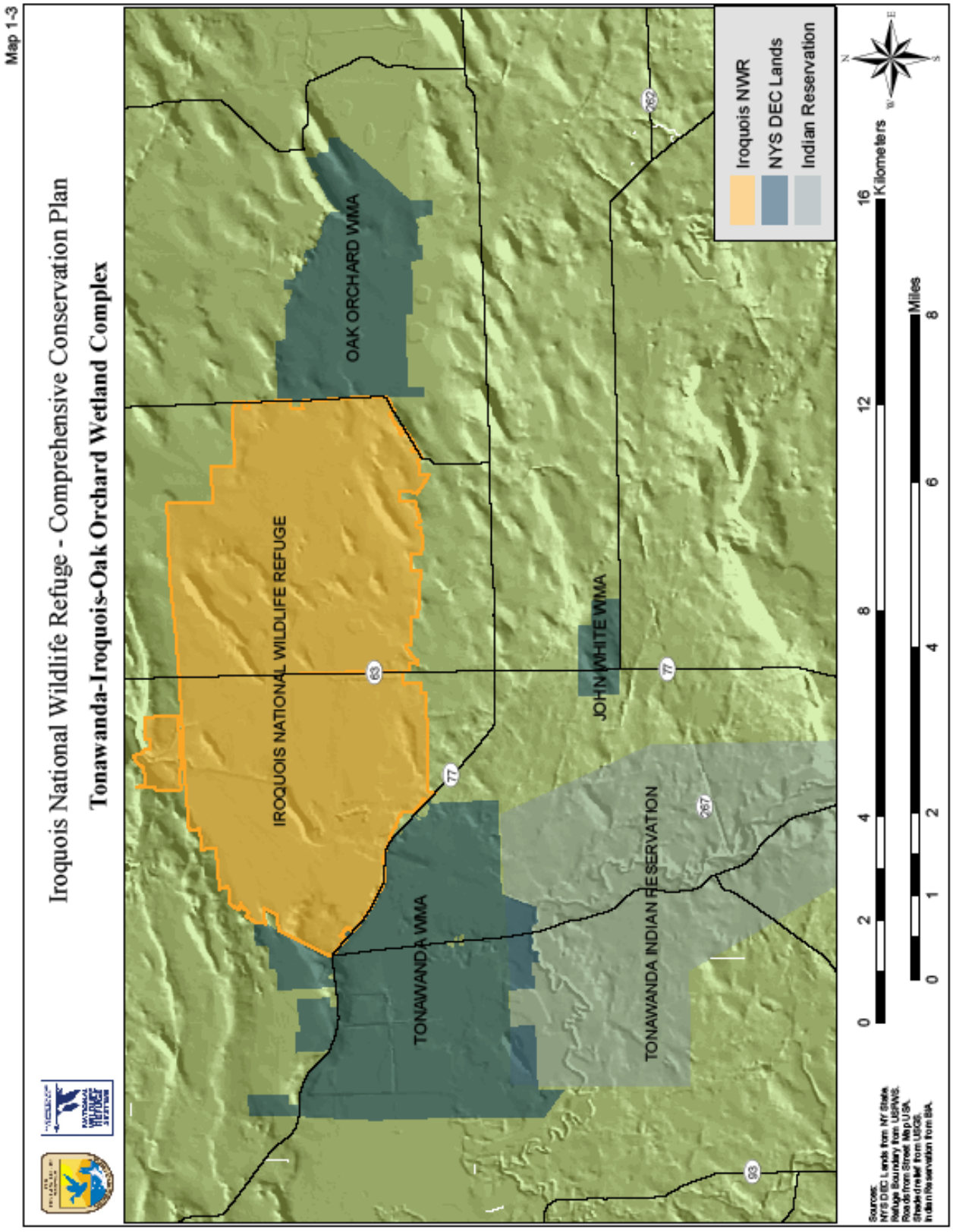

Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Location of Iroquois National Wildlife Refuge
Québec
Lake Huron
Ontario
Lake Ontario
New York
Rochester
Buffalo
Iroquois National Wildlife Refuge
Lake Erie
Erie
Cleveland
Scranton
Pennsylvania
Allentown
Pittsburgh
Map Location
Sources:
Refuge Boundary from USFWS.
Cities,states, lakes and rivers from StreetMapUSA.
Shadedrelief map from USGS.
0 50 100 200 300 400 Kilometers
0 30 60 120 180 240 Miles
N
W
E
S

Map 1-2

Iroquois National Wildlife Refuge - Comprehensive Conservation Plan

Oak Orchard Watershed and Hydrology




Map 1-3
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Tonawanda-Iroquois-Oak Orchard Wetland Complex
Iroquois NWR
NYS DEC Lands
Indian Reservation
IROQUOIS NATIONAL WILDLIFE REFUGE
OAK ORCHARD WMA
JOHN WHITE WMA
TONAWANDA WMA
TONAWANDA INDIAN RESERVATION
77
63
267
0 2 4 8 12 16 Kilometers
0 1 2 4 6 8 Miles
Sources:
NYS DEC Lands from NY State.
Refuge Boundary from USFWS.
Roads from Street Map USA.
Shaded relief from USGS.
Indian Reservation from BIA.

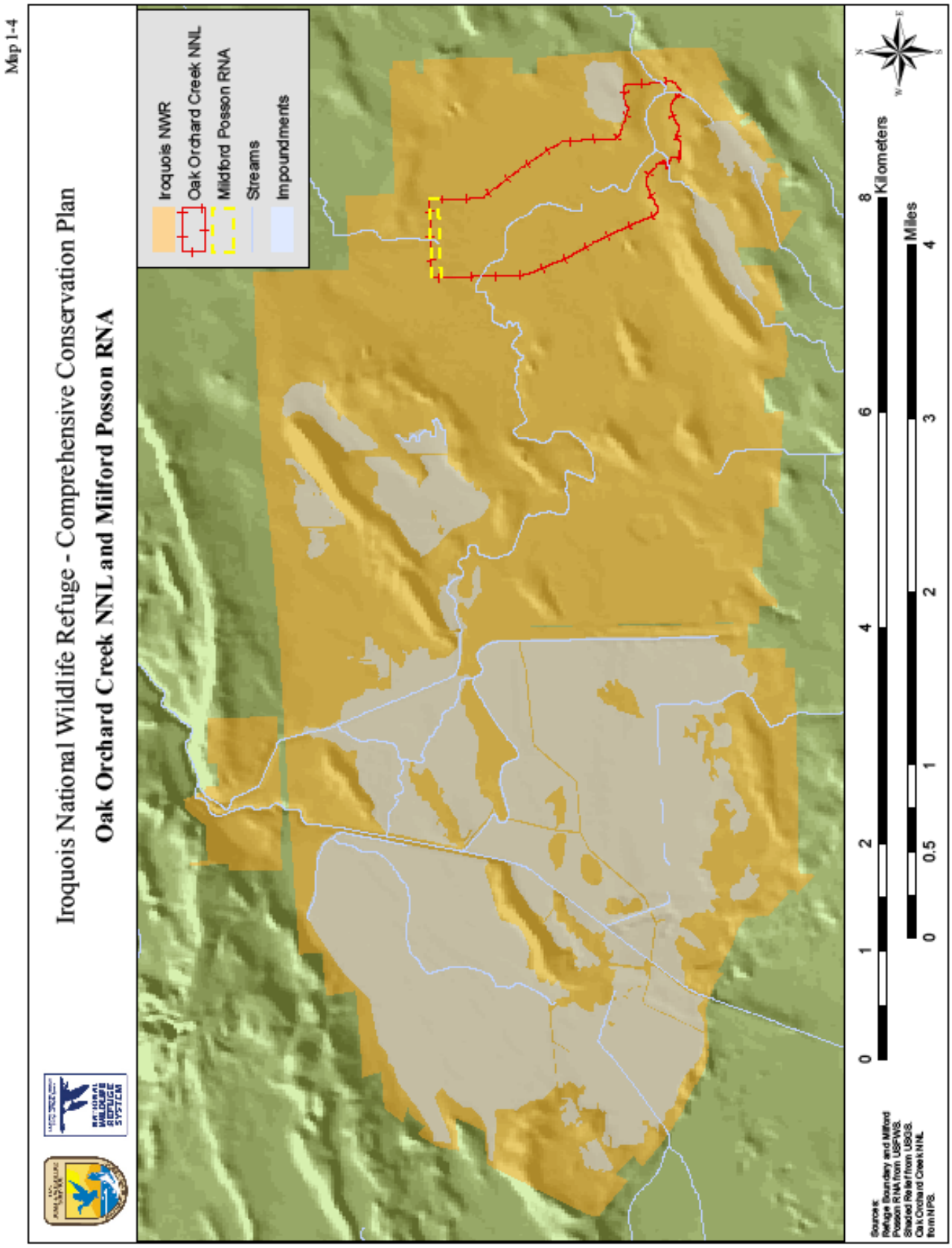
Over half of the Refuge is wetland (6,500 acres) with 4,000 of these wetland acres contained in 19 managed freshwater impoundments. Water levels are adjusted within and between years to mimic natural hydroperiods associated with unaltered wetlands to provide a variety of feeding, nesting, brood rearing, and resting habitats for migratory birds and resident wildlife. The interspersion of open water and aquatic and emergent plant communities provide resting and feeding habitat for over 120,000 waterfowl annually.

Forested wetlands comprise about 3,400 acres of the Refuge and are located in the natural floodplain of Oak Orchard Creek and in Seneca Pool, a constructed greentree impoundment. Wood duck boxes and natural tree cavities in mature forested wetlands provide nesting sites for wood duck, hooded merganser, more than a dozen species of resident and migratory landbirds, and habitat for many mammal species. Approximately 2,200 of the 4,100 acres of upland habitat at Iroquois NWR are currently maintained in an early successional stage as grassland or shrubland through active management. Grasslands and impoundment dikes are mowed or burned according to a multi-year rotation schedule to suppress encroachment of broadleaf forbs and woody plants.

Iroquois NWR was one of the first areas in New York designated as a National Audubon Society Important Bird Area. The 523-acre Oak Orchard Creek Marsh was designated in 1973 as a National Natural Landmark (NNL) (Map 1-4). When this landmark was established it included the 15 acre Milford Posson Research Natural Area (RNA) (Map 1-4).

USFWS

Wood Duck


Map 1-4
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Oak Orchard Creek NNL and Milford Posson RNA
Iroquois NWR
Oak Orchard Creek NNL
Milford Posson RNA
Streams
Impoundments
0
1
2
4
6
8
Kilometers
0
0.5
1
2
3
4
Miles
Sources:
Refuge Boundary and Milford Posson RNA from USFWS.
Shaded Relief from USGS.
Oak Orchard Creek NNL from NPS.

The Refuge is open to the public and facilitates wildlife-dependent recreational opportunities including hunting, fishing, interpretation, environmental education, wildlife observation and photography. The Refuge Improvement Act encourages refuges to provide these types of opportunities when compatible with the primary purpose of the refuge or Mission of the NWRS. Total visitation to the Refuge fluctuates year to year between 35,000 to 50,000 visits. A large portion of visitors (75% to 80%) participate in the Refuge's non-consumptive uses such as wildlife observations and interpretation. Iroquois NWR has four nature trails meandering over six miles allowing visitors to experience the diverse wildlife habitats found on the Refuge. Four overlooks provide vantage points for viewing wildlife, including nesting bald eagles. Consumptive recreation includes fishing, hunting for deer, turkey, waterfowl, rail, snipe, woodcock, rabbit and squirrel. Trapping for furbearers including muskrat, beaver and mink is conducted for management purposes. A smaller percentage of Refuge visitors (20% to 25%) participate in consumptive recreation.

The Refuge has partnered with several organizations including Friends of Iroquois NWR, Inc., Lake Plains Waterfowl Association, Buffalo Audubon Society, the University of Buffalo, Canisius College and Iroquois Job Corps Center to provide quality special events, youth orientations, environmental education and interpretation programs. The Refuge hosts a Spring into Nature Celebration each April in cooperation with partners providing a range of activities that introduce approximately 1,000 visitors to wildlife, wildlife habitat and conservation on the Refuge. Buffalo Audubon Society has been providing interpretive programs on and near the Refuge since 2003. Their nature programs help reach approximately 1,000 people annually. A youth turkey hunt, youth waterfowl hunt and youth fishing derby are conducted each year to introduce younger generations to these outdoor activities and to provide them with a quality recreational opportunity.

The Service, Policies and Legal Mandates

This section provides an overview of the USFWS, the NWRS, and Service policies and mandates that directly influenced the development of this draft CCP/EA.

Our Mission

The Service is part of the Department of the Interior. Our mission is

"*Working with others, to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.*"

By law, Congress entrusts national resources to the Service for conservation and protection. Those trust resources consist of national wildlife refuges, migratory birds, federal-listed endangered and threatened species, inter-jurisdictional fishes, wetlands, and certain marine mammals. To uphold our responsibilities and to achieve our mission we engage in a diversity of activities and programs. These include

- operation and management of the 150-million acre National Wildlife Refuge System which includes 551 national wildlife refuges and thousands of small wetlands and other special management areas;
- operation and management of 70 national fish hatcheries, 65 fishery resource offices and 81 ecological services field stations;
- enforcement of federal wildlife laws and international treaties on importing and exporting wildlife;
- protection, restoration and management of endangered species, migratory birds, marine mammals, nationally significant fisheries, and wildlife habitat such as wetlands;

- assistance to foreign governments with their international conservation efforts and development of wildlife conservation programs;

- oversight of the Federal Aid program that distributes hundreds of millions of dollars in excise taxes on fishing and hunting equipment to state fish and wildlife agencies; and

- employment of approximately 7,500 people at facilities across the country, with a headquarters in Washington D.C., eight geographic regions, and nearly 700 field units.

The Service manual contains standing and continuing directives for implementing those authorities, responsibilities, and activities. The manual can be accessed at: *http://www.fws.gov/pdm/direct.html*. Special Service directives that affect the rights of citizens or the authorities of other agencies are published separately in the Code of Federal Regulations (CFR), and are not duplicated in the Service manual. Most of the current regulations that pertain to the Service are issued in 50 CFR parts 1-99. The CFR can be accessed at: *http://www.access.gpo.gov/nara/cfr/index.html*.

The National Wildlife Refuge System, its Mission, and Policies

The NWRS is the world's largest network of public lands and waters set aside specifically for conserving wildlife and protecting ecosystems. The Refuge System began in 1903 when President Theodore Roosevelt designated the three-acre Pelican Island in Florida as a national bird sanctuary. From its creation, the Refuge System has grown to more than 551 national wildlife refuges protecting 150 million acres of public lands; there is at least one refuge in all 50 states and there are waterfowl production areas in 10 states. Each year, more than 40 million visitors hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretation on refuge lands. Varying in size from half-acre parcels to thousands of square miles, the majority of these lands are in Alaska, with the rest spread across the lower 48 states and U.S. territories. Like Pelican Island, many early wildlife refuges were created for herons, egrets, and other water birds. Other refuges were set aside for large mammals like elk and bison. But most national wildlife refuges were created to conserve migratory waterfowl. This is a result of the United States' responsibilities under international treaties for migratory bird conservation and legislation such as the Migratory Bird Conservation Act of 1929. Refuges dot the map along the four major "flyways" that waterfowl follow from their northern nesting grounds to southern wintering areas. Iroquois NWR lies within the Atlantic Flyway.

In 1997, the National Wildlife Refuge System Improvement Act (Improvement Act) was passed. This law established a unifying mission for the Refuge System, a new process for determining compatible public use activities on the refuges, and the requirement to prepare CCPs for each refuge. The Improvement Act states first and foremost, that the Refuge System must focus on wildlife conservation. It further states that the national mission, coupled with the purpose(s) for which each refuge was established, will provide the principal management direction for each refuge.

The mission of the Refuge System is

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

- Refuge Improvement Act; Public Law 105-57

The Improvement Act identifies six wildlife-dependent public uses: hunting, fishing, wildlife observation, photography, environmental education, and interpretation. These six uses receive priority consideration on refuges and in the development of CCPs. The Improvement Act also declares that all existing or proposed refuge uses must be compatible with the refuge's purpose and consistent with public safety. The Refuge Manager determines if an existing or proposed use is compatible by evaluating its potential impact on refuge resources. This ensures that the use supports the System mission and does not materially interfere with or detract from the purpose for which the Refuge was established.

The Refuge Manual provides a central reference for current policy governing the operation and management of the Refuge System not covered by the Service manual, including technical information on implementing refuge policies and guidelines. This manual can be reviewed at Iroquois NWR Headquarters.

Refuge System Planning Policy

The Refuge System has developed a planning policy that provides guidance, systematic direction, and minimum requirements for developing all CCPs and step-down management plans. This policy also provides a systematic decision-making process that fulfills those requirements. The policy states that we will manage all refuges in accordance with an approved CCP. Once implemented, the CCP will achieve the purpose of the Refuge, help fulfill the Refuge System mission, maintain and restore the ecological integrity of each refuge, help achieve the goals of the National Wilderness Preservation System, and meet other mandates that apply to the Refuge System (Fish and Wildlife Service Manual, 602 FW 1,2,3).

The Improvement Act of 1997 stipulates that each CCP shall identify and describe

- the purposes of each refuge comprising the planning unit (Chapter 1);
- the distribution, migration patterns, and abundance of fish, wildlife, and plant populations and related habitats within the planning unit (Chapter 3, Affected Environment);
- the archaeological and cultural values of the planning unit (Chapter 3);
- areas within the planning unit that are suitable for use as administrative sites or visitor facilities (Chapter 2, Alternatives and Proposed Action);
- significant problems that may adversely affect the populations and habitats of fish, wildlife, and plants within the planning unit and the actions necessary to correct or mitigate such problems (Chapters 1, 2 and 3); and
- opportunities for compatible wildlife-dependent recreational uses (Chapter 2).

Appropriate Refuge Uses Policy

The Appropriate Refuge Uses Policy provides a national framework and procedure for refuge managers to follow when deciding if uses are appropriate on a refuge. It also clarifies and expands on the Compatibility Policy (603 FW 2.10D) which describes when refuge managers should deny a proposed use without determining compatibility. When we find a use is appropriate, we must then determine if the use is compatible before we allow it on a refuge. This policy applies to all proposed and existing uses in the Refuge System only when we have jurisdiction over the use and does not apply to refuge management activities or situations where reserved rights or legal mandates provide we must allow certain uses (603 FW 1). Appendix B further describes the Appropriate Refuge Uses Policy and describes its relationship

to the CCP process. To view the policy and regulations online, visit: *http://www.fws.gov/policy/603fw1.html* .

Compatibility Policy

Federal law and Service policy provide the direction and planning framework to protect the Refuge System from incompatible or harmful human activities and ensure that Americans can enjoy Refuge System lands and waters. The Improvement Act is the key legislation regarding management of public uses and compatibility. The compatibility requirements of the Improvement Act were adopted in the USFWS Final Compatibility Regulations and Final Compatibility Policy published October 18, 2000 (Federal Register, Vol. 65, No. 202, pp. 62458 to 62496). This Compatibility Policy changed or modified Service regulations contained in Chapter 50, Parts 25, 26, and 29 of the Code of Federal Regulations (USFWS 2000a). The specific compatibility determinations for Iroquois NWR can be found in Appendix B along with additional information on the process. To view the policy and regulations online, visit: *http://www.fws.gov/policy/603fw2.html*.

Wildlife-Dependent Recreation Policy

The Improvement Act defines and establishes that compatible wildlife dependent recreational uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation) are the priority general public uses of the Refuge System and will receive special consideration in refuge planning and management over other general public uses. The Wildlife Dependent Recreation Policy explains how we will provide visitors with opportunities for those priority public uses on units of the Refuge System and how we will facilitate these uses. To view the policy and regulations online, visit:

http://www.fws.gov/policy/605fw1.html (Wildlife Dependent Recreation Policy)

http://www.fws.gov/policy/605fw2.html (Hunting)

http://www.fws.gov/policy/605fw3.html (Recreational Fishing)

http://www.fws.gov/policy/605fw4.html (Wildlife Observation)

http://www.fws.gov/policy/605fw5.html (Wildlife Photography)

http://www.fws.gov/policy/605fw6.html (Environmental Education)

http://www.fws.gov/policy/605fw7.html (Interpretation)

Maintaining Biological Integrity, Diversity and Environmental Health Policy

This policy provides guidance on maintaining or restoring the biological integrity, diversity and environmental health of the Refuge System including the protection of a broad spectrum of fish, wildlife and habitat resources found in refuge ecosystems. Refuge managers are provided with a process for evaluating the best management direction to prevent the additional degradation of environmental conditions and restore lost or severely degraded environmental components. Guidelines are also provided for managing external threats to the biological integrity, diversity and environmental health of a refuge and its ecosystem (601 FW 3) and can be found at: *http://www.fws.gov/policy/601fw3.html*.

Fulfilling the Promise

In 1999 a report titled, "Fulfilling the Promise, The National Wildlife Refuge System; Visions for Wildlife, Habitat, People and Leadership" (Fulfilling the Promise) was published by the Service. The report is a culmination of a year-long process by teams of Service employees to create a vision for the Refuge System nation-wide. This report was a result of the "System Conference" held in Keystone, Colorado in October 1998. It was attended by every refuge manager in the country, other Service employees, and scores of conservation organizations. The Fulfilling the Promise report contains 42 recommendations packaged within three vision statements focusing on wildlife and habitat, people, and

leadership. We have often looked to the recommendations in this report for guidance when writing this draft CCP/EA. For example, Fulfilling the Promise recommends forging new alliances through citizen and community partnerships and strengthening partnerships with the business community. One of the goals in our CCP at Iroquois NWR is devoted almost entirely to the development of community partnerships and several of our strategies focus on forging new partnerships or strengthening existing ones.

Other Mandates

Service and Refuge System policy and the Refuge's purposes provide foundation for its management. However, other federal laws, executive orders, treaties, interstate compacts and regulations on the conservation and protection of natural and cultural resources also affect how refuges are managed. The Digest of Federal Resource Laws of Interest to the USFWS lists many of them and can be accessed at: *http://law.fws.gov/lawsdigest/indx.html*.

Chapter 4 of this Draft CCP/EA, "Environmental Consequences," specifically evaluates our compliance with the Clean Water Act, Clean Air Act, the National Historic Preservation Act, the Archeological Resources Protection Act and the Endangered Species Act (ESA).

Conservation Plans and Initiatives Guiding the Project

To the extent possible, a refuge CCP assists in meeting the conservation goals established in existing national and regional plans, state fish and wildlife conservation plans, and other landscape-scale plans covering the same watershed or ecosystem. We consulted the following plans in developing this CCP.

North American Bird Conservation Initiative (NABCI)

The NABCI brings together individual landbird, shorebird, waterbird, and waterfowl plans (described below) into a coordinated effort to protect and restore all native bird populations and their habitats in North America. This "all bird" conservation initiative reduces redundancy in the structure, planning and implementation of conservation projects. It uses Bird Conservation Regions (BCRs) to guide landscape-scale, science-based approaches to conserving birds and their habitats. Iroquois NWR lies within BCR 13 (Map 1-5), the Lower Great Lakes/St. Lawrence Plain. This CCP takes guidance from priorities outlined in the BCR 13 preliminary plan and from the individual bird plans. For more information visit: *http://www.nabci-us.org/*.

Steve Maslowski/USFWS

Bobolink

Map 1-5


Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Bird Conservation Region (BCR) 13
Québec
Ontario
Maine
Vermont
Lake Huron
Lake Ontario
Michigan
New York
Iroquois National Wildlife Refuge
Massachusetts
Lake Erie
Connecticut
Pennsylvania
Ohio
New Jersey
West Virginia
Maryland
Delaware
Virginia
Kentucky
Sources:
Refuge Boundary from USFWS.
Lakes and States from StreetMapUSA.
BCR and Shadedrelief map from USGS.
Ocean from National Atlas.
0 80 160 320 480 640 Kilometers
0 50 100 200 300 400 Miles
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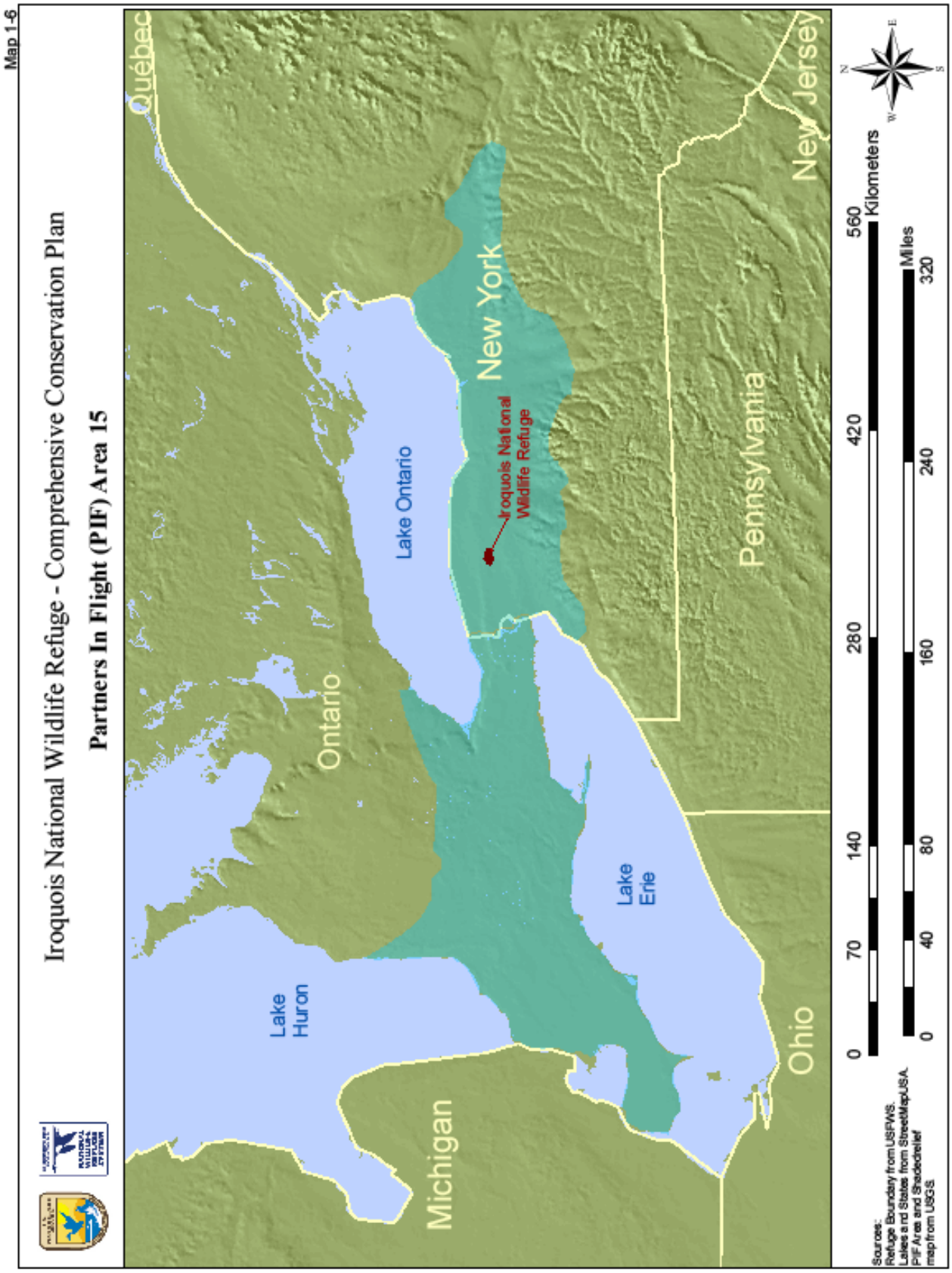
BCR 13 encompasses the vast, low-lying lake plain region surrounding Lake Erie and Lake Ontario, the St. Lawrence River Valley, low-lying regions between the Adirondack Mountains and the Laurentian Highlands, and upper regions of the Hudson River Valley. In addition to providing important lakeshore habitats and associated wetlands, this region was originally dominated a mixture of oak-hickory, northern hardwood, and mixed-coniferous forests. Nearly 95% of the original habitat types have been lost and the landscape is now dominated by agriculture with interspersed wetlands and remnant forest stands. BCR 13 plays a critical role in providing important staging and migrating habitat for birds during the spring and fall migration (Hartley 2007). The Refuge used the 2007 BCR 13 Conservation Plan and information in the four individual bird plans to identify important local bird species and to develop habitat management goals and objectives for the Refuge. The four individual bird plans relevant to Iroquois NWR include

- Partners in Flight – Landbirds – Lower Great Lakes Plain,
- North American Waterfowl Management Plan – Atlantic Coast Joint Venture,
- North American Waterbird Management Plan – Upper Mississippi Valley/Great Lake Region, and
- U.S. Shorebird Conservation Plan and Northern Atlantic Regional Shorebird Plan.

Partners in Flight Landbird Conservation Plan

In 1990, Partners in Flight (PIF) began as a voluntary, international coalition of government agencies, conservation organizations, academic institutions, private, industry and other citizens dedicated to reversing the population declines of bird species and "keeping common birds common." The foundation of PIF's long-term strategy for bird conservation is a series of scientifically and geographically based Bird Conservation Plans. The initial focus on neotropical migratory bird species has since expanded to include all landbirds. You can view the PIF Landbird Conservation Plan at: *http://www.partnersinflight.org/cont_plan/default.htm*.

Initially, PIF developed draft conservation plans within "physiographic areas"; Iroquois Refuge lies in PIF Area 15 – the Lower Great Lakes Plain (Map 1-6). PIF developed a set of objective, science-based rules to evaluate the conservation status of all bird species using species population size, distribution, population trend, threats, and regional abundance to identify regional and continental conservation priorities. Those rules were adapted, and are now being used, to identify bird conservation priorities and opportunities within BCRs. National wildlife refuges, including Iroquois NWR, protect critical habitats in New York to help reverse decline of priority bird species such as cerulean warbler, Henslow's sparrow and other grassland birds, and shrub-dependent species.


Map 1-6
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Partners In Flight (PIF) Area 15
Québec
Ontario
New York
Pennsylvania
New Jersey
Ohio
Michigan
Lake Huron
Lake Ontario
Lake Erie
Iroquois National Wildlife Refuge
0 70 140 280 420 560 Kilometers
0 40 80 160 240 320 Miles
N
E
S
W
Sources:
Refuge Boundary from USFWS.
Lakes and States from StreetMapUSA.
PIF Area and Shadedrelief
map from USGS

North American Waterfowl Management Plan (NAWMP): Atlantic Coast Joint Venture

The NAWMP, signed by the United States and Canada in 1986 and by Mexico in 1994, provides a strategy to protect North America's remaining wetlands and conserve waterfowl populations through habitat protection, restoration, and enhancement (USFWS and CWS 1986). The plan was updated in 1998 and again in 2004. The updated plan includes a stronger biological foundation, a landscape planning approach, and expanded partnerships (USFWS and CWS 2004). Implementation of the NAWMP is accomplished at the regional level in Joint Venture Habitat Areas. There are eleven Joint Venture Habitat Areas in the United States, four in Canada and one that stretches across the United States/Canada border. Partners for habitat conservation include federal, state and local governments, tribal nations, local businesses, conservation organizations and individual citizens. By 2004, NAWMP partners had invested more than $3.2 billion to protect, restore or enhance more than 13 million acres of habitat. More information on the NAWMP is available at: *http://www.fws.gov/birdhabitat/nawmp/nawmphp.htm*.

Iroquois NWR lies within the Atlantic Coast Joint Venture (ACJV); one of the original joint ventures formed under the NAWMP. The ACJV initially focused on protecting and restoring habitat for the American black duck and other waterfowl species in the Atlantic Coast region of the United States. Much of its support is generated through grants provided by the North American Wetlands Conservation Act. While maintaining a strong focus on waterfowl, the ACJV mission has evolved to include the conservation of habitats for all birds. At the regional scale the ACJV is working on integrated planning efforts in eight BCRs. An important part of this planning effort is the development of Focus Area Plans. Focus Areas are discrete and distinguishable habitats or habitat complexes that are regionally important for one or more priority species during one or more life history stages. Focus Areas have been developed for waterfowl and are being developed for other migratory birds within the BCRs.

The Tonawanda-Iroquois-Oak Orchard Focus Area Plan (ACJV 1991) identified the rehabilitation of Mohawk Pool on Iroquois NWR as a high priority project. The Service prepared an Environmental Assessment (EA) specifically for this project in 2002 (USFWS 2002). The initial phase of the project is complete; three new wetland sub-units in the Mohawk Pool provide significant improvement in wetland habitat. Rehabilitation of Mohawk Pool and other priorities from the local Focus Area Plan are incorporated into this CCP. For more information on the ACJV go to: *http://www.acjv.org*.

North American Waterbird Conservation Plan (NAWCP)

The NAWCP reflects an independent partnership among individuals and institutions with interest and responsibility for conserving waterbirds and their habitats. The primary goal of the plan is to ensure that the distribution, diversity and abundance of populations and habitats of breeding, migratory, and non-breeding waterbirds are sustained or restored throughout the lands and waters of North America, Central America and the Caribbean. The plan provides a framework for conserving and managing colonially nesting water-dependent birds and promotes continent-wide planning and monitoring, national-state-provincial conservation action, regional coordination and local habitat protection and management (Kushlan et al. 2002). A draft conservation plan has been prepared for the Upper Great Lakes/Mississippi Valley Region.

We used the NAWCP in the development of objectives, actions and strategies for protecting and managing waterbirds that breed on the Refuge including black tern, American bittern and great blue heron. The waterbird plan is available at: *http://www.waterbirdconservation.org*.

U.S. Shorebird Conservation Plan (US SCP) and Northern Atlantic Regional Shorebird Plan

The US SCP was developed by partners to ensure that stable, self-sustaining populations of all shorebird species are restored and protected. Collaborators include local, state, and federal agencies, non-

governmental organizations, business-related sectors, researchers, educators and policy makers. The plan was closely coordinated with the NAWMP and Joint Venture staff, as well as PIF and the NAWCP teams as they concurrently developed their revised national plans. Team experts helped set conservation goals for each region of the country, identified critical habitat and research needs, and proposed education and outreach programs to increase awareness of shorebirds and the threats they face.

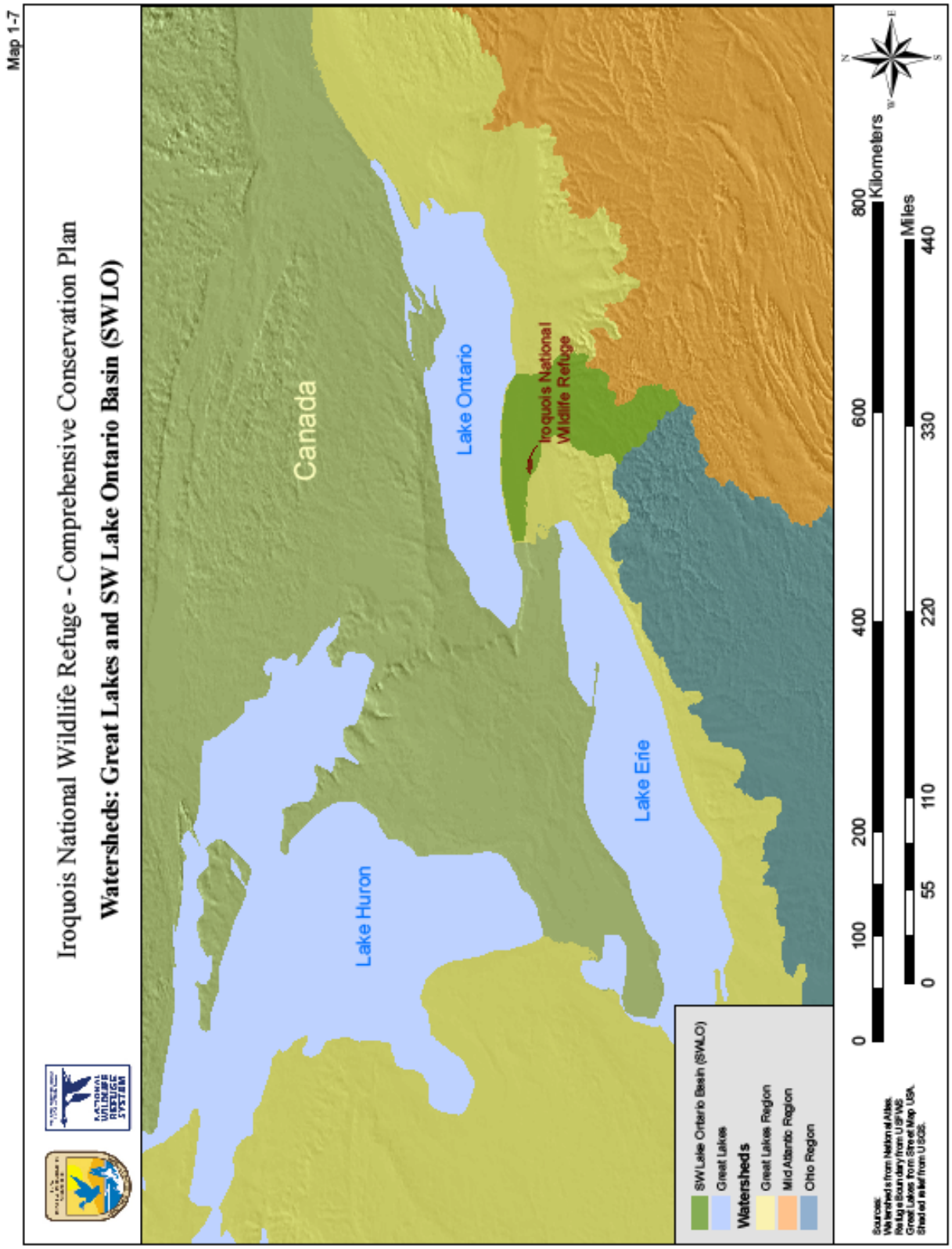
The US SCP (Brown et al. 2001) identifies three primary objectives: 1) Develop a standardized, scientifically sound system for monitoring and studying shorebird populations that will provide practical information to researchers and land managers for shorebird habitat conservation; 2) Identify the principles and practices upon which local, regional and national management plans can effectively integrate shorebird habitat conservation with multiple species strategies; and 3) Design an integrated strategy for increasing public awareness and information concerning wetlands and shorebirds.

Regional plans, including the Upper Mississippi Valley/Great Lakes Regional Shorebird Plan, are being developed as part of the overall strategy (Clark and Niles 2000). We used the national and regional shorebird plans in developing the regional "resources of concern" list in Appendix C, and in considering the value of the Refuge for migrating shorebirds. The U.S. Shorebird Plan can be accessed at: *http://shorebirdplan.fws.gov/USShorebird.htm* and the regional plan at: *http://www.fws.gov/shorebirdplan/RegionalShorebird/RegionalPlans.htm*.

New York State Wildlife Action Plan

In fall 2001, Congress established a new "State Wildlife Grants" program that provided funds to state wildlife agencies for the conservation of fish and wildlife and their habitats. Each state was charged with developing a wildlife action plan by October 2005. State fish and wildlife agencies identified Species of Greatest Conservation Need (SGCN) while also addressing the full array of wildlife. The New York Comprehensive Wildlife Conservation Strategy (CWCS) is available at: *http://www.dec.ny.gov/animals/30483.html*

The NY State Department of Environmental Conservation (NYSDEC) prepared a CWCS for New York and organized the conservation recommendations within eleven watershed basins (NYSDEC 2005). Iroquois NWR falls within the Southwest Lake Ontario Basin (Map 1-7). The CWCS provides pertinent natural resource information on historical and current conditions for the region of Iroquois NWR. The list of SGCN was included in the Refuge's potential list of resources of concern (Appendix C).


Map 1-7
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Watersheds: Great Lakes and SW Lake Ontario Basin (SWLO)
Canada
Lake Ontario
Iroquois National Wildlife Refuge
Lake Huron
Lake Erie
SW Lake Ontario Basin (SWLO)
Great Lakes
Watersheds
Great Lakes Region
Mid Atlantic Region
Ohio Region
0
100
200
400
600
800
Kilometers
0
55
110
220
330
440
Miles

The Southwest Lake Ontario Basin (SWLO) covers 2.2 million acres in western and central New York. The Basin stretches across the state from north to south and includes three major sub-watersheds: West Lake Ontario, Lower Genesee and Upper Genesee. The Basin is characterized by a highly diverse landscape covering several ecological zones and a wide variety of vegetative cover, wildlife habitat and land use. Although grasslands were historically found in the Basin, there are no lands in the Basin currently classified by the U.S. Environmental Protection Agency (EPA) as natural grasslands. The northern portion of the Basin is primarily an agricultural region with scattered forest stands, diverse and extensive wetlands, and is generally flat. Iroquois NWR, the only refuge in the basin, is abutted by NYSDEC managed Oak Orchard Wildlife Management Area (WMA) to the east and Tonawanda WMA (partially in the basin) to the west.

Important Bird Area (IBA) and Bird Conservation Area (BCA) Programs

The IBA program is an international bird conservation initiative to identify and conserve the most important places for birds. IBAs are identified according to standardized, scientific criteria through a collaborative effort among state, national, and international non-governmental conservation organizations (NGOs), state and federal government agencies, local conservation groups, academics, grassroots environmentalists, and birders. IBAs link global and continental bird conservation priorities to local sites that provide critical habitat for native bird populations. New York's IBA program began in 1996 and has identified 136 IBAs including the Tonawanda-Iroquois-Oak Orchard Wetland Complex. This IBA is noted for its large expanses of wetland, for providing habitat for over 100,000 migrating waterfowl, and breeding and migration habitat for a suite of at-risk bird species. More information can be found at: *http://iba.audubon.org/iba/profileReport.do?siteId=1729&navSite=search&pagerOffset=0&page=1*.

In 1997 the NYSDEC established the Bird Conservation Area (BCA) Program modeled after the IBA program. The BCA program safeguards and enhances bird populations and their habitats on state-owned lands and waters. The Oak Orchard and Tonawanda WMAs are a BCA immediately adjacent to Iroquois NWR. The major management recommendations for this BCA include water level control to benefit waterbirds, invasive species control, and maintaining grasslands for nesting birds (*http://www.dec.ny.gov/animals/27111.html*). Given the juxtaposition of the state and federal lands within the wetlands complex, there are management opportunities on the Refuge that can contribute to the BCA objectives.

Refuge Establishment, History and Purpose

On May 19, 1958 the federal government established the Oak Orchard National Wildlife Refuge using money from the sale of Migratory Bird Conservation Stamps, or "Duck Stamps." To avoid confusion with the neighboring Oak Orchard State Game Management Area (later changed to Wildlife Management Area), the Refuge was renamed Iroquois NWR in 1964, in respect to the Iroquois Nation.

The purpose for which the Refuge was established provides the basic framework for developing management direction for the Refuge. The Refuge purpose directs which management functions are developed and the types of uses and facilities that may be offered.

In 1958, Iroquois NWR was established *"...for use as an inviolate sanctuary, or any other management purposes, for migratory birds"* under the Migratory Bird Conservation Act. A total of 10,828 acres of lands were acquired in the towns of Alabama and Shelby, in Genesee and Orleans County, New York (Table 1-1) under provisions of the Migratory Bird Conservation Act, Migratory Bird Hunting and Stamp Act, and other authorities. The majority of our land acquisition funds come from the Migratory Bird Conservation Fund, replenished primarily through the sale of federal duck stamps to migratory waterfowl hunters and other conservationists.

Table 1-1 History of Land Acquisition at Iroquois NWR

Acquired	Acres
1958	810.53
1959	1822.22
1960	1115.01
1961	1211.62
1962	331.89
1963	665.16
1964	2514.37
1965	2315.95
1966	6.49
1970	34.82
Total Acres	**10,828.06**

The Refuge is also responsible for over 444 acres on 23 easements held by Farmers Home Administration. These easements were acquired in the late 1980s and early 1990s and are spread out among eight western New York counties (Map 1-8). The easements help protect wetlands and stream corridors. Table 1-2 provides a summary of these easements by county.

USFWS

Sutton's Marsh

Map 1-8

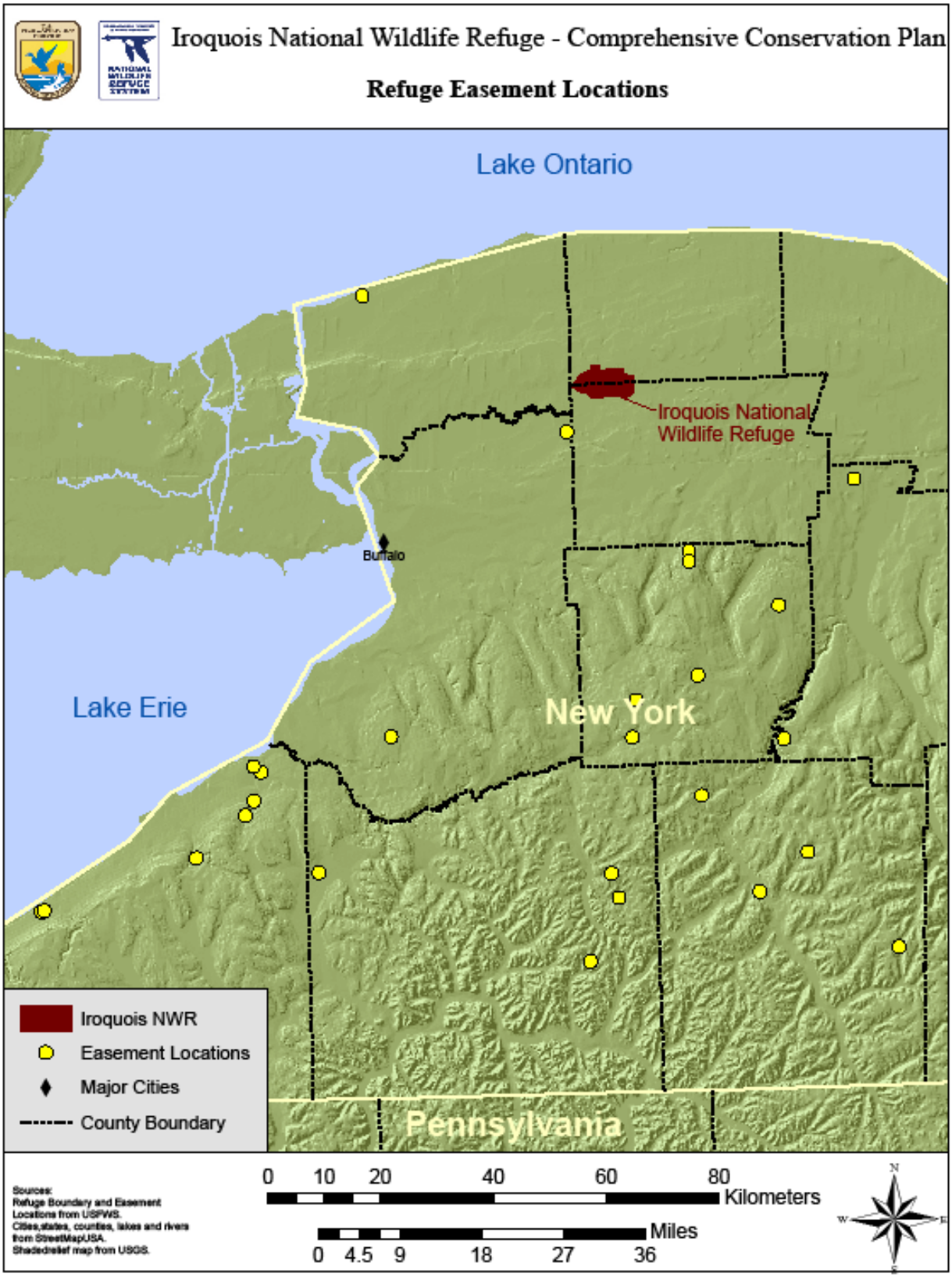

Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Refuge Easement Locations
Lake Ontario
Iroquois National Wildlife Refuge
Buffalo
Lake Erie
New York
Pennsylvania
Iroquois NWR
Easement Locations
Major Cities
County Boundary
Sources:
Refuge Boundary and Easement Locations from USFWS.
Cities,states, counties, lakes and rivers from StreetMapUSA.
Shadedrelief map from USGS.
0 10 20 40 60 80
Kilometers
0 4.5 9 18 27 36
Miles
N
W
E
S

Table 1-2 Easements by County

County	Acres
Allegany	80
Cattaraugus	50.1
Chautauqua	76.3
Erie	7.6
Livingston	60
Niagara	7.6
Wyoming	163.7
Total Acres	**444.8**

Step-down Management Plans

The Service Manual (602 FW 4, "Refuge Planning Policy") lists more than 25 step-down management plans that may be appropriate to ensure safe, effective and efficient operation on every refuge. These plans contain specific strategies and implementation schedules for achieving refuge goals and objectives. Some plans require annual revisions; others are revised every five to ten years. Some plans require additional NEPA analysis, public involvement, and compatibility determinations before they can be implemented.

Changes in recent policy will make some of the older Refuge plans obsolete because they will become a component of other plans (Table 1-3). For example, the Refuge has a Forest Plan, Grassland Plan and Marsh and Water Plan. These will all be incorporated into the Habitat Management Plan. Likewise, public uses such as hunting, interpretation, and fishing will become a component of the Visitor Services Plan.

Table 1-3 Step-Down Management Plan Schedule for Iroquois NWR

Step-Down Management Plan	Date Completed/Updated	Anticipated Date Completion/Update
Habitat Management Plan		2011
Forest Management Plan	4/04/1990	*
Grassland Management Plan	5/16/1990	*
Upland Habitat Plan	3/29/1990	*
Marsh and Water Management Plan	1/19/1984	*
Visitor Services Plan		2011
Public Use Plan	5/18/1991	+
Hunt Plan	10/15/1985	+
Fire Management Plan	2008	2013
Law Enforcement Plan (Crowd Control)	1971	2012
Wildlife Inventory and Monitoring Plan	5/11/1982	2011

Furbearer Management Plan	11/19/1983	2012
Fishery Resources Management Plan	5/04/1995	2014
Integrated Pest Management Plan		2013
Cultural Resources Management Plan		2013

*** Now incorporated into the Habitat Management Plan**
+ Now incorporated into the Visitor Services Plan

Iroquois NWR Vision Statement

We developed the following vision statement for Iroquois NWR to provide a guiding philosophy and sense of purpose for our planning effort.

Iroquois National Wildlife Refuge, known locally as part of the "Alabama Swamps" will be the ecological "puzzle piece" for western New York by creating and maintaining unsurpassed habitats including wetlands, grasslands, shrublands, and forests for migratory birds and other wildlife. By encouraging compatible wildlife dependent recreation and working with partners, a deep understanding and appreciation for the Refuge's ecological integrity will be fostered in its visitors, regardless of generational, economic, or social boundaries. Through these efforts, future generations will cherish Iroquois National Wildlife Refuge's interconnectivity to the much larger National Wildlife Refuge System.

Refuge Goals

Our planning team developed the following draft goals after reviewing the Refuge purposes, the mission of the Service and Refuge System, our proposed vision, public and partner comments, and the mandates, plans and conservation strategies mentioned above.

Goal 1: Provide high quality freshwater wetland migration stopover and breeding habitat for waterfowl, marshbirds, shorebirds, and bald eagles in Refuge impoundments through water level control.

Goal 2: Maintain the environmental health and integrity of Oak Orchard Creek and associated bottomland floodplain forests and wetlands as a natural free-flowing habitat with a diverse assemblage of native plants and animals.

Goal 3: Provide a diverse mix of grassland, shrubland and forested upland habitats arranged to reduce fragmentation and edge effects and enhance habitat quality for priority species of conservation concern.

Goal 4: Refuge visitors will understand and appreciate fish and wildlife conservation through high quality recreation, education and interpretive programs.

Goal 5: Hunters and anglers will enjoy and support programs designed to provide high quality hunting and fishing experiences.

Goal 6: Enhance partnerships with local communities and various organizations to garner support and promote Refuge programs and resources.

The Comprehensive Conservation Planning Process

Service policy establishes an eight-step planning process for development of a CCP. This planning process also facilitates compliance with NEPA (Figure 1-1). Each individual step of the planning process is described in detail in the Planning Policy and CCP training materials (602 FWS 3, "The

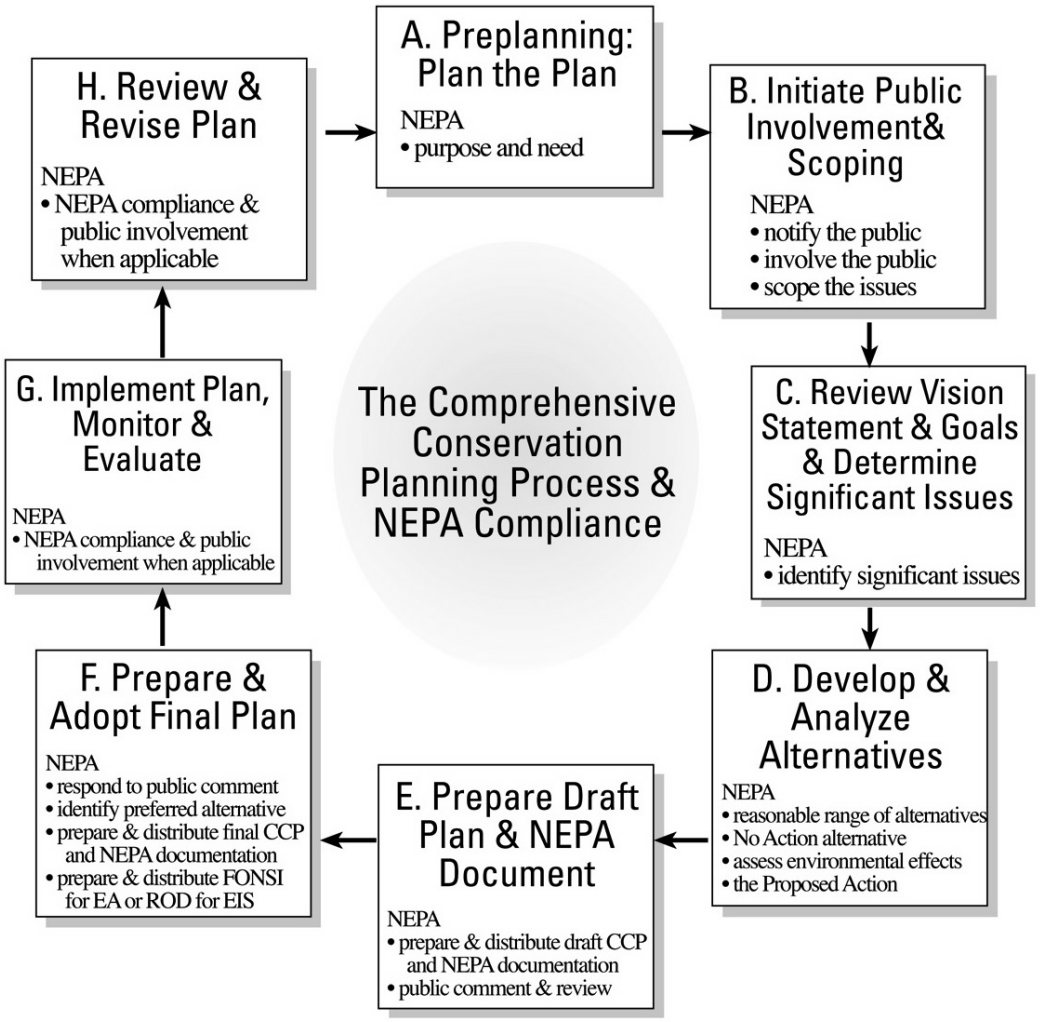
Comprehensive Conservation Planning Process"). The Planning Policy can be accessed at: *http://policy.fws.gov/602fw3.html*.

Planning Process

The key to effective conservation begins with community involvement. To ensure future management of the Refuge takes into consideration the issues, concerns, and opportunities expressed by the public, multiple public involvement techniques were used: In the spring of 2008, staff at Iroquois NWR sought public input on all aspects of Refuge management as part of the planning process. An introductory newsletter was mailed to over 360 Refuge neighbors, sporting groups, local politicians, conservation groups and state agencies to inform them of the CCP development process. Copies of the newsletter were also available at the Refuge visitor contact station, through the Refuge website and at community outreach events. Iroquois NWR staff hosted public meetings on April 8, 9 and 10, 2008 in Batavia, Albion and the Refuge Headquarters in Alabama, respectively. Each day the public could attend either an open house style meeting in the afternoon or a more structured meeting in the evening. Approximately 20 people attended over the three days. A written public comment period was also open from February 26, 2008 through April 30, 2008 during which time people could mail, email or drop off comments. Personalized written comments were received from 41 individuals and several stakeholder groups. Participants were encouraged to actively express their opinions and suggestions. The public meetings allowed us to gather information and ideas from local residents, adjacent landowners, and various organizations and agencies. Updates regarding the progress of the CCP were provided via newsletters, website updates and at outreach events.

After a 30-day public review of this draft CCP/EA, we will review and analyze all written and oral comments to help inform development of the Final CCP. The Final CCP will identify the Service-preferred alternative. If no further NEPA review is required, a Finding of No Significant Impact (FONSI) will be written to certify that the Final CCP has met all Service requirements, that it will achieve Refuge purposes and fulfill the mission of the NWRS. The final CCP and FONSI will then be submitted to the USFWS Regional Director for final review and approval. As soon as the Final CCP has been approved, implementation can begin.

Figure 1-1 Steps in the Comprehensive Conservation Planning Process and its relationship to the National Environmental Policy Act of 1969



Issues, Concerns and Opportunities

As part of the CCP planning process we developed a list of key issues, other issues, and opportunities from our scoping, public, focus group, and planning team meetings.

Key issues are public, partner, or Service concerns that do not have obvious solutions and warrant further consideration and investigation. Along with the Refuge goals stated above, these key issues helped guide our development and analysis of the proposed alternatives presented in Chapter 2, "Alternatives and Proposed Action." Key issues include the following:

Habitat management - Habitat management strategies utilized by the Refuge are often interpreted by the public as mismanagement or lack of management. Currently, Refuge staff must analyze and determine whether isolated habitats surrounded by a different habitat (i.e., small grassland surrounded by shrublands) are as beneficial as one, continuous, connected habitat. Determining what type of habitat will provide the best nesting and breeding grounds for many different species, and how that management is implemented in the future, is a primary focus of this CCP.

Drainage - A system of dikes and water control structures regulate water levels on the Refuge to mimic the historic flood and drought cycle in a natural, undisturbed marsh. Homeowners within the floodplain to the east and north of the Refuge have expressed concerns with the Refuge's system of holding and releasing water, stating that they can be unnecessarily flooded during peak runoff periods.

Development - Potential industrial development around the Refuge (e.g., windfarm, quarry, industrial park, roads, Sour Springs Bridge) may result in adverse impacts to wildlife and wildlife habitat. The Refuge must understand and evaluate these potential development threats and determine the best way to counter, mitigate or adapt to changes in land use around the Refuge.

Increased visitor access for recreation - Area residents have requested that the Refuge increase opportunities and access for recreational activities. These activities include boating, hunting, and wildlife photography. Additionally, some people would also like to see more trails, more youth activities, and more access for persons with disabilities. The Service recognizes the importance of visitors to National Wildlife Refuges. Furthermore, the Improvement Act mandates providing wildlife-dependent recreation opportunities for the public if they do not conflict with wildlife and habitat management activities, and if they are consistent with public safety.

Hunting conflicts - Some waterfowl hunters have expressed a desire to lengthen the waterfowl hunting season (usually late October to mid-November) into the deer hunting season (usually beginning mid-November). The spring turkey hunt coincides with the nesting season of migratory birds that nest on the Refuge in many of the same areas that hunters search for turkeys. The potential conflict between different types of hunting and between hunting and wildlife habitat needs must be evaluated.

Staffing and facilities - The Refuge currently is operating with a staff of 6 full-time employees, which is a 50% reduction from its historic staffing level. Furthermore, the Refuge now administratively oversees and manages Erie NWR in northwestern Pennsylvania, providing administrative and supervisory support to that station. Co-locating with other Service offices (e.g., Lower Great Lakes Fisheries Resource Office in Amherst, NY) may help reduce government expenditures. However, the existing Refuge headquarters does not have enough office space for both Refuge and Fisheries staffs; the visitor services area is outdated and unable to fully meet the current and future needs of visitors.

Invasive Species - Non-native invasive plant, fish and wildlife species threaten valuable Refuge habitat and species populations. These non-native species out compete native species, resulting in reduced biodiversity and decreased critical food sources and quality breeding habitat. Once invasive species are established, eliminating them can be expensive and labor-intensive. Unfortunately, they establish easily, reproduce prolifically, and disperse readily, making eradication difficult. The most common non-native invasive plant species found on the Refuge are common reed, autumn olive, purple loosestrife, honeysuckle, garlic mustard, bittersweet, and multi-flora rose. The common carp is the most prevalent non-native invasive fish species and European starling and house sparrow are the two most common non-native bird species found on the refuge.

Law enforcement - Law enforcement capability has been greatly reduced on the Refuge: There is only one officer splitting duties between five refuges across three states. Some current problems on the Refuge include trespassing, vandalism, poaching, illegal drugs, and littering/dumping. Thus, there is a need for increased enforcement and outreach for resource management issues associated with public access and public effects.

Partnerships - The Refuge relies on partnerships with several organizations and individuals for helping with Refuge programs and other efforts. These existing partnerships include, but are not limited to,

volunteers, the Friends of Iroquois NWR, Inc., Buffalo Audubon Society, other NGO's, the Iroquois Job Corps Center, local waterfowl associations, and colleges/universities. Establishment of new or improving existing partnerships will help achieve the goals of the CCP.

Other Issues to Address: Some issues and management concerns are also presented and discussed in Chapter 2, but not in as great detail as the key issues. Many of these types of issues are resolved in a similar manner in all of the alternatives presented in Chapter 3. Additionally, some issues fall outside the scope of this document. More specifically, they fall outside the purpose of and need for action as we describe in this draft CCP/EA. These issues include, but are not limited to, global warming, development, and non-point source runoff. These issues may be discussed in the document, but cannot be resolved solely by the Service in the 15-year timeframe of the plan.

Decision to Be Made

The USFWS Region 5 Director will make the final determination of a preferred alternative to serve as the CCP for Iroquois NWR. This final determination will be based on the Service and Refuge System missions, the purposes for which the Refuge was established, other legal mandates, and public and partner responses to this draft CCP/EA. The alternative selected could be the proposed action in the draft CCP/EA, the no action alternative, or a combination of actions or alternatives presented. The final decision will identify the desired combination of species protection, habitat management, public use and access, and administration for the Refuge.

The Service determined that an EA would be a more appropriate document than an Environmental Impact Statement (EIS) to accompany the CCP. The need to prepare an EIS is a matter of professional judgment requiring consideration of all issues in question. If the EA determines that the CCP will constitute a major federal action significantly affecting the quality of the human environment, an EIS will then be prepared. If not, a FONSI is prepared that briefly describes why the proposed action will not have a significant effect on the human environment. The FONSI also certifies that we have met agency compliance requirements and that the CCP, when implemented, will achieve the purposes of the Refuge and help fulfill the Refuge System mission. Once the Regional Director has signed the FONSI and we have completed the CCP for the Refuge, we will notify the public in the Federal Register and implementation can begin.

Chapter 2

USFWS

Canada Geese on Marsh 300

Alternatives and Proposed Action

- Introduction
- Formulating Alternatives
- Features and Assumptions Common to All Alternatives
- Alternative A – Current Management
- Alternative B – Proposed Action
- Alternative C – Natural Systems
- Summary of Strategies by Alternative

Chapter 2
Alternatives and Proposed Action

Introduction

The National Environmental Policy Act (NEPA) requires that we evaluate a reasonable range of alternatives for managing Iroquois National Wildlife Refuge (Iroquois NWR, the Refuge) before selecting the best one possible. This chapter outlines our process for formulating alternatives, describes features common to all alternatives, and provides a description of the three alternatives we analyzed in detail. These three alternatives include the following:

- Alternative A – Current Management. This alternative fulfills the NEPA requirement for a "no action" alternative: one that proposes no change in the current management of the Refuge. Alternative A is to continue to manage the Refuge as we do now.

- Alternative B – Proposed Action. This alternative will expand biological monitoring and management and enhance public awareness and education. Alternative B is our proposed alternative and the action that we recommend for final selection.

- Alternative C – Natural Systems. This alternative proposes to discontinue most management and allow the Refuge to return to a more natural state and focus on public outreach and education.

All three alternatives are based on statutory and policy requirements and each alternative addresses the purpose of the Refuge; Refuge management concerns; and issues identified by conservation partners, Refuge staff, and the public. Alternatives vary in how issues are addressed. Each alternative identifies Refuge goals, objectives for achieving those goals, and strategies for accomplishing objectives.

Goals are intentionally broad and define management targets prescriptively rather than quantitatively. Refuge goals capture the principal elements of Refuge purposes and our vision statement, and provide the foundation for developing specific management objectives and strategies. The six Refuge goals first presented in Chapter 1 and addressed by each of the three alternatives are as follows:

Goal 1: Provide high quality freshwater wetland migration stopover and breeding habitat for waterfowl, marsh birds, shorebirds, and bald eagles in Refuge impoundments through water level control.

Goal 2: Maintain the environmental health and integrity of Oak Orchard Creek and associated bottomland floodplain forests and wetlands as a natural free-flowing habitat with a diverse assemblage of native plants and animals.

Goal 3: Provide a diverse mix of grassland, shrubland and forested upland habitats arranged to reduce fragmentation and edge effects and enhance habitat quality for priority species of conservation concern.

Goal 4: Refuge visitors will understand and appreciate fish and wildlife conservation through high quality recreation, education and interpretive programs.

Goal 5: Hunters and anglers will enjoy and support programs designed to provide with high quality hunting and fishing experiences.

Goal 6: Enhance partnerships with local communities and various organizations to garner support and promote Refuge programs and resources.

Objectives are incremental steps in achieving a goal; they further define management targets in measurable terms, and usually vary among alternatives. They provide the basis for determining detailed strategies, monitoring Refuge accomplishments, and evaluating our success. The U.S. Fish and Wildlife Service (USFWS, the Service) recommends that objectives possess five properties in the mnemonic acronym "SMART": objectives should be *S*pecific, *M*easurable, *A*chievable, *R*esults-oriented, and *T*ime-fixed (USFWS 2004). We strove to make each objective, in combination with its rationale and strategies, "SMART".

Most objectives include a rationale to define its context and importance. The Refuge step-down plans, including its Habitat Management Plan (HMP) and Visitor Services Plan (VSP), will implement the objectives our Regional Director selects for the final CCP.

Strategies are specific or combined actions, tools, techniques or other considerations in achieving objectives. The process of developing step-down plans may require the revision of some strategies. The availability of staff, volunteers, funding, and other resources may affect the way we ultimately implement our plans.

A tabular matrix that compares the specific management strategies of each alternative is presented at the end of this chapter (Table 2-4). We organized the table to clearly show and compare how each alternative addresses the significant issues presented at the end of Chapter 1.

Formulating Alternatives

Relating Goals, Objectives, and Strategies

Developing Refuge goals was one of the first steps in our planning process (Chapter 1). Each of the three management alternatives described below are organized around Refuge goals and present objectives and strategies to achieve those goals.

Developing Alternatives

Once Refuge goals were established, we identified a wide range of potential management objectives and strategies that could achieve these goals. Objectives and strategies were then organized first into "alternative themes" (i.e., current management, focal species management, natural processes) and finally into the three management alternatives. Simply put, each alternative packages complementary objectives and strategies designed to meet Refuge goals. All three alternatives are designed to support the purpose of the Refuge, the Refuge System mission and goals, and respond to issues and opportunities identified during this planning process over the next 15 years. We believe the three alternatives represent a reasonable range of proposals for achieving Refuge goals and addressing issues described in Chapter 1.

Unless otherwise noted, all actions prescribed in each alternative will be implemented by Refuge staff. Alternative A satisfies the NEPA requirement of a "no action" alternative, which we define as continuing current management. Alternative A describes our existing management priorities and activities, and serves as a baseline for comparing and contrasting Alternatives B and C. We suggest you first read Chapter 3, "Description of the Affected Environment," for detailed descriptions of current Refuge resources and programs.

Many of the objectives in Alternative A do not strictly follow the guidance in the Service's Goals and Objectives Handbook because we are describing management decisions and activities that were established prior to this guidance. Our descriptions of current activities were derived from a variety of formal and informal management decisions and planning documents. As such, Alternative A objectives more subjective in nature than objectives presented in Alternatives B and C.

Alternative B, the Service-proposed action, presents the actions we believe will most effectively achieve the purpose, vision and goals of the Refuge, and respond to public issues. It emphasizes management of specific Refuge habitats to benefit Refuge species of conservation concern. In particular, we emphasize habitat for priority bird species of conservation concern identified for Bird Conservation Region (BCR) 13 (Chapter 3).

Alternative C presents objectives and strategies that restore, where practicable, the distribution of natural communities in the Oak Orchard Creek watershed that would have resulted from natural processes without the influence or intervention of human settlement and management. While this alternative does not propose filling in the Feeder Canal or removing all impoundment dikes, it does propose to cease active management of the impoundments and allow Oak Orchard Creek to flow more freely.

The description of each alternative includes a habitat map to help readers visualize how the Refuge vegetation would look over the long-term after managing under each scenario. Using Geographical Information System (GIS) mapping tools and data sets, our habitat maps are a graphic representation of the potential vegetation that may result under each alternative at a coarse scale, and over an approximate 50 year time frame. While we describe in detail possible vegetation management actions within the 15-year CCP planning horizon for Alternatives B and C, most of the distinct habitat changes would not be observable at this scale for at least 50 years. Habitat maps are meant to compare the potential distribution of those habitat changes, but are not intended to identify exact locations for implementing a particular strategy on the ground. Refuge staff will determine appropriate strategies, and the level, timing and location for specific sites during the implementation phase. These actions will be detailed in the Habitat Management Plan (HMP) which will be developed for the selected alternative (see "Refuge Step-Down Plans" below).

Features and Assumptions Common to All Alternatives

All three alternatives share common features and assumptions. Some of these commonalities are required by law or policy, or represent NEPA decisions that recently have gone through public review and agency review and approval. Others may be administrative actions that do not necessarily require public review, but we want to highlight them in this public document. Common features and assumptions may also represent actions we believe are critical to achieving the Refuge's purpose, vision and goals.

Funding Considerations

We included an estimate of staffing and funding requirements for implementation of proposed management activities in all three alternatives (Appendix F). An assumption is made that projects proposed by each alternative will be implemented as such funds become available.

Federal Regulations

We developed and assessed each alternative based on the assumption that all applicable federal laws and regulations will be complied with if the alternative were implemented.

Protecting Historical and Cultural Resources

We will comply with all regulations and employ existing methods for protecting historical and cultural resources across the Refuge regardless of the alternative selected. Implementation of individual projects will be reviewed for their potential effect on cultural resources to comply with the National Historic Preservation Act. The New York State Preservation Officer and Native American tribal governments will be engaged for consultation as appropriate. Our regional cultural resources staff will evaluate certain management actions which have the potential to negatively affect cultural resources. These include new facilities such as hunt blinds, non-motorized boat access, boardwalks and dike extensions.

Adaptive Management

We acknowledge that our current information on species and ecosystems is incomplete or provisional, and subject to change as our knowledge base improves. We will use an adaptive management approach to keep the CCP relevant and current. Through this approach we will incorporate the most recent scientific research, experience from past management actions and the knowledge of staff and other partners to make the most informed future management decisions.

Control of Invasive Plant Species

The Refuge System has identified invasive species control as a national priority. Fortunately the threat of invasive species at Iroquois NWR is currently low. Our objective is to prevent new invasive plant species from becoming established as we continue to manage and control the spread of the few invasive species that already exist. To the extent possible, we will physically remove invasive species whenever they are encountered. Service-approved herbicides may be used to control invasive species when considered necessary by the Refuge manager and upon regional office review and approval. Invasive species of concern on the Refuge include purple loosestrife, common reed, black swallow wart, non-native honeysuckles, autumn olive, oriental bittersweet and multiflora rose.

Control of Resident Canada Geese

The Refuge currently supports a population of Resident Canada geese that appears to be stable and in balance with desired vegetation conditions and other wildlife populations. If the Refuge population of Resident Canada geese becomes large enough to have a negative effect on Refuge vegetation and consequently on other wildlife that are dependant on that vegetation, we will consider opening a controlled goose hunt during the State's September Canada goose season.

Resident geese that use the refuge as a roosting area in September are currently exposed to hunting pressure as they leave the Refuge each day to feed in nearby agricultural fields. Currently, this hunting pressure appears to be adequate to keep the Refuge Resident Canada goose population at a sustainable level.

Hydrological Constraints

The refuge lies near the center of the Oak Orchard Creek watershed in a section of floodplain that is relatively flat over a large geographic area. High water events, especially in the spring, occasionally cause flooding of roadways and uplands within and around the refuge. Water restrictions (e.g., natural rock restriction in Shelby) exist downstream of the refuge within the Creek which slow water movement and prolong flood events. The refuge has minimal control over the flow of Oak Orchard Creek. Some refuge impoundments are lowered in anticipation of flood events to reduce the chances of flooding State Route 63. However, the water holding capacity of refuge impoundments is only a small fraction of the overall size of the upstream watershed and runoff quickly fills impoundments to capacity. When this happens the only relief from flooding comes when downstream water levels begin to recede.

Under each alternative the refuge will continue to function under the hydrological constraints imposed upon it due to its location within the Oak Orchard Creek watershed.

Developing Refuge Step-down Plans

Service planning policy (602 FW 4) identifies 25 step-down plans that may be applicable on any given refuge. We have identified nine plans listed below in priority order as the most relevant to this planning process and necessary to achieve all six Refuge goals stated in this CCP. Sections of the Refuge HMP which require public review are presented within this document and will be incorporated into the final

version of the HMP immediately upon CCP approval. The HMP along with Inventory and Monitoring Plan (IMP) will be developed as the highest priority step-down plans, regardless of which alternative is selected for implementation. These are described in greater detail below. Step-down plans will be modified and updated as new information is obtained. All three alternatives schedule the completion of the following step-down management plans as shown.

- Habitat Management Plan (HMP) - immediately following CCP approval
- Inventory and Monitoring Plan (IMP) - within two years of CCP approval
- Visitor Services Plan (includes hunting and fishing) - within two years of CCP approval
- Law Enforcement Plan - within three years of CCP approval
- Furbearer Management Plan - within three years of CCP approval
- Fire Management Plan – within three years of CCP approval
- Integrated Pest Management Plan - within four years of CCP approval
- Cultural Resources Management - within four years of CCP approval
- Fishery Resources Management – within five years of CCP approval

Habitat Management Plan

The Refuge HMP is the requisite first step to achieving the objectives of Goals 1–3 for any alternative selected for implementation. The HMP will incorporate the selected alternative's habitat objectives developed herein, and will also identify "what, which, how, and when" actions and strategies will be implemented over the 15 year time frame to achieve those objectives. Specifically, the HMP will define management areas, treatment areas, identify type or method of treatment, establish the timing for management actions, and define how we will measure success over the next 15 years. In this CCP, the goals, objectives, and list of strategies under each objective identify how we intend to manage habitats on the Refuge. Both the CCP and HMP are based on current resource information, published research, and our own field experiences. Our methods, timing, and techniques will be updated as additional information becomes available. To facilitate our management, we will regularly maintain our GIS database, documenting any major vegetation changes at least every five years. Features and assumptions common to all alternatives (listed above) will be incorporated into the HMP.

Inventory and Monitoring Plan

The Refuge IMP is vital for implementing habitat management actions and measuring our success in meeting the objectives under whichever alternative is selected. The IMP will outline the methodology to assess whether our original assumptions and proposed management actions are supporting our habitat and species objectives. Inventory and monitoring needs will be prioritized in the IMP. The results of inventories and monitoring activities will provide us with more information on the status of our natural resources and allow us to make informed management decisions.

Visitor Services Plan

The Refuge visitor services plan is the requisite first step to achieving the objectives in Goals 4 and 5 for any alternative selected for implementation. The visitor services plan will incorporate the selected alternative's public use and recreation objectives developed herein and will incorporate and further define implementation of strategies to achieve the objectives.

Alternative A - Current Management

Introduction

Alternative A describes current, planned or approved management activities and provides a baseline for comparing Alternative B, our proposed alternative, and Alternative C. Alternative A proposes to continue current management activities based on existing priorities in the biological program:

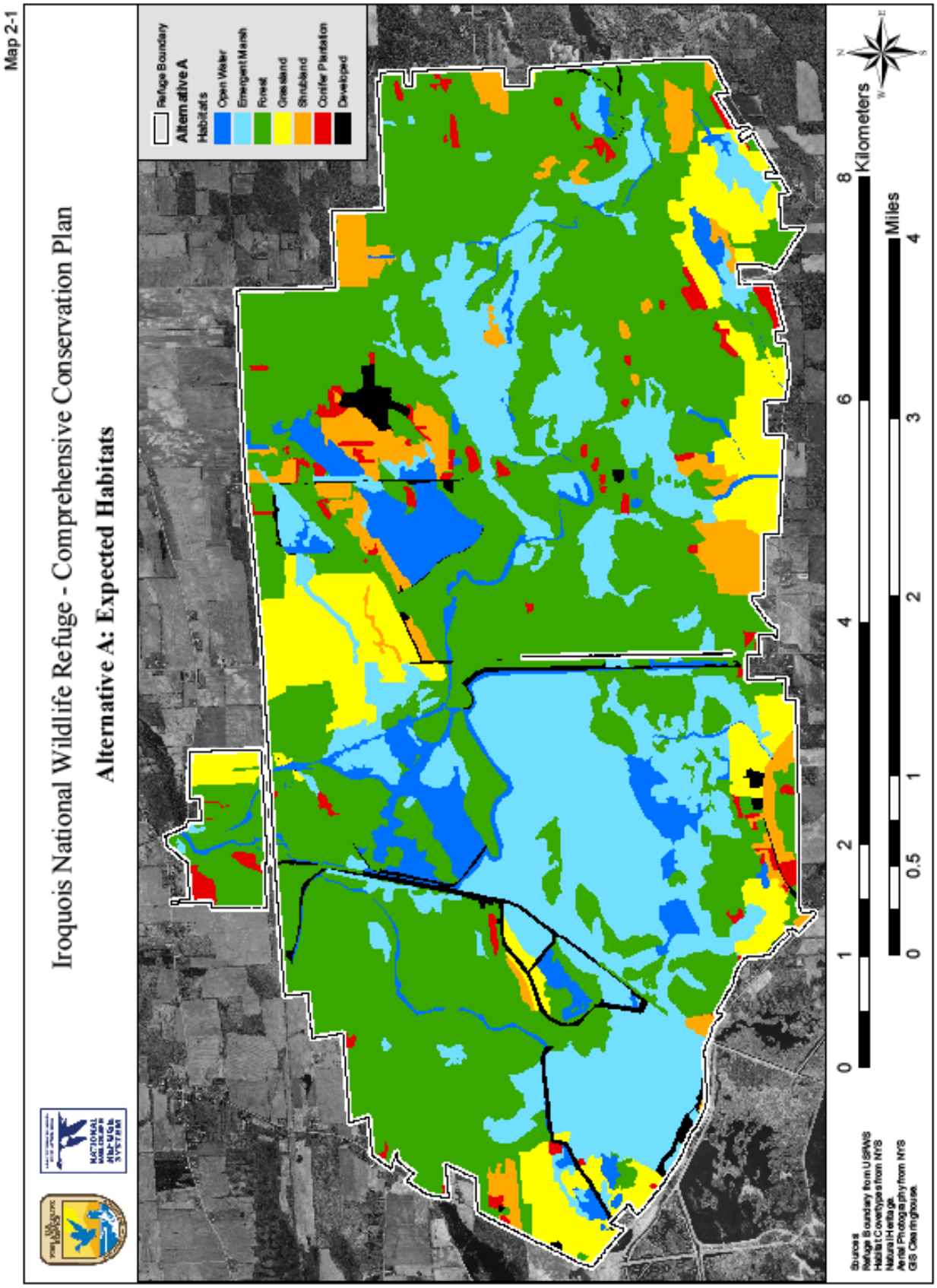
- Manage habitat for
    - migratory waterfowl,
    - breeding great blue herons,
    - black terns,
    - bald eagles, and
    - breeding, nesting and migratory song birds.
- Protect state or federally listed threatened or endangered species.
- Monitor and control invasive species.
- Manage furbearers to protect nesting birds.
- Manage furbearers to protect infrastructure (e.g., dikes).

Habitat Conditions

Under Alternative A, the Refuge habitat conditions will change from existing habitat conditions (Table 2-1 and Map 2-1). Management of Refuge impoundments will not change in respect to existing conditions. Therefore, there will be no change in the amount of open water and emergent marsh that will be available to wildlife in Alternative A. Early successional habitat including grasslands and shrublands will decrease in comparison to existing conditions. Grassland acres will decrease by 138 acres as the Refuge continues to eliminate small, isolated grasslands that are not providing significant habitat. Refuge shrublands are currently managed at a rate of 10 to 20 acres cut per year. At this management rate approximately 445 acres of Refuge shrublands will convert back to forest under Alternative A. Refuge forests are the only habitat under this alternative that will increase in acreage. The increase is a result of the natural succession of shrubland and grassland habitat to forest. Two acres of conifer plantations will be removed as a result of the Refuge's ongoing efforts to remove hedgerows and decrease fragmentation of grasslands.

Table 2-1 Alternative A Habitat Acres

Habitat Acres by Alternative and Difference from Existing and Alt A			
Habitat	**Alternative A**	**Existing**	**Difference (Alt A - Existing)**
Open Water	823	823	0
Emergent Marsh	2,581	2,581	0
Grassland	1,048	1,186	-138
Shrubland	526	971	-445
Forest	5,402	4,817	585
Conifer Plantation	200	202	-2
Developed	248	248	0
Total	**10,828**	**10,828**	


Map 2-1
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative A: Expected Habitats
Refuge Boundary
Alternative A
Habitats
Open Water
Emergent Marsh
Forest
Grassland
Shrubland
Conifer Plantation
Developed
0
1
2
4
6
8
Kilometers
0
0.5
1
2
3
4
Miles
Sources
Refuge Boundary from USFWS
Habitat Covertypes from NYS
Natural Heritage
Aerial Photography from NYS
GIS Cleaningrouse

Refuge Activity, Hunting and Special Use Fees

Alternative A maintains the current Refuge fee structure and continues charging for specific hunting opportunities and for special use permits. Refuge fees include a $5.00 application fee for the spring turkey hunt and a permit fee for all waterfowl hunting sites ($5.00 for weekday hunts and $10.00 for weekend hunts). The special use permit fee for marsh furbearer management is $50.00. There are no fees associated with hunting small game, other migratory birds and deer, or for a special use permit for upland furbearer management.

Our hunting fee program was established under the Federal Lands Recreation Enhancement Act (REA), 16 U.S.C. 6803(c) and the Consolidated Appropriations Act (PL 108-447). These laws grant the Secretary of Interior authority to collect recreation fees to establish revenue to support public recreation. REA replaces the Recreation Fee Demonstration Program and authorizes the current Recreation Fee Program (Fee Program) through 2014. The Fee Program directs us to reinvest 80 percent of revenues generated by the collection of fees for Refuge programs to enhance visitor services and maintain recreation facilities. We use the remaining 20 percent in the Northeast Region for region-wide projects to improve and maintain visitor services, address visitor and staff health and safety, and pay for overhead associated with the recreation fee program and the service in general.

Special Designation Areas

Oak Orchard Creek Marsh National Natural Landmark

The Refuge contains the 523-acre Oak Orchard Creek Marsh National Natural Landmark (NNL, Map 1-4). The marsh encompasses a pristine stretch of the sluggish and meandering creek that varies in width from 20 to 150 feet. The surrounding terrain is low, flat and floods annually. Broad-leaved cattail grows in marshy areas at the bends in the creek. Buttonbush and water willow are common shrubs along the creek edges, accompanied by a diversity of other plant species including red osier dogwood, flowering dogwood, swamp rose, purple nightshade, watercress, water hemlock, swamp milkweed, lizards tail, cardinal flower, broad-fruited bur reed, and forget-me-nots. A forested wetland dominated by silver maple with some green ash, swamp white oak and slippery elm with a dense understory of sensitive fern borders the creek channel (Vogelmann 1972). When this landmark was established in 1974 it also included the 15-acre Milford Posson Natural Area described below.

Research Natural Areas (RNA)

The Service cooperates with many other agencies and organizations to establish and preserve a diverse representative network of plant and animal communities of different ecological types, managing each in a natural state for research purposes. Research Natural Areas (RNAs) are intended to represent the full array of North American ecosystems including biological communities, habitats and phenomena, and geological and hydrological formation and conditions. They are areas where natural processes are allowed to predominate with little or no human intervention (USFWS 2009b, *http://www.fws.gov/Refuges/whm/wilderness.html*).

Located within Iroquois NWR is a single RNA: the Milford Posson. This RNA is a small 15-acre upland forest near the Oak Orchard Creek Marsh NNL (Map 1-4). This site supports a good example of an old-age northern hardwoods-hemlock stand growing on a narrow ridge that rises 6-8 feet above the surrounding wetland. Eastern hemlock, beech, yellow birch and sugar maple are the dominant trees. The larger hemlocks and beeches have trunk diameters greater than 30 inches and heights greater than 70 feet. These trees are approximately 150 to 200 years old. Hop hornbeam, ironwood, red oak and red elm also grow in the overstory; witchhazel and maple-leaved viburnum are typical in the understory along with spicebush in the wetter areas. A diverse groundcover includes spinulose wood fern, New York fern, Jack-

in-the-pulpit, Canada mayflower, bellworts, foamflower, wild sarsaparilla, Indian cucumber root, partridgeberry and goldthread.

Refuge Goals, Objectives and Strategies

Strategies that apply to all goals in Alternative A:

Strategies have been developed to achieve objectives under each of the six Refuge goals. While most strategies are specific to each goal, a few apply to all goals in this alternative. These include

- Continue to recruit, hire and train, students under the Student Career Experience Program and Student Temporary Employment Program to assist with all Refuge goals, programs, and operations.
- Continue to recruit and train interns and volunteers to assist with all Refuge goals, programs, and operations and provide housing where possible.
- Continue to Support Friends of Iroquois NWR to assist in Refuge programs and operations.
- Continue to annually evaluate approximately 15% of the Refuge's boundary and replace boundary signs and/or posts as needed.

GOAL 1. *Provide high quality freshwater wetland migration stopover and breeding habitat for waterfowl, marsh birds, shorebirds, and bald eagles in Refuge impoundments through water level control.*

Strategies that apply to all objectives under this goal:

- Continue to conduct management of furbearers in marshes at the completion of the waterfowl hunt season to help sustain desired ratio of vegetation and open water in each impoundment (Map 2-2).
- Continue to allow management of furbearers throughout the entire Refuge, with restrictions on muskrat trapping on impoundments that have a large percentage of cattail coverage.
- Continue to issue up to 50 permits for marsh furbearer management across the entire Refuge.
- Continue to charge $50.00 for the marsh furbearer management permit.

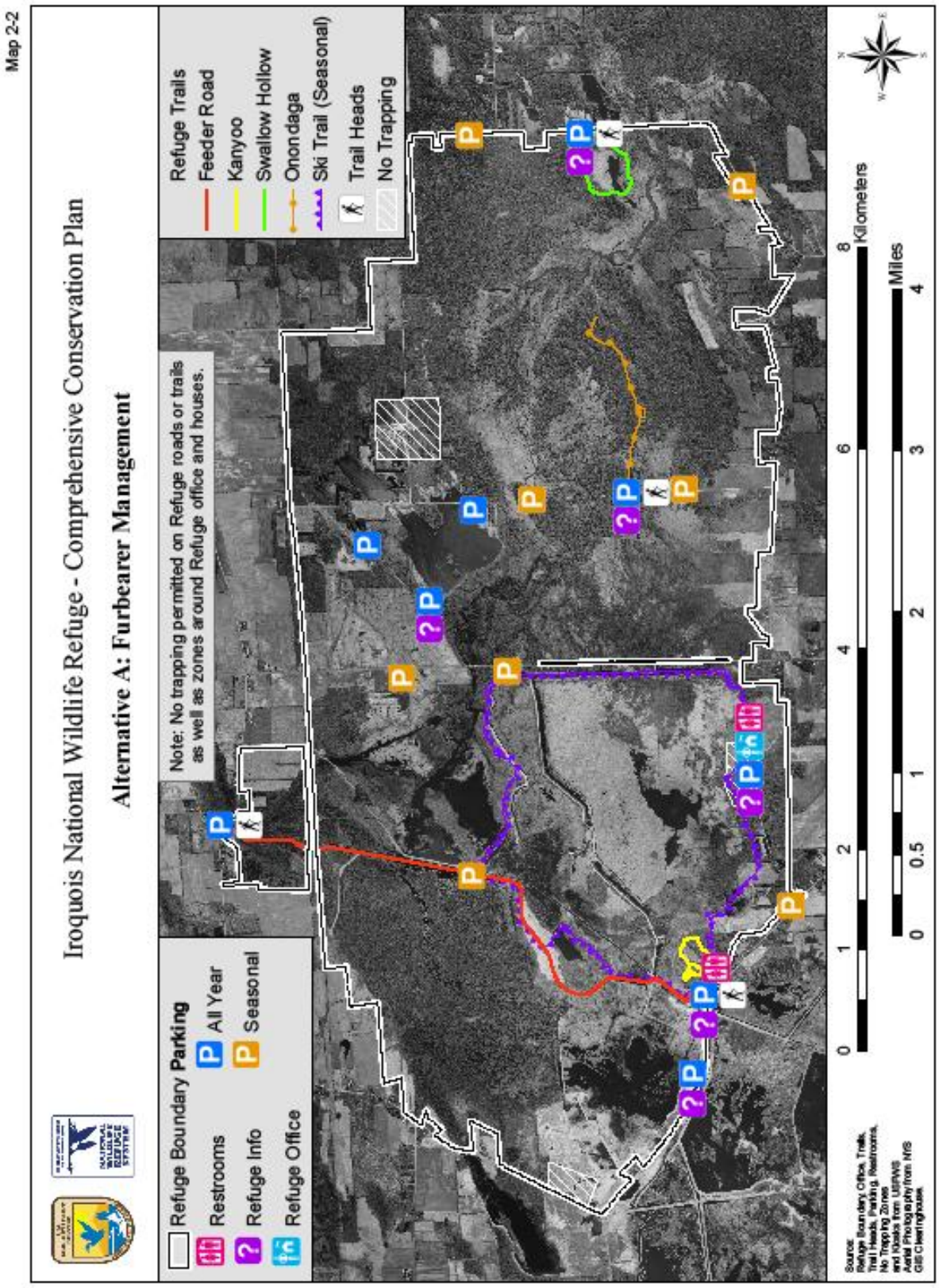
Background

Iroquois NWR lies within the Atlantic Coast Joint Venture (ACJV); one of the original joint ventures formed under the NAWMP. The ACJV initially focused on protecting and restoring habitat for the American black duck and other waterfowl species in the Atlantic Coast region of the United States. Much of its support is generated through grants provided by the North American Wetlands Conservation Act. While maintaining a strong focus on waterfowl, the ACJV mission has evolved to include the conservation of habitats for all birds. At the regional scale the ACJV is working on integrated planning efforts in eight BCRs. An important part of this planning effort is the development of Focus Area Plans. Focus Areas are discrete and distinguishable habitats or habitat complexes that are regionally important for one or more priority species during one or more life history stages. The Tonawanda-Iroquois-Oak Orchard Focus Area Plan (ACJV 1991) identified the rehabilitation of Mohawk and Oneida Pools on Iroquois NWR as a high priority project. The Service prepared an EA specifically for this project in 2002 (USFWS 2002). The initial phase of the project is complete; three new wetland sub-units in the Mohawk Pool provide significant improvement in wetland habitat.

Iroquois NWR lies within BCR 13, the Lower Great Lakes/St. Lawrence Plain (Map 1-5). BCR 13 encompasses the vast, low-lying lake plain region surrounding Lake Erie and Lake Ontario, the St.

USFWS

Eastern Cottontail


Map 2-2
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative A: Furbearer Management
Refuge Boundary
Parking
All Year
Seasonal
Restrooms
Refuge Info
Refuge Office
Note: No trapping permitted on Refuge roads or trails as well as zones around Refuge office and houses.
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Ski Trail (Seasonal)
Trail Heads
No Trapping
0
1
2
4
6
8
Kilometers
0
0.5
1
2
3
4
Miles
Source:
Refuge Boundary, Office, Trails, Trail Heads, Parking, Restrooms, No Trapping Zones and Kiosks from USFWS
Aerial Photography from NYS GIS Clearinghouse

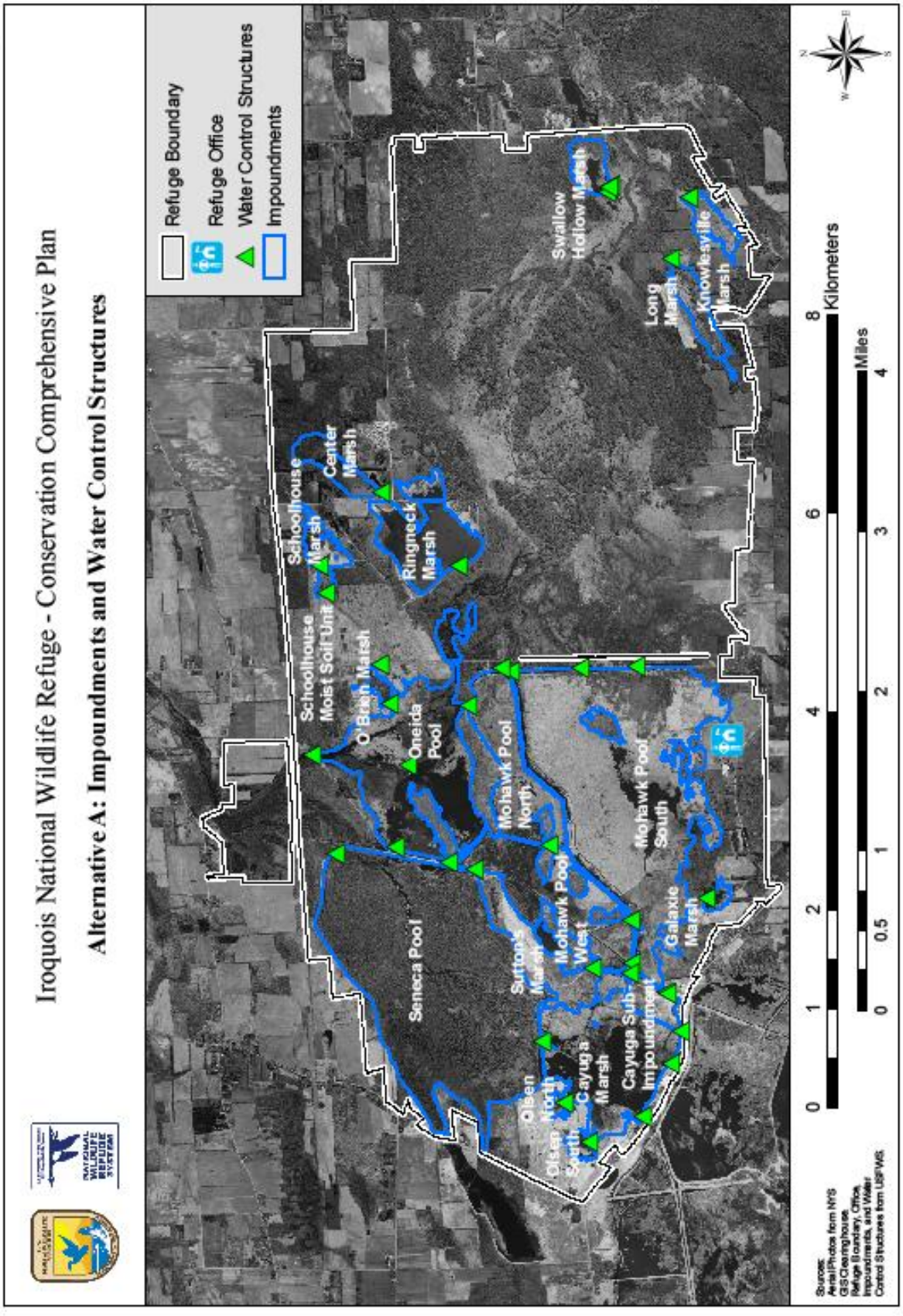
Lawrence River Valley, low-lying regions between the Adirondack Mountains and the Laurentian Highlands, and upper regions of the Hudson River Valley. In addition to providing important lakeshore habitats and associated wetlands, this region was originally dominated by a mixture of oak-hickory, northern hardwood, and mixed-coniferous forests. Nearly 95% of the original habitat types have been lost and the landscape is now dominated by agriculture with interspersed wetlands and remnant forest stands. BCR 13 plays a critical role in providing important staging and migrating habitat for birds during the spring and fall migration (Hartley 2007).

Iroquois NWR is part of the 19,000-acre Tonawanda-Iroquois-Oak Orchard Wetland Complex. The creation of the Barge Canal System, beginning in the early 1800s, and the draining of wetlands for agriculture and other uses dramatically changed the hydrology of the "Alabama Swamps," as this area was known. The area continued to flood each spring creating thousands of acres of shallow wetlands, but the spring waters would recede quickly and only the lowest areas remained wet through the summer. Once the Refuge was established, farm ditches were plugged and several impoundments were created to allow managers to control water levels. Water level management provided wetland habitat throughout the year and restored variability to the hydrology of the region.

There are currently 19 wetland impoundments on the Refuge (Map 2-3). These impoundments encompass nearly 4,000 acres of diverse wetland habitat. Because of the uneven topography within individual impoundments, often a single impoundment will help meet multiple objectives within the same year. Water levels are adjusted within and between years to mimic natural hydroperiods associated with unaltered wetlands and to provide the optimal habitat conditions for wetland dependent wildlife species.

Each impoundment is drawn down approximately every three to six years; a few impoundments are scheduled for drawdown every year. These drawdowns mimic a drought in a natural marsh and allow the re-growth of natural vegetation in a "drawdown cycle". In the first year of the cycle, water is drained from the impoundment after the peak of waterfowl migration (early spring). The relatively cool soils in April and May favor the germination of annual moist soil plants such as sedges, smartweed and wild millet. The seeds of these plants provide waterfowl food when the impoundment is re-flooded in the fall. Organic material comprised of dead marsh vegetation accumulating over several years is exposed to oxygen during the drawdown and thus oxidizes (breaks down) and becomes nutrients for the growth of new marsh plants. As more of the water evaporates the bottom "firms up" and provides a rich bed for the new plant roots. Some perennials, such as cattail and bur-reed, germinate and grow. These plants usually will remain in the understory beneath the annual plant species. These perennials play an important role in future years of the cycle. If the water is drained off later in the year when the soil is warmer (June to August) it is likely that purple loosestrife will germinate. Purple loosestrife has become less of a problem due to expanding populations of *Galerucella* beetles, but the Refuge still tries to keep loosestrife germination to a minimum.

The second year of the cycle is a year of growth and re-colonization. Residual seeds from the annuals provide a rich carbohydrate food source for the northward migrating waterfowl in the spring. The dead and partially decomposing stalks of the first year plants become a food source for many kinds of invertebrates. Invertebrates provide a critical protein source for migrating birds, particularly female ducks that will soon lay eggs. The cattails and bur-reed grow vigorously in the second year and the impoundment quickly becomes colonized by muskrats which utilize the perennials as both a food source and as material for construction of their houses. Habitat cover provided by perennial vegetation interspersed with new open water areas created by increased muskrat activity provides ideal conditions for waterfowl broods and migrating waterfowl.


Map 2-3
Iroquois National Wildlife Refuge - Conservation Comprehensive Plan
Alternative A: Impoundments and Water Control Structures
Refuge Boundary
Refuge Office
Water Control Structures
Impoundments
Schoolhouse Marsh
Center Marsh
Ringneck Marsh
Schoolhouse Moist Soil Unit
O'Brien Marsh
Oneida Pool
Mohawk Pool North
Mohawk Pool South
Mohawk Pool West
Seneca Pool
Sutton's Marsh
Galaxie Marsh
Cayuga Sub-Impoundment
Cayuga Marsh
Olsen North
Olsen South
Swallow Hollow Marsh
Long Marsh
Knowlesville Marsh
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Sources:
Aerial Photos from NYS GIS Clearinghouse,
Refuge Boundary, Office, Impoundments, and Water Control Structures from USFWS

In subsequent years of the cycle the interspersion of small, irregular open water areas becomes greater as the perennials are used by muskrats and are stressed by higher, more constant water levels. Greater interspersion of open water results in habitat conditions suitable to marsh-nesting birds. Initially, the dense vegetation is ideal for rails. As it becomes more open, it becomes ideal for least bitterns and as the impoundment continues to open, black terns may begin to nest. The terns seem to favor old, sunken muskrat houses as nesting platforms. Eventually conditions become too open and the habitat value is greatly reduced for waterfowl and most marsh nesting species. The drawdown cycle starts over when Refuge managers determine that habitat value is relatively low. A typical cycle may last three to six years.

Furbearer management is conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions. Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.

Objective 1.1 Emergent Marsh – Migrating Waterfowl

Each year, provide a minimum of 800 acres of waterfowl stopover habitat in mid-March through early May (spring migration) and again in late September to early November (fall migration) consisting of shallow flooded wetlands (<18") dominated by annual moist soil vegetation such as sedges, Bidens *spp*., smartweed, and wild millet.

Rationale - Objective 1.1 will benefit many of the 20,000 ducks that pass through the Refuge during migration including several waterfowl species listed as priorities (highest, high, or medium) in the BCR 13 Plan: American black duck (highest), northern pintail (high), blue-winged teal (medium), and mallard (medium). The black duck, mallard, and northern pintail are species of management concern for the USFWS in the northeast region and are also listed in the New York Wildlife Action Plan (NYWAP) as species of greatest conservation concern. The New York Important Bird Area (IBA) program listed a large concentration of migrating waterfowl as important criteria in designating Iroquois NWR as an IBA.

Fall migrant waterfowl require large amounts of carbohydrate rich foods to prepare them for their migration to the wintering grounds and also to replace the large amounts of energy needed to sustain them as cooler fall temperatures drain their energy reserves. Moist soil annual seeds produced as a result of wetland drawdowns provide a readily available source of carbohydrates. At Iroquois NWR, these drawdowns are conducted in the spring of the year to ensure the greatest amount of annual vegetation and highest species diversity will result. Most annual species need a minimum of 60 days growing period to produce seeds. Prior to fall migration, wetlands that have been drawn down are shallowly re-flooded in preparation for the arrival of fall migrant waterfowl. Water levels are kept to 18" or less as this depth has

been found to provide the best foraging habitat for most waterfowl species. Waterfowl will forage on these areas until they leave to continue their fall migration or until ice conditions force them to move to open water elsewhere. In some cases, water is not available in the fall to allow flooding of drawn down wetlands. When this happens, these areas are shallowly re-flooded over the winter and early spring as melt waters become available. These shallow wetlands provide habitat for migrating waterfowl in the spring of the year.

Spring migrant waterfowl, particularly females, require large amounts of protein rich foods to prepare them for the remainder of their northward migration and to provide them with the nutrition necessary to successfully nest. Hens gather this protein by feeding heavily on aquatic invertebrates on the wintering grounds and on feeding areas along their migration corridors. Invertebrate populations thrive on the residual annual vegetation left over from the previous year's drawdown and invertebrates emerge as soon as temperatures rise enough to melt the ice. Additionally, seeds produced by these annual plants during the drawdown year are often still available the following spring to northward migrating waterfowl and provide a carbohydrate rich food source that supplements the protein being gathered while feeding on invertebrates.

Iroquois NWR is an important spring migratory stopover area for many species of waterfowl in the Atlantic Flyway as it contains a variety of wetland types and sizes. Active wetland management, including drawdowns and subsequent shallow flooding, allows the Refuge to provide the best possible migration habitat for spring migrant waterfowl. Wetlands that have undergone a drawdown in the previous year and are shallowly flooded (<18") in the spring are of particular importance to waterfowl during spring migration.

The goal of the Refuge water management program is to provide high quality functioning wetlands that supply optimal stopover and breeding habitat for waterbirds and bald eagles. This program requires the manipulation of wetland water levels to provide high-energy plant and invertebrate foods and structural habitat diversity for feeding, resting, and breeding waterfowl and other migratory birds (USFWS 2005b). Waterfowl need appropriate nesting cover and substrate, as well as quality foraging areas.

Strategies:

- Continue to implement the 3-6 year drawdown cycle through water level control.
- Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed).
- Continue to collect bathymetry data on impoundments.
- Continue to monitor the response of annual moist soil vegetation after each drawdown at random points in areas that were previously open water; about 10-20 points for small impoundments.
- Continue to conduct early spring drawdowns and subsequent water level manipulations to promote the growth of annual wetland plants and minimize germination of perennial emergent vegetation in impoundments where robust perennial emergent vegetation makes up <40% (based on road-side surveys) of the total wetland acres. Percentage of emergent vegetation should be determined in the late fall/early winter with considerations the following spring.
- Continue to re-flood drawn down impoundments to coincide with waterfowl migration chronology.
- Continue to induce physical/chemical disturbance to set back succession and promote growth of annual moist soil vegetation, if necessary.
- Continue to monitor the response of annual moist soil vegetation after each drawdown.

- Continue to monitor waterfowl trends during spring and fall migration.
- Continue to monitor the response of purple loosestrife to herbivory by the *Galerucella* beetles.

Objective 1.2 Emergent Marsh – Spring Migrating Geese
Each spring, provide a minimum of four patches of roosting habitat ≥50 acres in size, totaling at least 300 acres, for 75,000 or more migrating Canada geese from mid-March to May. Roosting habitat should consist of wetlands where open water makes up 50% or more of the wetland area.

Rationale - Over half of the Refuge is wetland (6,200 acres) with 4,000 of these wetland acres contained in 19 managed freshwater impoundments. Water levels are adjusted within and between years to mimic natural hydroperiods associated with unaltered wetlands to provide a variety of feeding, nesting, brood rearing, and resting habitats for migratory birds and resident wildlife. The interspersion of open water and aquatic and emergent plant communities provides resting and feeding habitat for over 120,000 waterfowl annually. The thousands of geese that migrate through the Iroquois Wetlands Complex each spring spend their day feeding in cornfields in the extensive agricultural lands surrounding the wetlands. The geese feed on waste corn left from the previous year's harvest before a new crop is planted later in the spring. At night the Refuge serves as a secure roosting area away from predators. The flocks of geese using the Refuge include birds from the Atlantic and Southern James Bay populations as well as geese from the resident population. Large numbers of resident geese are perceived to cause substantial resource and socioeconomic problems across the region, necessitating control programs. However, the Atlantic and Southern James Bay populations are of conservation concern because of significant population declines and are listed as highest priority in the BCR 13 Plan.

Large wetlands with substantial amounts of open water provide ideal roosting areas for Canada geese. The geese roost in these areas where they are safe from terrestrial predators. Additionally, these wetland areas provide the birds with another food source to compliment the high carbohydrate waste grains that they are feeding on in fields near the Refuge. Iroquois NWR was created in part for its value as a spring migration stopover area for Canada geese. To this day, tens of thousands of geese roost and feed on the Refuge during spring migration. Smaller numbers use the Refuge during fall migration and a few hundred geese spend the summer months breeding on the Refuge.

Strategies:

- Continue to provide a 50:50 mix of water and vegetation.
- Continue to limit visitor access near roosting areas to minimize disturbance.

Objective 1.3 Emergent Marsh – Deep Water Breeding Marsh Birds
Each year, provide a minimum of 800 acres of habitat for breeding marsh birds that use deeper water areas with specific emphasis on black tern, pied-billed grebe and least bittern. Target a 50:50 mix of vegetation and open water with an average water depth of 18-20" and at least three muskrat lodges per acre. Additionally, this habitat should be provided in a minimum of three patches ≥100 acres each.

Rationale – Weller and Spatcher (1965) found the maximum number and diversity of marsh birds occurred in wetlands with a well interspersed vegetation cover to water ratio of 50:50. This habitat type is usually referred to as a "hemi-marsh". At Iroquois NWR hemi-marsh habitat has been found to support robust populations of breeding marsh birds. This habitat usually occurs during the middle two or three years of an average drawdown cycle. Wetland management on most Refuge impoundments is designed to provide this habitat type.

Black tern, pied-billed grebe and least bittern are all priority species (medium) in the BCR 13 Plan and are species of greatest conservation concern in the NYWAP. The black tern is listed as an endangered species and pied-billed grebe and least bittern are listed as threatened in New York. The abundance of these three breeding species was included as important criteria in designating the Iroquois Wetlands Complex as an IBA in New York. The New York Natural Heritage Program describes the Iroquois deep emergent marsh as a significant ecological community.

Pied-billed grebe, least bittern and black tern are generally found in the deeper areas of hemi-marsh habitat with slightly more open vegetation. This habitat type allows these species more access to their preferred food resources and the optimal conditions for foraging. These species swim (pied-billed grebe), fly and dive (black tern), or grasp vegetation along the edge of open water (least bittern) to forage, thus allowing them to use deeper water areas of the marsh. Conversely, species such as American bittern and Virginia rail are usually associated with shallower water areas supporting a slightly more robust vegetation component with less open water. These species stand in water to forage, thus restricting them to areas where water levels are only a few inches deep.

Strategies:

- Continue to maintain flooded conditions with and average water depth of 18-20" where the coverage of perennial emergent vegetation is >60 percent of the unit. .
- Continue to implement the 3-6 year drawdown cycle through water level control.
- Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed).
- Continue to survey and inventory muskrat houses.
- Continue to collect bathymetry data on impoundments.
- Continue to conduct marsh bird surveys in cooperation with NYSDEC.

Objective 1.4 Emergent Marsh – Shallow Water Breeding Marsh birds

Each year, provide a minimum of 400 acres of habitat for breeding marsh birds that use shallow water areas with an emphasis on American bittern and Virginia rail. Target a 70:30 mix of vegetation and open water with an average water depth of 10-12". Additionally, this habitat should be provided in a minimum of two patches $\geq$50 acres each.

Rationale

The American bittern is a high priority species in the BCR 13 Plan, the NYWAP, and the North American Waterfowl Management Plan. The Virginia rail is a medium priority in BCR 13. See the rationale under Objective 1.3 for habitat requirements of selected marsh bird species.

Strategies:

- Continue to maintain flooded conditions with an average water depth of 18-20" where the coverage of perennial emergent vegetation is between 80% and 100%.
- Continue to implement the 3-6 year drawdown cycle through water level control.
- Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed).
- Continue to survey and inventory muskrat houses.

- Continue to collect bathymetry data on impoundments.
- Continue to conduct marsh bird surveys in cooperation with NYSDEC.

Objective 1.5 Emergent Marsh – Waterfowl Brood Rearing

Each year, provide a minimum of 400 acres of waterfowl (mallard, blue-winged teal and wood duck) brood rearing habitat consisting of 40% to 80% vegetative cover with an average water depth of 10-20". This habitat should be provided in a least four patches ≥50 acres each.

Rationale - Breeding (brood-rearing) habitat for mallard, blue-winged teal and wood duck is a high priority in the BCR 13 Plan and in the North American Waterfowl Management Plan. Waterfowl broods require habitat that provides an abundance of food (primarily protein) and safety from predators. At Iroquois NWR these needs can be met within impoundments in a hemi-marsh stage. Hemi-marsh habitat provides needed cover through the interspersion of robust perennial vegetation and open water allowing ducklings to forage on aquatic invertebrates while never being very far from adequate cover. The presence of both emergent and submergent vegetation in these wetlands provides the necessary substrate for invertebrate reproduction and subsequently provides ducklings with the protein-rich food resources necessary for their growth and survival.

Many duck species found at Iroquois NWR nest in grasslands. Some nest sites can be a significant distance from water (> one mile). When a brood hatches the hen leads the ducklings to a wetland area where they can find food and safety. This overland trip from nest site to wetland has been found in some studies to result in a significant loss of ducklings (Dzubin and Gollop 1972). Providing brood rearing habitat in close proximity to nesting grasslands should help reduce some of this duckling mortality. Impoundments used to meet Objectives 1.3 and 1.4 may also fulfill this objective, particularly if they are close to waterfowl nesting habitat.

Strategies:

- Continue to maintain flooded conditions with a minimum 18-20 inches water depth where the coverage of perennial emergent vegetation is >80%.
- Continue to locate brood rearing habitat in close proximity to waterfowl nesting cover (grasslands).
- Continue to induce physical/chemical disturbance as needed to reduce vegetation cover.
- Continue to coordinate volunteers to maintain approximately 400 wood duck nesting structures.

Objective 1.6 Open Water

Each year, provide bald eagle feeding habitat on a minimum of 250 acres, consisting of at least two patches ≥100 acres each of open water wetland for foraging bald eagles to coincide with their hatching and fledging period (April - June).

Rationale - The bald eagle is a New York State threatened species and a bird of management concern for the USFWS. The presence of three breeding pairs contributed to the designation of the Iroquois Wetland Complex as an IBA.

The USFWS *National Bald Eagle Management Guidelines* of 2007 state recommendations for land management practices as well as how to avoid disturbance to the eagles. In general, activities should be kept as far away from nest trees as possible; loud and disruptive activities should be conducted when eagles are not nesting; and activity between the nest and the nearest foraging area should be minimized. Some disturbance categories listed in the guidelines that are relevant to Iroquois NWR are:

- **Category D - Off-road vehicle use**. No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet.
- **Category F - Non-motorized recreation and human entry** (e.g., hiking, camping, fishing, hunting, bird watching, kayaking, canoeing). No buffer is necessary around nest sites outside the breeding season. If the activity will be visible or highly audible from the nest, maintain a 330-foot buffer during the breeding season, particularly where eagles are unaccustomed to such activity (USFWS 2007b).

The above categories are taken directly from the USFWS *National Bald Eagle Management Guidelines* and although off-road vehicle use is indicated, Iroquois NWR does not allow ORV use on the refuge. This category would cover vehicle use by researchers, volunteers, refuge staff, etc. in conducting official duties.

Strategies:

- Continue to implement USFWS 2007 National Bald Eagle Guidelines.
- Continue to restrict public access to eagle nesting areas during the breeding season.
- Continue to coordinate with the NYSDEC on the protection, monitoring and management of the Iroquois Wetland Complex nesting eagles.
- Continue drawdowns on Refuge impoundments for other objectives in Goal 1 to help concentrate foraging areas around eagle nesting sites.
- Continue not to conduct drawdowns on Ringneck Marsh in years when drawdowns are conducted in impoundments containing eagle nests.

Objective 1.7 Mudflats

Provide up to 40 acres of mudflats with shallow water (<3") and sparse (<25%) vegetation and high invertebrate biomass annually during fall (August - September) to benefit migrating shorebirds including least, pectoral, semipalmated and solitary sandpipers and Wilson's snipe.

Rationale - Most shorebirds using the Great Lakes region are long-distance migrants that require stopover sites to replenish their fat reserves and meet the high energy demands of migration. These "staging" areas require shallow water and/or mudflat habitats with sparse vegetation, undisturbed roosting areas, and abundant invertebrate food resources. In this region these conditions can occur in various habitats including natural and managed wetlands, lakeshore, sand and gravel bars, reservoirs, and flooded agricultural fields.

Researchers are just beginning to understand the importance of habitats in the interior U.S. to shorebirds. However, variable climatic conditions common to inland areas make shorebird habitat unpredictable compared to coastal regions. Precipitation and hydrology patterns are highly variable from year to year and in different locations. In addition, loss of wetlands from urban development, hydrological disturbance, and agriculture has reduced the amount of habitat in the region. With the ability to manage water levels, Iroquois NWR can contribute to providing habitat for migrating shorebirds.

Many shorebird species are of conservation concern in the Upper Mississippi Valley/Great Lakes (UMVGL) Shorebird Plan. The populations of these species are known or believed to be small and/or declining, and they are experiencing other known or potential threats (de Szalay et al. 2000). More information on the regional abundance, distribution, chronology, and population trends of shorebirds;

responses of shorebirds and their invertebrate food base to management activities; wetland distribution and habitat conditions during a variety of climatic patterns; and effects of human disturbance on shorebirds is needed to guide shorebird habitat management on Iroquois NWR.

Strategies:

- Continue to conduct early drawdowns, mechanical manipulation (when needed to reduce vegetation cover), and subsequent flooding of impoundments at least four weeks prior to peak shorebird migration to allow aquatic invertebrates to develop.
- Continue to maintain high water levels through early summer and slowly lower levels during late summer to expose mudflats.
- Continue to manage the 41-acre Cayuga sub-impoundment and the 10-acre Schoolhouse sub-impoundment for fall migrating shorebirds using water level controls to create mudflats with shallow water areas less than three inches deep.

Objective 1.8 Seneca Pool Forested Wetland

Maintain the 935-acre Seneca Pool as a forested wetland dominated by red and silver maple, green ash, American elm, swamp white oak, and willow species to provide breeding habitat for cavity nesting waterfowl (primarily wood duck) and migratory songbirds (especially cerulean warbler).

Rationale - Red and silver maple and green ash dominate the approximately 3,330 acres of forested wetland habitat on the Refuge. Second growth mature trees 75+ years old dominate most of this habitat. More than 900 acres of forested wetland habitat are contained in Seneca Pool, an impoundment that was originally built and managed as a green tree impoundment. This pool is a red maple/green ash swamp, which has been purposely flooded in the past. Long periods of flooding have stressed and killed mature trees and prevented germination and survival of seeds and seedlings. Due to this negative effect on the forested wetland habitat, the pool level is now allowed to fluctuate with the level of Oak Orchard Creek. Fluctuating with the creek level reduces the amount of water in this pool and limits the amount of water stress put on the trees, while still providing wetland habitat during spring migration. This pool provides a large contiguous tract of forested wetland habitat managed for species such as the wood duck and cerulean warbler.

The floodplain forest and forested wetlands associated with Oak Orchard Creek support migrating and nesting species of conservation concern within BCR 13 including cerulean warbler, prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker and wood duck. The Cerulean Warbler Atlas Project identified Iroquois as an important area for ceruleans. The NYWAP identifies several species of bats (eastern red, eastern small-footed and hoary bats) and the river otter as priority species; all of which use the floodplain forest habitat within the Oak Orchard Watershed.

Typically riparian or floodplain forests support a high diversity of plant species and food resources that are particularly important to migrating songbirds. An abundance of dead and dying trees of various sizes in floodplain forested wetlands are critical to cavity nesting ducks including wood duck and hooded merganser. Some songbird species (e.g., prothonotary warbler) require natural cavities as well. The USFWS is shifting away from artificial cavity nesting structures to a greater reliance on natural cavities.

Strategies:

- Continue to allow water levels in Seneca Pool to fluctuate with the level of Oak Orchard Creek.
- Continue to monitor Seneca Pool's water control structure to ensure that debris does not obstruct the flow of water into or out of the impoundment.

- Continue to monitor avian species of conservation concern through landbird surveys.

GOAL 2. *Maintain the environmental health and integrity of Oak Orchard Creek and associated bottomland floodplain forest and wetlands as a natural free-flowing habitat with a diverse assemblage of native plants and animals.*

Background

The Refuge contains the 523-acre Oak Orchard Creek Marsh National Natural Landmark (NNL, Map 1-4). The marsh encompasses a pristine stretch of the sluggish and meandering creek that varies in width from 20 to 150 feet. The surrounding terrain is low and flat and floods annually. Broad-leaved cattail grows in marshy areas at the bends in the creek. Buttonbush and water willow are common shrubs along the creek edges, accompanied by a diversity of other plant species including red osier dogwood, flowering dogwood, swamp rose, purple nightshade, watercress, water hemlock, swamp milkweed, lizards tail, cardinal flower, broad-fruited bur reed, and forget-me-nots. A forested wetland dominated by silver maple with some green ash, swamp white oak and slippery elm with a dense understory of sensitive fern borders the creek channel (Vogelmann 1972). When this landmark was established in 1974 it also included the 15-acre Milford Posson Natural Area.

Furbearer management is conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions. Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.

Strategies that apply to all objectives under this goal:

- Continue management of furbearers in marshes at the completion of the waterfowl season to help sustain desired ratio of vegetation and open water in each impoundment.
- Continue to allow management of furbearers throughout the entire Refuge, with restrictions on muskrat trapping in marshes that have a large percentage of cattail coverage (Map 2-2).
- Continue to issue up to 50 permits for marsh furbearer management across the entire Refuge.
- Continue to charge $50.00 for the marsh furbearer management permit.

Objective 2.1 Oak Orchard Creek and Associated Emergent Marsh and Forested Wetlands

Maintain, and restore as necessary, the water quality, natural flow regimes, and biological integrity of Oak Orchard Creek in the eastern portion of the Refuge, relying on natural processes when possible.

Rationale - Oak Orchard Creek enters the Refuge from the east and meanders sluggishly and unimpeded through the Refuge east of Route 63. This area includes the Oak Orchard Creek Marsh NNL and supports many of the native plants and animals found in this region. While this section of the Creek is impacted by invasive species and upstream land use practices that degrade water quality, it offers some semblance of the watershed's historic condition before ditching and diking.

Most of the natural emergent marsh habitat on the Refuge is located along Oak Orchard Creek, east of Sour Springs Road. In this area the creek is essentially uncontrolled. The only constrictions are Sour Springs Road itself, which may back water up during flood events, and transient beaver dams. These dams alter hydrology and ultimately change the vegetative characteristics of the creek.

A healthy riparian ecosystem provides migration, breeding and wintering habitat for many migratory birds and resident fish and wildlife species. Very few unmanaged, unaltered wetland systems still exist in western New York. While this section of Oak Orchard Creek is not wholly unaltered, it is essentially unmanaged. It is also in a condition where water management control is not critical to maintaining the quality of the wetland habitat. Preserving this section of the Creek in this "natural" condition allows the Refuge to provide a significant amount of riparian habitat for fish and wildlife with a minimum expenditure of resources.

Strategies:

- Continue to monitor for invasive species within the floodplain and remove invasive species using mechanical methods wherever possible.
- Continue to identify and map vernal pools within the floodplain forest.
- Continue to monitor colonial nesting bird rookery along Route 63.

Objective 2.2 Natural Forested Wetlands

Maintain a minimum of 2,300 acres of mature forested wetlands dominated by red and silver maples, green ash, American elm, swamp white oak, and willow species by allowing natural processes and controlling non-native invasive species to provide breeding habitat for cavity nesting waterfowl (primarily wood duck) and migratory songbirds (especially cerulean warbler).

Rationale - The floodplain forest and forested wetlands associated with Oak Orchard Creek supports migrating and nesting species of conservation concern within BCR 13 including cerulean warbler, prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker and wood duck. The Cerulean Warbler Atlas Project identified Iroquois as an important area for ceruleans. The NYWAP identifies several species of bats (e.g.,eastern red, eastern small-footed and hoary bats) and the river otter as priority species; all of which use the floodplain forest habitat within the Oak Orchard Watershed.

Typically riparian or floodplain forests support a high diversity of plant species and food resources that are particularly important to migrating songbirds. An abundance of dead and dying trees of various sizes in floodplain forested wetlands are critical to cavity nesting ducks including wood duck and hooded merganser. Some songbird species (e.g., prothonotary warbler) require natural cavities as well. The USFWS is shifting away from artificial cavity nesting structures to a greater reliance on natural cavities.

Strategies:

- Continue as time and funds permit, identify and map forested wetlands for rare plant species and natural communities to document their occurrence.

- Continue to conduct annual surveys of exotic invasive plants and control as necessary.
- Continue to maintain and conserve known vernal pools to sustain populations of species of conservation concern including obligate amphibians across the entire Refuge.

GOAL 3. *Provide a diverse mix of grassland, shrubland, and forested upland habitats arranged to reduce fragmentation and edge effects and enhance habitat quality for priority species of conservation concern.*

Strategies that apply to all objectives under this goal:

- Continue to conduct an upland furbearer management program that will help keep mammalian predator numbers in check decreasing the potential for predation on nesting migratory birds and reducing the spread of some density dependent diseases such as distemper, parvo, and rabies (Map 2-2).
- Continue to issue up to 50 permits for upland furbearer management across the entire Refuge except in on trapping zones (Refuge office, residences and Job Corps) and on Refuge trails and dikes.
- Continue to not charge for an upland furbearer management permit.

Background

Approximately half of the 4,000 acres of upland habitat at Iroquois NWR is currently maintained in an early successional stage as grassland or shrubland through active management. Grasslands are mowed or burned according to a multi-year rotation schedule to suppress encroachment of broadleaf forbs and woody plants.

Furbearer management is conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions. Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.

Objective 3.1 Grasslands

Provide a minimum of 800 acres of grassland habitat in patches >20 acres including two grassland areas >100 acres. Maintain a diverse mix of grass and forb species with < 2% shrub cover and $\leq$ 30% forb cover to provide breeding and nesting habitat for grassland nesting birds such as bobolink, Henslow's

sparrow, grasshopper sparrow, sedge wren, and waterfowl, and to benefit other native wildlife including pollinating bees, butterflies and other insects.

Rationale - Grasslands provide breeding habitat for songbirds and waterfowl. Many grassland-nesting songbirds are area-sensitive and each species prefers a slightly different mix of grass, forb and bare ground. The Henslow's sparrow is one of the highest priority species in BCR 13; bobolink and grasshopper sparrow are also priorities (medium). Grasslands of 100 acres or more will provide habitat for a larger suite of grassland bird species than will small (<20 acres), isolated grassland patches.

Populations of grassland birds are declining as their habitats are converted to agricultural, residential, and other urban uses. Norment (2002) identifies a need to approach grassland bird conservation in the northeast with "particular wisdom and care." He notes that despite the relatively recent (last 200 years) rise and fall of grassland habitats and associated birds in the northeast, the region may still be important for these species given their continental decline and habitat loss in the core of their ranges in the Midwest.

Refuge grasslands are a mix of managed warm and cool season fields and unmanaged forb dominated fields. Switchgrass, smooth brome, and goldenrod dominate the grasslands. Grasslands are currently managed using a combination of mowing, chemical spraying and prescribed burns to control unwanted vegetation and to maintain nesting habitat for waterfowl and other grassland nesting birds. Haying, conducted through a cooperative farming program is also used as a grassland management tool (USFWS 2002). Approximately 450 acres of upland habitat have been planted to warm season grasses (primarily switchgrass, big bluestem and indiangrass) and succession is suppressed in these units (USFWS 2000c).

Refuge grassland units range in size from one to 250 acres. Patch size is often the most important factor limiting use and nest success of grassland nesting birds. Generally, the larger the grassland, the more it will be used and the higher the nest success. The goal of the Refuge's grassland management program is to provide a few large grassland units and eliminate the smaller fragmented grasslands that are providing very little habitat to targeted wildlife species.

Strategies:

- Continue to use mowing, haying, prescribed fire and herbicide application as tools to maintain grassland conditions. Schedule mowing every one to three years to occur between July 15 and October 15 depending on the desired vegetation structure. Mowing later in the season will provide added benefits to pollinators.
- Continue to schedule prescribed fires between April 1 to June 15 to take advantage of adequate site conditions for burning and achieve the desired vegetation results.
- Continue to conduct herbicide applications to provide maximum control of undesirable vegetation.
- Continue to evaluate and determine the feasibility of using Refuge grasslands for Karner blue butterfly reintroduction.
- Continue to conduct three grassland bird surveys before July 15 each year.
- Continue to remove fence-lines and hedgerows in grassland along Route 63 and Roberts Road as staff time permits.

Objective 3.2 Shrublands

Provide 200 to 400 acres of mesic to dry shrubland habitat throughout the Refuge to provide breeding, nesting, and migrating habitat for American woodcock, golden and blue-winged warblers, field sparrow, and black-billed cuckoo and to provide food sources for migrating songbirds. These shrublands should be

dominated by native shrubs including willows, dogwoods, viburnums and alders with less than 5% non-native invasive species.

Rationale - A range of habitat types are included under shrubland habitat ranging from brushy old field conditions to regenerating forests to more naturally maintained, relatively stable shrublands associated with wetlands. Shrublands support many high priority bird species in the BCR 13 Plan including blue and golden-winged warblers and field sparrow. Managing small areas (< 20 acres) of shrubland habitat can be effective for many shrubland-dependent birds. Consolidating and clustering patches and maintaining some large patches of shrubland habitat will provide habitat for a range of wildlife associated with these habitats.

Many of the shrublands on the Refuge have matured to a stage where they are moving from shrubland to forest habitat. The Refuge is identifying those shrubland areas that would be best kept as shrubland management units and those areas that would be better left to revert to forest.

Strategies:

- Continue to maintain approximately 10-20 acres of shrublands each year by hydroaxing in the winter on frozen ground or in mid-summer on dry ground.
- Continue to treat shrubland units that have become dominated by trees as necessary to retard succession into young forest.
- Continue to conduct shrub management in winter on frozen ground or in mid-summer on dry ground.
- Continue to monitor avian composition annually for priority BCR species.

Objective 3.3 Upland Forests (Early, Mid and Late Successional)

Provide 300 to 500 acres of late successional upland forest (>150 years old) in blocks > 75 acres dominated by hemlock, sugar maple, black cherry, hickory and oaks to benefit migratory breeding birds including wood thrush, cerulean warbler and black-billed cuckoo.

Rationale - Although once dominated by a mix of oak-hickory, northern hardwood, and hemlock-northern hardwood forests, the upland areas adjacent to Iroquois NWR are now dominated by agricultural land interspersed with wetlands and remnant forest stands. Thus, Iroquois NWR offers some of the best, remaining blocks of upland forest in this region. Currently, the late successional forest habitats on the Refuge are not actively managed. The upland forests are relatively intact with a diversity of canopy tree species and some midstory and understory plant associates and light impact from invasive species. These forests support BCR 13 priority bird species including wood thrush and cerulean warbler (highest), and black-billed cuckoo (high). These three species are also birds of management concern for the USFWS in the Northeast Region and are noted as species of greatest conservation concern in the NYWAP.

Over 46% of the Refuge is covered by forest, 66% of which is forested wetland. Species composition of the forest varies across the Refuge with mixed hardwood stands predominated by elm, maple, aspen, and upland species such as beech, hickory and oak. Most conifers occur in plantations and include white pine, white spruce, Norway spruce, Scotch pine, red pine, Austrian pine and Douglas fir. Several natural hemlock stands are found in small pockets.

Large blocks of forested upland and forested wetland habitats are unique to the present day landscape of the Western Lake Plain. Landuse or landcover data for northwestern New York was developed by the U.S. Geological Survey (USGS) as part of the Geographic Information Retrieval Analysis System

(GIRAS) during the 1970's. Of the entire area displayed (1,469,706 acres), 1.6% of the land cover (23,709 acres) is mapped as forested wetlands and 6% (8,417 acres) as upland forest. Sizes of these forested areas vary, but the largest block of forested wetlands (20% of the total forested wetland cover) is within the Iroquois NWR boundary.

During the 1960s and 1970s logging was conducted on the Refuge for both production of wood products and firewood. Habitat degradation due to cutting outside specified areas and lack of staff time to monitor these areas caused an end to cutting in 1978. Currently, there is little to no management within the forested areas. Many species such as woodcock, grouse, turkey, wood duck and hooded mergansers use the forested areas on the Refuge.

Strategies:

- Continue to monitor avian species of conservation concern through landbird surveys and woodcock surveys.
- Continue to conduct vernal pool surveys and amphibian surveys.
- Continue to conduct annual surveys of exotic invasive plants and control as necessary.
- Continue to limit any new trails into undisturbed upland forest to avoid providing pathways for invasive species.
- Continue to rely on natural tree fall gaps within the mature forest to create a multi-layered forest structure with a variety of dead and fallen woody debris.

Objective 3.4 Conifer Plantations

Remove two acres of conifer plantations in the highest priority areas of the Refuge to encourage development of natural communities that are more beneficial for Refuge priority resources.

Rationale - Conifers are a relatively small component of the forest types on the Refuge. The only naturally occurring, native conifer is the eastern hemlock which is often found in association with sugar maple and American beech. All other conifers on the Refuge are planted stock. Conifer planting peaked during the 1960's and early 1970's. Species planted include white spruce, white pine, red pine, Austrian pine, Scotch pine, Douglas fir and Norway spruce. Conifer plantations are removed when necessary to facilitate other Refuge objectives such as grassland or shrubland restoration and woodcock management activities.

Strategies:

- Continue to remove conifers as they interfere with other management actions or Refuge needs.
- Continue annual surveys of exotic invasive plants, and control as necessary.
- Continue to rely on natural tree fall gaps within conifer plantations to create a multi-layered forest structure with a variety of dead and downed woody debris.
- Continue to evaluate current bird survey transects in conifer plantations and establish new surveys as needed to monitor species of conservation concern as plantations convert to a more natural state.

Goal 4. *Refuge visitors will understand and appreciate fish and wildlife conservation through high quality recreation, education and interpretive programs.*

Strategies that apply to all objectives under this goal:

- Continue to replace outdated and faded signs (e.g. boundary, hunt zones, closed areas) using current standard Service signs.
- Continue to restrict public access to seasonally sensitive wildlife areas as needed.
- Continue to restrict access to the Refuge from March 1 through July 14 except in designated public areas (trails, overlooks, photo blinds and fishing locations).

Background

The Improvement Act identifies six priority public uses for Refuges: hunting, fishing, wildlife observation, photography, environmental education, and interpretation. Interpretation and hunting have regionally been identified as the top two priority Areas of Emphasis at the Iroquois NWR. These two activities will be given highest priority to ensure wise use of staff and funding resources and enable the Refuge to provide fewer, but higher quality, visitor opportunities. Public use opportunities will be provided to the extent that they are compatible with the Refuge System mission and the purposes of Iroquois NWR. Goal 4 addresses wildlife observation, wildlife photography, environmental education and interpretation. Goal 5 addresses hunting and fishing recreation.

We develop our wildlife-dependent recreation programs in consultation with state fish and wildlife agencies and stakeholders. Refuge recreation programs must

- promote safety of participants, other visitors and facilities;
- promote compliance with applicable laws and regulations and responsible behavior;
- minimize or eliminate conflict with fish and wildlife population or habitat goals or objectives in an approved plan;
- minimize or eliminate conflicts with other compatible wildlife-dependent recreation;
- minimize conflicts with neighboring landowners;
- promote accessibility and availability to a broad spectrum of the public;
- promote resource stewardship and conservation;
- promote public understanding and increase public appreciation of America's natural resources and our role in managing and conserving these resources;
- provide reliable/reasonable opportunities to experience wildlife;
- use facilities that are accessible to people and blend into the natural setting; and
- use visitor satisfaction to help define and evaluate programs.

A Visitor Services Assessment and Review was completed in March 2009 (USFWS 2009a). This review was completed by visitor services managers in Region 5 to provide an objective view about Refuge resources and visitor services programs. Their recommendations included example themes and key messages the Refuge could integrate into interpretation, outreach, and education activities. The themes and key messages are listed below and will be used to help form our messages to the public.

Biodiversity

Biodiversity was as crucial to the survival of the Native Americans who historically inhabited this area as it is to the people, wildlife, and wildlands inhabiting it today.

Wildlife
The Refuge is a significant stop-over point for migrating waterfowl and other birds and has been key in the recovery of the bald eagle and the comeback of nesting black terns while also providing critical habitat for other wildlife (mammals, reptiles, amphibians, fish).

Habitat
Iroquois NWR and the adjacent state wildlife management areas provide the largest contiguous block of wildlife habitat between the Allegheny Plateau and Lake Ontario. The size and diversity of this natural area provides a variety of habitats to benefit wildlife and for enjoyment and appreciation by people. The management of such habitat diversity provides a wildlife oasis within a landscape fragmented by development and farming.

People
Iroquois NWR is not only a refuge for wildlife, but also a refuge for people – a place where people connect with nature, rest, restore, and build health – before continuing on the day's or life's, journey.

A program called "Connecting Children with Nature" is part of the Service's "Connecting People with Nature: Ensuring a Conservation Legacy Strategy". It was established to address the American public's declining interaction with nature and the threat this decline poses to the mission of the USFWS. Connecting Children with Nature addresses the fact that children today spend less time playing outdoors than any previous generation. Today, kids reportedly spend an average of 6.5 hours per day with television, computers and video games. This lack of connection with nature has been linked to a number of health problems, both physical and emotional (Children and Nature 2009). In order to accomplish the USFWS Directorate priority to connect people with nature, Northeast Region personnel have established the following goals:

- Educate ourselves and others about the benefits of connecting people, particularly children, with nature.
- Identify and share existing or new Service success stories.
- Facilitate new, and refine existing, opportunities.
- Network with other staff, partners, and other organizations to optimize opportunities.
- Identify, reduce and remove barriers to connect people with nature.
- Identify and implement tools for accountability.
- Seek new funding and leverage existing funding for projects.
- Demonstrate federal leadership in connecting people with nature.

The Service has also adopted the slogan "Let's Go Outside" to promote events, programs and activities for the Connecting People/Children with Nature initiative. Each service unit can modify the slogan to suit the event or activity they have planned. For example, "Let's Go Birding" or "Let's Go Fishing" or "Let's Go Outside to Restore Habitat for Wildlife." Many of the Refuge programs are designed to connect with kids to continue the conservation initiatives.

Objective 4.1 Interpretive Programs
Provide high quality, compatible interpretive programs as staffing and time permits with a focus on local resources, conservation measures, the Refuge System mission, and the purpose of the Refuge**.**

Rationale - Interpretation is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. Because of our small staff and current facilities we limit interpretive programs to groups of 60 people or less with a minimum of 10 people in the target audience. Individuals, families or small groups have the option to attend scheduled weekend programs presented in partnership with the Buffalo Audubon Society. Interpretive messages are also presented through special events and non-personal interpretation including printed Refuge brochures, stationary interpretive panels in kiosks, wayside panels at Cayuga Overlook, and interpretive signs and materials at Kanyoo, Onondaga, and Swallow Hollow Nature Trails. Interpretation is one of the two Areas of Emphasis for the Refuge.

The visitor contact station is located within the Refuge office building and provides exhibits and information about the Refuge including common wildlife species and wildlife-dependant recreational opportunities. The visitor contact station is open Monday through Friday, 7:30am to 4:00 pm year-round except holidays. In the spring and fall the visitor contact station is also open on weekends from 9:00 am to 5:00 pm. The visitor contact station receives approximately 6,000 visits per year; most during the months of March, April and May. A 60-seat auditorium/multipurpose room serves as a meeting room and can accommodate school groups, civic groups and families for interpretive and environmental education programs. The Flyway Nature Store, operated by Friends of Iroquois NWR is also located within the visitor contact station.

Refuge visitors include students from pre-K to college, area tourists, local conservation groups, wildlife photographers and observers, and hunters and fishermen. Annual visitation ranges from 35,000 to 45,000 people. To help address a shortage of Refuge staff, the Refuge partners with Buffalo Audubon Society to conduct interpretive programs on the Refuge mostly during the spring and fall. These programs include a "scope watch" on the eagle nest from Cayuga Overlook, birding tours, nature walks to identify plants, butterflies and trees, bat programs, "owl prowls," and canoe trips down Oak Orchard Creek. These programs are attended by 1,000 to 1,800 people each year. Participation in these programs has been increasing over the years and we expect that trend to continue.

Refuge staff conducts interpretive programs both on and off site. Onsite interpretive programs presented by Refuge staff and volunteers include formal programs and presentation and guided trail walks. In fiscal year 2009 the Refuge received eight requests from local schools, scouts, and church groups for guided visits which totaled 172 visitors. The Refuge conducts two major interpretive events: Spring into Nature and the Youth Fishing Derby. Spring into Nature is a one-day event hosted at the Refuge visitor contact station and is usually attended by over 1,000 people. This event provides interpretive programs, kid's activities and provides additional information on wildlife, habitats, conservation and stewardship. The Youth Fishing Derby is held at Ringneck Marsh and incorporates interpretive information into a fishing contest for children under the age of 16 years. In addition to these two events, the Buffalo Audubon Society presents interpretive programs called Iroquois Observations. In fiscal year 2009, Iroquois Observations documented 829 visits for programs including eagle watches, birding field trips, guest speakers, woodcock walks, owl prowls, canoe treks, and themed nature walks.

Offsite programs include Conservation Field Days in three counties (Orleans, Niagara and Monroe) as well as local festivals and other events. At Conservation Field Days the Refuge provides one of many learning stations for over 200 students in each of the counties. Local festivals and other events include Plantaisia in Buffalo, Earth Day at Beaver Meadow Nature Center, the University of Buffalo Enviro Fair, EcoFest in Batavia, Ducks Unlimited's Green Wing events, and interpretive programs at local schools. These programs record nearly 800 contacts.

The Refuge maintains a series of nature trails open to the public year-round, including Kanyoo, Onondaga, and Swallow Hollow (See Map 2-14). Kanyoo and Swallow Hollow Nature trails are used

extensively for school groups for field trips to experience nature and wildlife. Over the past couple of years these trails have been enhanced to ensure adequate access and to provide interpretative panels. We will continue to ensure that the trails are maintained and free from obstruction to allow easy access to the trails.

Strategies:

- Continue to host two special events during the year: Spring into Nature on the last Saturday in April and the Annual Youth Fishing Derby on the first Saturday in June to coincide with National Fishing and Boating Week.
- Continue to offer programs to assist Boy Scouts and Girl Scouts to obtain badges on request for a minimum of 10 children in the target audience.
- Continue to have the visitor contact station open Monday through Friday, except holidays, from 7:30 am to 4:00 pm with extended hours on weekends in the spring and fall from 9:00 am to 5:00 pm.
- Continue to offer slide programs and/or guided trail walks as requested and presented by staff or volunteers with a minimum of 10 people in the target audience and no more than 60.
- Continue to partner with Buffalo Audubon Society to provide weekend nature programs in the spring and fall.
- Continue to distribute interpretive brochures including the Kanyoo Trail Guide.
- Continue to maintain interpretive displays in the visitor contact station, and interpretive panels in kiosks at Cayuga Overlook, Onondaga, Kanyoo, and Swallow Hollow Nature Trails, and at the visitor contact station.

Objective 4.2 Outreach

Provide at least 10 opportunities annually for the local communities and visitors to learn about Iroquois NWR and the role of the Refuge System in protecting and managing our natural resources.

Rationale – While the Refuge has been established for more than 50 years we continue to come in contact with people who are not aware of the Refuge even though they have lived in the area most of their lives. We have established programs for conducting outreach efforts to get local, year-round and seasonal residents to understand, appreciate and support the Refuge System, its mission and the Refuge's contribution to that mission. Through outreach efforts we strive to increase support for Refuge management priorities, grow the volunteer program, and support our Friends and partners.

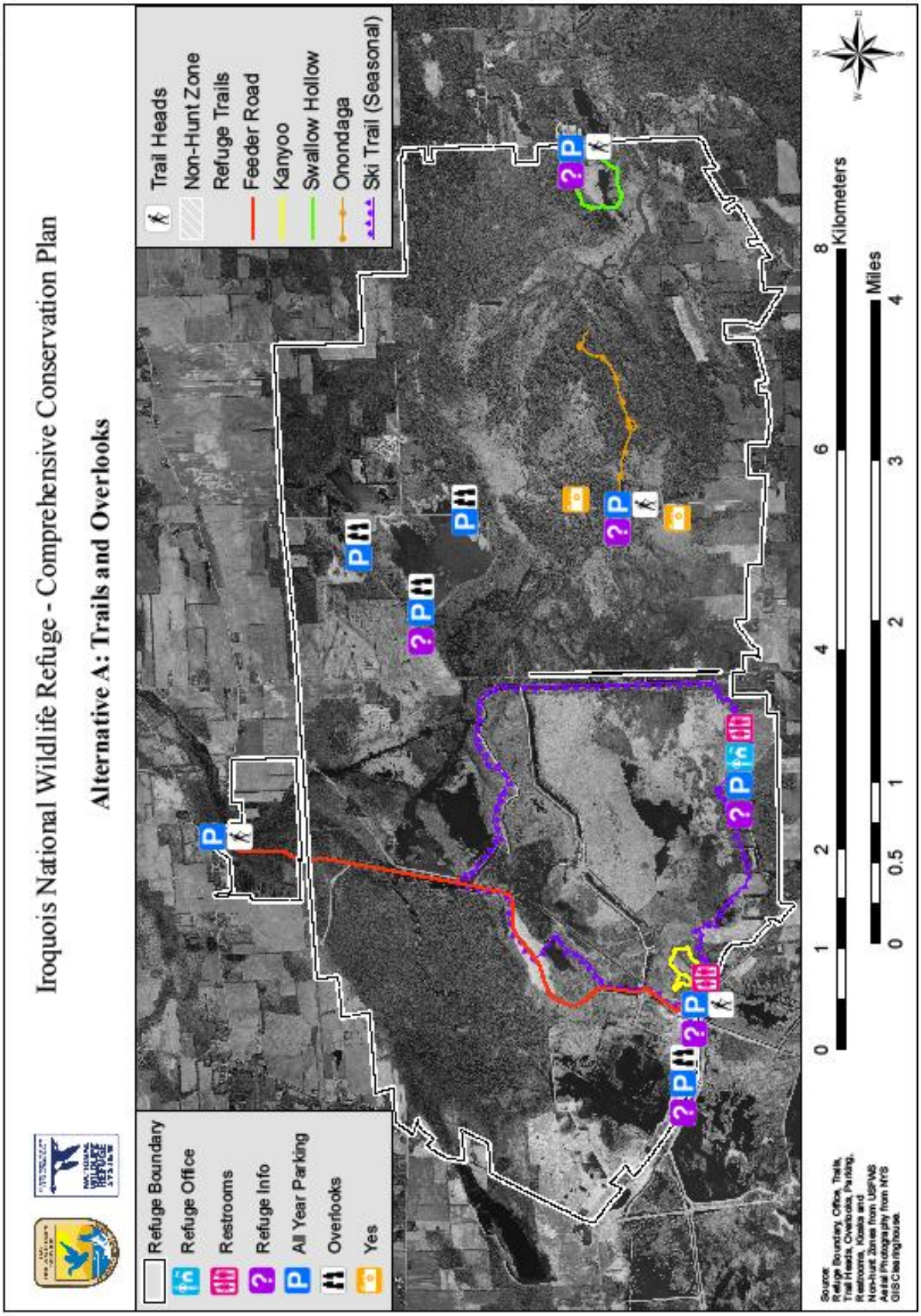
Strategies:

- Continue current outreach activities including news releases prior to major events and maintaining a Refuge website.
- Continue participating in Conservation Field Days in Orleans, Niagara and Monroe Counties and in festivals or special events offsite.
- Continue to work with the Chambers of Commerce to reach visitors through the tourism industry.

Map 2-4

Iroquois National Wildlife Refuge - Comprehensive Conservation Plan

Alternative A: Trails and Overlooks



Objective 4.3 Environmental Education

Reach 2,000 school-age (K-12) students annually with environmental education programs that coincide with NYS standards of learning. These programs should be conducted by staff, volunteers, partners and members of Friends of Iroquois NWR on or off Refuge property and integrate Refuge outreach and interpretive objectives and messages.

Rationale - Environmental education is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. Due to our small staff and available funding we look to partnerships to provide quality environmental education programs.

Through the Canisius Ambassadors for Conservation, a partnership with Canisius College, the Refuge now interacts with more than 2,000 area students each year. Specially selected students from Canisius College serve as guides at Swallow Hollow Nature Trail where participants learn about biological concepts and how the Refuge is managed for wildlife. School groups that participate in this program are given a tour of Refuge resources, participate in surveys and other data collection activities, and are then tested on what they learned using games.

Strategies:

- Continue the Canisius Ambassadors for Conservation (CAC) education program ensuring that the program ties into the New York State Standard of Learning requirements.
- Continue to work with teachers to develop their own environmental education programs.

Objective 4.4 Wildlife Observations and Photography

Provide access to unique and unusual habitats on the Refuge for wildlife observation and photography compatible with wildlife habitat management needs. Encourage wildlife photographers to use the Refuge by providing at least two well-placed photography blind.

Rationale - Wildlife observation and photography are two of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. Iroquois NWR provides opportunities to view and photograph wildlife in natural settings at nature trails and overlooks. The Refuge has historically been a popular birding site and has been recognized as an IBA by the National Audubon Society. The Refuge is a stopover point for migratory waterfowl and attracts hundreds of thousands of birds during migration. The Refuge's diverse habitat also attracts songbirds, shorebirds, raptors, marsh birds, reptiles, amphibians and over forty species of mammals.

Refuge visitors observe wildlife at several Refuge facilities (Map 2-4) including Cayuga, Mallard, Ringneck, and Schoolhouse overlooks. Visitors walk Kanyoo, Onondaga, and Swallow Hollow Nature Trails, as well as Feeder Road. Additional observations are achieved by canoeing Oak Orchard Creek and hiking, jogging, showshoeing and cross country skiing. The Refuge has two designated photo blind areas that receive little use and have been severly degraded over the past several years. In 2008 the Refuge received 401 visits for photography and 37,431 for wildlife observations.

Skiing and snowshoeing are often used by Refuge visitors to enjoy the solitude of the Refuge's natural areas and to view winter wildlife. Many skiers and snowshoers stop at the visitor contact station to obtain Refuge and wildlife viewing information. Hiking and walking to observe and photograph wildlife and nature are mostly associated with the Refuge's designated trail system. Visitors are currently required to stay on designated trails from March 1 through July 14. This limits disturbance to spring migration, nesting and brood rearing seasons. Off-trail access is allowed between July 15 through the end of February and is limited to upland areas of the Refuge. Actual numbers for off-trail use are not known.

Jogging and bicycling are not priority public uses and are classified as non-wildlife activities. However, most participants use the Refuge for the "wildlands" experience it provides.

Strategies:

- Continue to maintain Kanyoo, Onondaga, and Swallow Hollow Nature Trails and Feeder Road to provide opportunities for wildlife observation and photography.
- Continue to maintain Cayuga, Mallard, Ringneck and Schoolhouse Overlooks.
- Continue to promote Oak Orchard Creek as a canoe/kayak route to provide additional unique opportunities for wildlife viewing and photography.
- Continue to loan binoculars which can be checked out at the visitor contact station.
- Continue to operate the live kestrel cam to provide a unique opportunity to view an active kestrel nest. The live feed can be viewed via a monitor in the visitor contact station and on the web.
- Continue to permit cross-country skiing on the Mohawk Ski Trail from December 1 until the last day in February.
- Continue to allow biking on Feeder Road.
- Continue to allow jogging on nature trails and Feeder Road.
- Continue to restrict hiking and walking to Kanyoo, Onondaga and Swallow Hollow Nature Trails only during the spring migrations, nesting and brood rearing season, March 1 to July 14.
- Continue to allow hiking and walking the Refuge uplands (off designated nature trails) from July 15 to the end of Februrary.
- Continue to update Refuge publications and brochures regarding wildlife observation and photography opportunities every three years (e.g., fact sheets, wildlife lists, general brochure).
- Continue to repair and maintain two photo blinds in their current locations.

Objective 4.5 Other Recreation
Provide opportunities for compatible non-wildlife dependent recreation on the Refuge.

Rational - The Refuge has permitted berry picking as a traditional use of Refuge resources. Berry picking is not a priority public use but we hope that after participating in these activities, visitors will appreciate fish and wildlife and that they will ultimately support the Refuge and its management goals.

Few visitors gather berries from the Refuge. The majority of berry collection occurs alongside established roads and pathways, visitors do not tend to wander into the uplands for gathering. While bird use of berry patches is precluded in the presence of people, human use and disturbance is minimal when collecting along the established roadsides, trails and overlooks.

Strategies:

- Continue to allow picking of berries and fruits from July 15 to December 15.
- Continue to allow berries to be picked for recreational use only, no commercial operations.
- Continue to allow the use of baskets smaller than ½ bushel at any one time.

Goal 5. *Hunters and anglers will enjoy and support programs designed to provide high quality hunting and fishing experiences.*

Background

The Improvement Act identifies six priority public uses for refuges: hunting, fishing, wildlife observations, photography, environmental education and interpretation. Hunting and interpretation have regionally been identified as the top two priority Areas of Emphasis at the Refuge. These two activities will be given highest priority to ensure wise use of staff and funding resources and enable the Refuge to provide fewer, but higher quality, visitor opportunities. Iroquois NWR is popular among all hunting groups, but most notably deer and waterfowl hunters. The Refuge is becoming increasingly popular for these hunting activities and we are experiencing greater law enforcement challenges such as illegal deer stands, access into closed areas, littering, conflicts among user groups, and failure to abide by permit regulations.

We develop our wildlife-dependent recreation programs, including hunting, in consultation with state fish and wildlife agencies and stakeholders. Refuge recreation programs must

- promote safety of participants, other visitors and facilities;
- promote compliance with applicable laws and regulations and responsible behavior;
- minimize or eliminate conflict with fish and wildlife population or habitat goals or objectives in an approved plan;
- minimize or eliminate conflicts with other compatible wildlife-dependent recreation;
- minimize conflicts with neighboring landowners;
- promote accessibility and availability to a broad spectrum of the public;
- promote resource stewardship and conservation;
- promote public understanding and increase public appreciation of America's natural resources and our role in managing and conserving these resources;
- provide reliable/reasonable opportunities to experience wildlife;
- use facilities that are accessible to people and blend into the natural setting; and
- use visitor satisfaction to help define and evaluate programs.

Objective 5.1 Hunting

Allow access for hunting of small game, deer, turkey, waterfowl and other migratory birds in accordance with New York State regulations and consistent with sound biological principles to provide participants with reasonable harvest opportunities, uncrowded conditions and minimal conflicts with other users.

Rationale - Hunting is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. Hunting is a popular and traditional activity in the area and a management tool to keep wildlife populations at healthy numbers to maintain healthy habitats. When managed appropriately, hunting can instill a unique understanding and appreciation of wildlife, their behavior, and their habitat needs.

According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation approximately 566,000 residents and non-residents participated in hunting in New York in 2006. That group spent more than $715 million on activities and equipment related to hunting (USFWS 2006b).

Current hunting activities and methods permitted on the Refuge were established in the Refuge Hunting Plan. This plan was approved in the mid-1980's and has had few modifications. In 2008 the Refuge received approximately six visits for migratory bird hunting (non waterfowl), 432 visits for waterfowl

hunting, 453 for upland game, 4,498 for deer hunting and 158 for turkey hunting. The Refuge provides information regarding annual hunt programs through Refuge brochures, hunting maps, fact sheets and websites.

Providing a high-quality hunt on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for the Refuge hunt program include the following:

- Manage wildlife populations consistent with the Refuge System, specific management plans approved after 1997, to the extent practicable, state fish and wildlife conservation plans.
- Promote visitor understanding of, and increase visitor appreciation for, America's natural resources.
- Provide opportunities for quality recreation and interpretive experiences consistent with criteria describing quality found in 605 FW 1.6 (*Service Manual*).
- Encourage participation in hunting to help preserve it as a tradition deeply rooted in America's natural heritage and conservation history.
- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreational activities.

The Refuge is open to hunting during most New York State hunting seasons and in accordance with New York State Hunting laws and Refuge specific regulations. All hunting requires a Refuge permit. Except for the spring turkey season which is open during the month of May, hunting is restricted on the Refuge from March 1 through September 30. The Refuge is closed to turkey hunting in the fall. Waterfowl hunting ends after the first split or when the regular (gun) deer season begins, whichever comes first. Waterfowl hunting is only allowed on Tuesdays, Thursdays and Saturdays from New York State opening day for the Western Region until the Thursday preceding the New York State opening of deer firearms season. Hunting hours are from legal start time until noon. All hunters must check out no later than 1:00 p.m. Night hunting is not permitted on the Refuge.

Maps 2-5 and 2-6 illustrate designated and restricted hunting areas for waterfowl and other migratory bird hunting (Map 2-5) and big and small game (Map 2-6).

As part of the Refuge's commitment to young hunters, we accommodate two youth orientation programs and two youth-only hunt days each year. Youth orientation programs are followed by a single youth-only hunt day the first Sunday of the spring turkey season and the first Sunday of the waterfowl season. These youth events are coordinated with the National Wild Turkey Federation and Lake Plains Waterfowl Association and are limited to 25 junior hunters.

Strategies – Deer Hunting:

- Continue to provide deer hunting via archery, regular firearms and muzzleloader.
- Continue to close Onondaga Nature Trail to all uses except hunting during the regular (shotgun) deer season.
- Continue to provide two locations for deer hunters with disabilities.

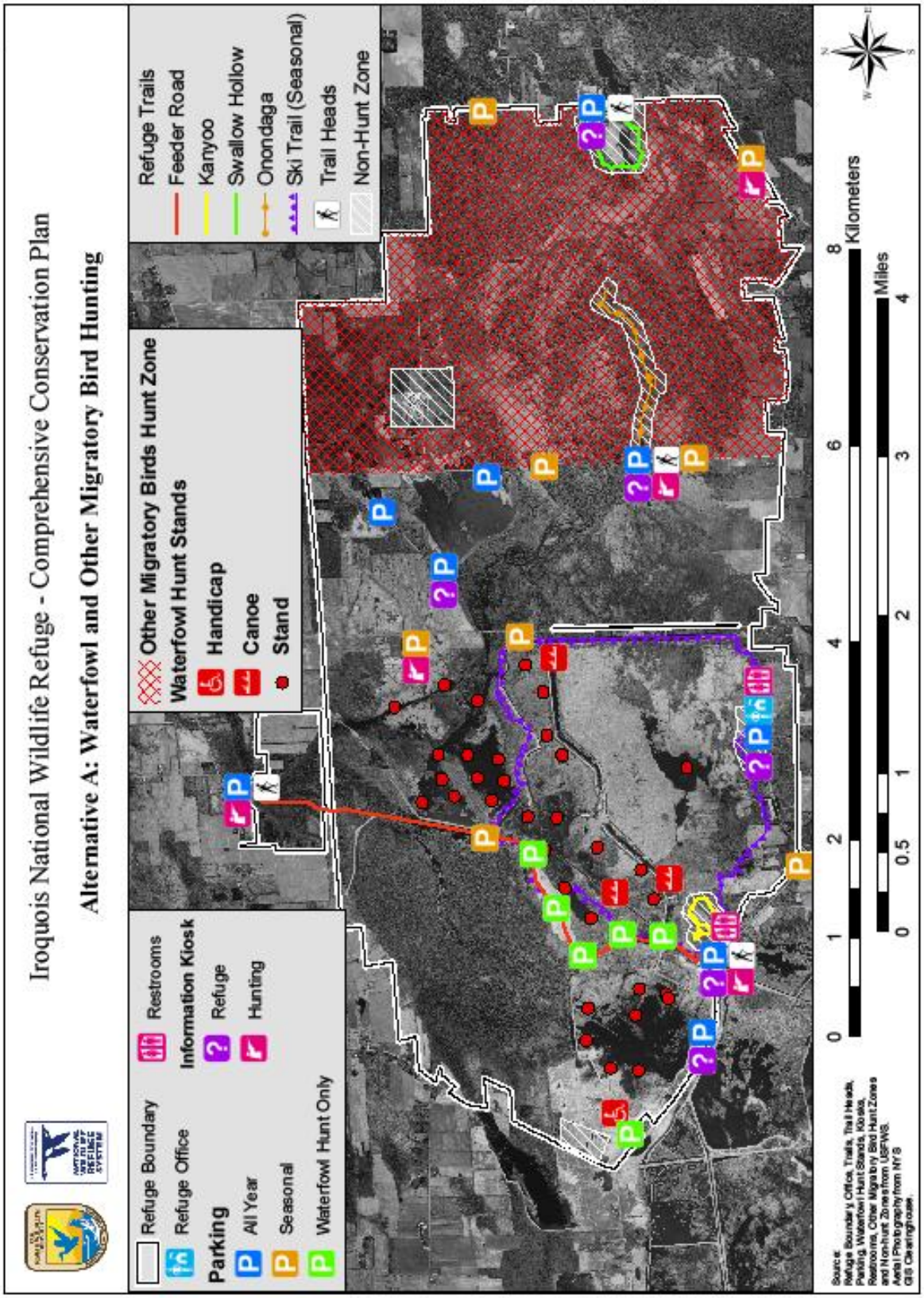
Strategies – Turkey Hunting:

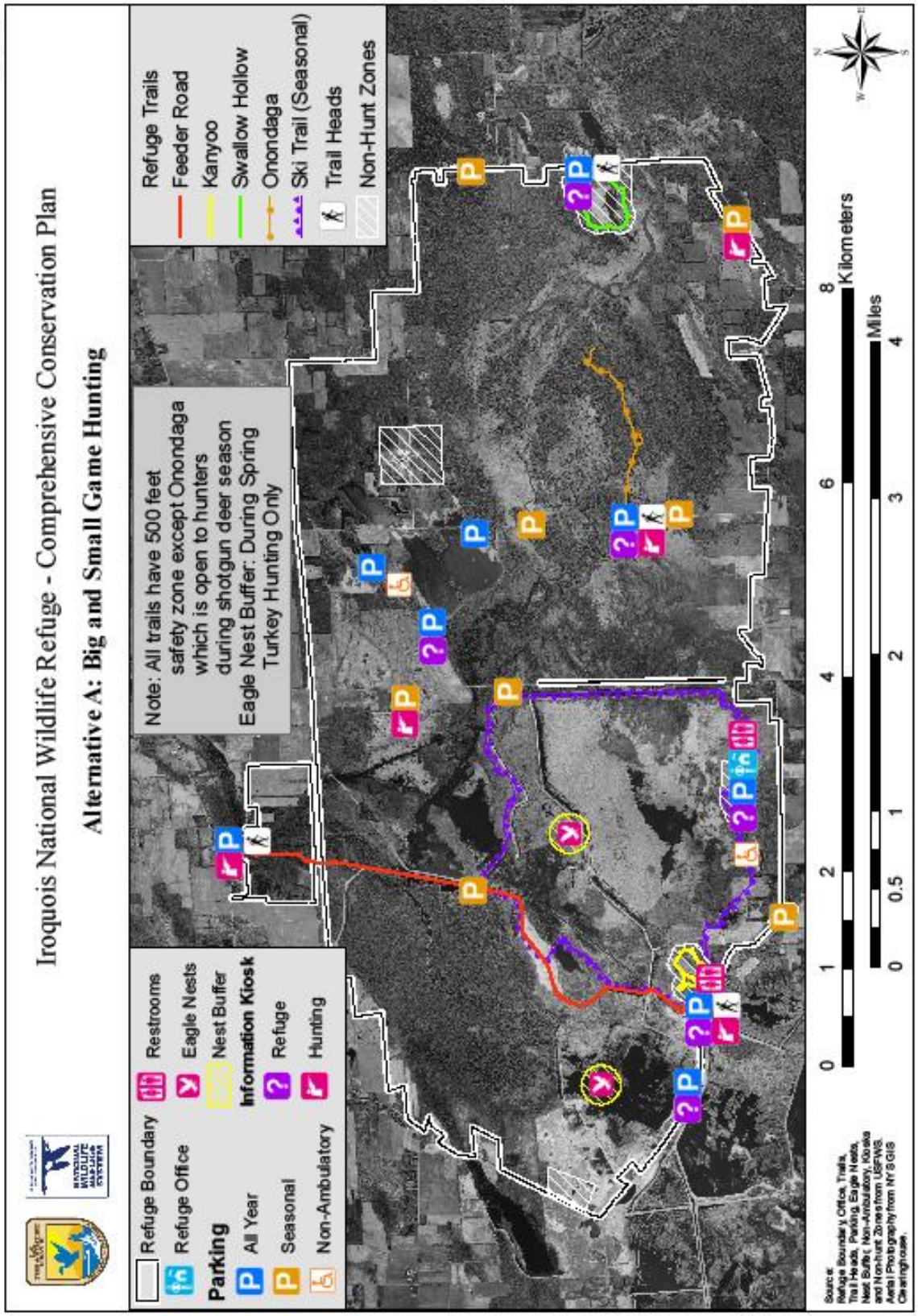
- Continue to allow spring turkey hunting and issue up to 50 permits via a pre-season lottery draw.
- Continue to collect a $5 application fee for the spring turkey hunt.

- Continue to provide a youth only orientation and hunt in cooperation with the local chapter of the National Wild Turkey Federation on the first Sunday of May.

USFWS

Wild Turkey


Map 2-5
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative A: Waterfowl and Other Migratory Bird Hunting
Refuge Boundary
Refuge Office
Restrooms
Information Kiosk
Parking
Refuge
All Year
Hunting
Seasonal
Waterfowl Hunt Only
Other Migratory Birds Hunt Zone
Waterfowl Hunt Stands
Handicap
Canoe
Stand
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Ski Trail (Seasonal)
Trail Heads
Non-Hunt Zone
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Source:
Refuge Boundary, Office, Trails, Trail Heads, Parking, Waterfowl Hunt Stands, Kiosks, Restrooms, Other Migratory Bird Hunt Zones and Non-Hunt Zones from USFWS.
Aerial Photography from NYS GIS Clearinghouse.


Map 2-6
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative A: Big and Small Game Hunting
Refuge Boundary
Refuge Office
Parking
All Year
Seasonal
Non-Ambulatory
Restrooms
Eagle Nests
Nest Buffer
Information Kiosk
Refuge
Hunting
Note: All trails have 500 feet safety zone except Onondaga which is open to hunters during shotgun deer season
Eagle Nest Buffer: During Spring Turkey Hunting Only
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Ski Trail (Seasonal)
Trail Heads
Non-Hunt Zones
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
N
W
E
S

Strategies – Waterfowl Hunting:

- Continue to host waterfowl identification courses in cooperation with the NYSDEC and the Finger Lakes and Western New York Waterfowl Association.
- Continue to issue permits for opening day and/or the first two Saturdays of waterfowl season through a pre-season lottery draw.
- Continue to permit waterfowl hunting from designated stands in Cayuga, Oneida and Mohawk Pools, and Sutton's Marsh.
- Continue to allow waterfowl hunting on Tuesdays, Thursdays and Saturdays until noon. From New York State opening day until the Thursday preceding opening day of deer firearm season.
- Continue to allow up to three hunters per permit and charge $5.00 for permits on Tuesdays and Thursdays and $10.00 on Saturdays.
- Continue to provide a 50% discount on permit fees for Golden Age and America the Beautiful – Interagency Senior Pass Holders.
- Continue to provide one hunt stand for hunters with disabilities.
- Continue to host the Young Waterfowler's Program with a youth only hunt day on the first Sunday in the season.

Strategies - Other Migratory Bird Hunting:

- Continue to allow rail, snipe, and woodcock hunting on the Refuge east of Sour Springs Road with no associated fees.

Strategies – Small/Upland Game:

- Continue to upland game hunting with no associated fees.

Objective 5.2 Fishing

Provide opportunities for fishing on the Refuge in a manner that minimizes conflicts between fishing and biological resources, particularly nesting birds and provide participants with reasonable harvest opportunities, uncrowded conditions and minimal conflict with other users.

Rationale - Fishing is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on Refuges. Fishing, which includes frogging, is a popular and traditional activity in the area. Fishing will be permitted in accordance with federal and state regulations. The Refuge received 1,073 visits in 2008 for recreational fishing.

According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation approximately 741,000 residents and non-residents participated in fishing in New York during 2006. Approximately 247,000 more anglers fished in the Great Lakes. Anglers spent more than $925 million on activities and equipment related to fishing during 2006 (USFWS 2006b).

Providing high-quality fishing opportunities on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for our fishing program include the following:

- Maximize safety for anglers and other visitors.
- Cause no adverse impact on populations of resident or migratory species, native species, threatened and endangered species, or habitat.

- Encourage the highest standards of ethical behavior in regard to catching, attempting to catch, and releasing fish.
- Provides opportunities to a broad spectrum of the public that visits, or potentially would visit, the Refuge.
- Provide reasonable accommodations for individuals with disabilities to participate in Refuge fishing activities.
- Reflect positively on the Refuge System.
- Provide uncrowded conditions.
- Create minimal conflict with other priority, wildlife-dependent recreational uses or Refuge operations.
- Provide reasonable challenges and harvest opportunities.
- Increase visitor understanding and appreciation for the fishery resource.

Fishing is permitted year-round from sunrise to sunset in Ringneck Marsh and Oak Orchard Creek year-round. Fishing in Oak Orchard Creek is permitted from the bank at Route 63, Sour Springs Road and Knowlesville Road, or by non-motorized boat between Route 63 and Knowlesville Road (Map 2-7).

Strategies:

- Continue to allow access for fishing in accordance with New York State regulations in designated areas providing participants with reasonable harvest opportunities, uncrowded conditions and minimal conflicts with other users.
- Continue to have fishing areas in Ringneck Marsh and Oak Orchard Creek open year-round.
- Continue to allow fishing from sunrise to sunset.
- Continue to permit frogging using a spear, club, hand or hook under state fishing regulations.
- Continue to host the youth fishing derby on the first Saturday in June as part of National Fishing and Boating Week.

Goal 6. Enhance partnerships with local communities and various organizations to garner support and promote Refuge programs and resources.

Objective 6.1 Landscape-scale Conservation

Enhance the conservation and management of fish and wildlife resources in Western New York through partnerships with public and private conservation groups, private landowners, state and local entities including Oak Orchard Watershed Protection Alliance, NYSDEC and other USFWS offices.

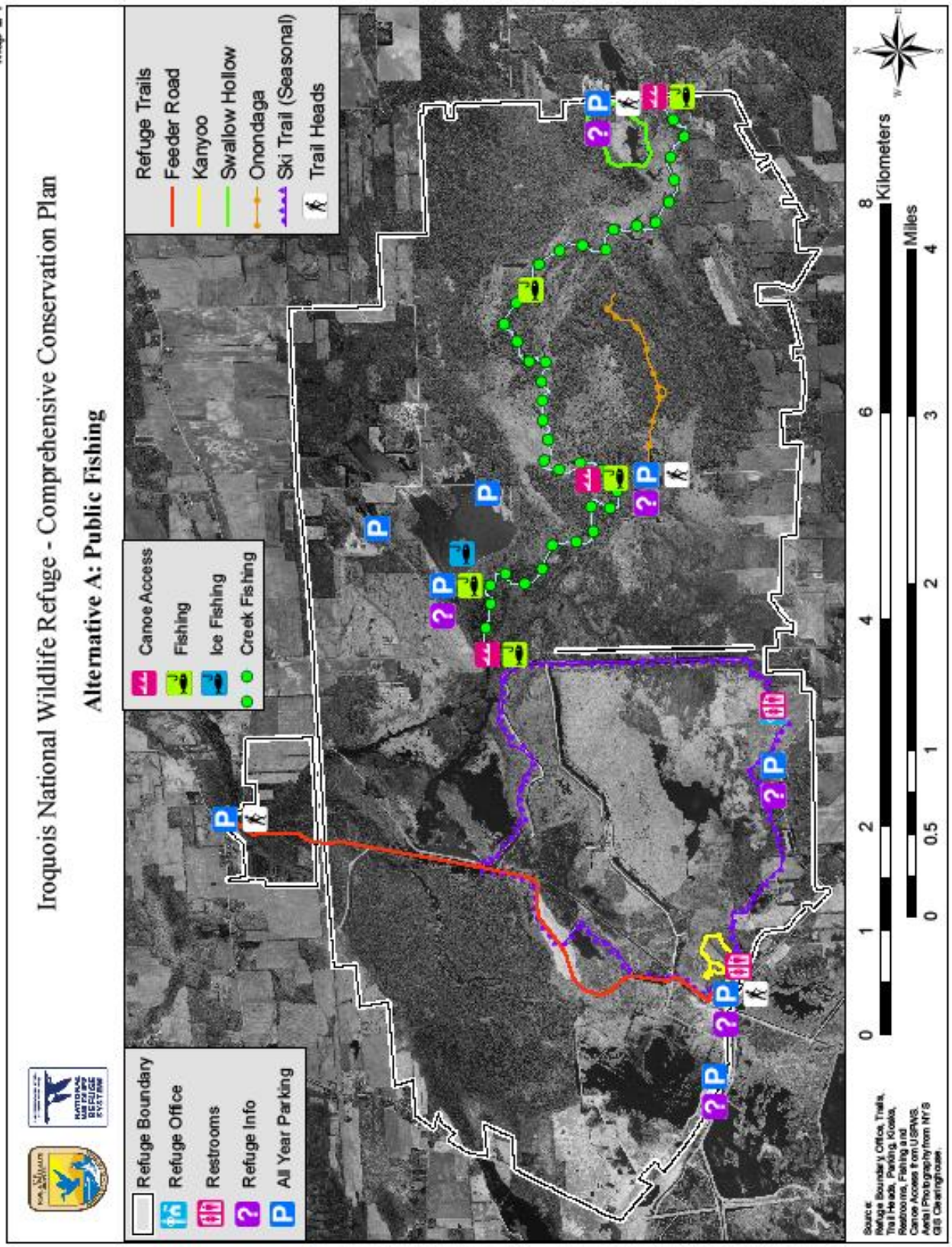
Rationale - The Refuge has benefited from existing partnerships in a variety of ways. These include: sharing of technical expertise to support wildlife and public resources; collaborative land conservation planning to ensure that important wildlife habitat is conserved throughout western New York; and cooperative outreach and enforcement of Refuge regulations. We conduct biological and environmental research and monitoring through partnerships with colleges, local schools, Ducks Unlimited (DU), other NGO's, and NYSDEC.

The Refuge and the NYSDEC have been in partnership for management of the Iroquois Wetland Complex which includes Iroquois NWR, Oak Orchard State Wildlife Management Area (WMA) and Tonawanda State WMA since the Refuge was established. The Refuge and the NYSDEC work together to manage the wetlands and other habitats and cooperate on shared projects and activities. In addition, NYSDEC Environmental Conservation Officers provide law enforcement coverage on the Refuge and NYSDEC trains and provides instructors for the waterfowl identification classes held at Iroquois NWR.

USFWS

Red Fox

Map 2-7


Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative A: Public Fishing
Refuge Boundary
Refuge Office
Restrooms
Refuge Info
All Year Parking
Canoe Access
Fishing
Ice Fishing
Creek Fishing
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Ski Trail (Seasonal)
Trail Heads
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
N
Source:
Refuge Boundary, Office, Trails, Trail Heads, Parking, Kiosks, Restrooms, Fishing and Canoe Access from USFWS.
Aerial Photography from NYS GIS Clearinghouse.

The Refuge is a partner in the Oak Orchard Watershed Protection alliance which was established to guide the development of the State of the Basin Report for the Oak Orchard Watershed. The State of the Basin Report is the first step in the development of a comprehensive watershed management plan. The Orleans and Genesee County Soil and Water Conservation Districts sponsor this watershed planning effort. Iroquois NWR lies entirely within the Oak Orchard Watershed and is participating in this planning initiative. The lack of Refuge staffing and funding is a limiting factor in the development and growth of these types of partnerships and programs.

Additionally, the Refuge currently oversees 23 conservation easements on lands throughout western New York. These easements were transferred to the Refuge from the U.S. Department of Agriculture (USDA) through the Farm and Home Administration (FmHA) loans. Generally, these easements protect relatively small wetlands located on agricultural lands. The Refuge has neither visited nor catalogued the biological resources on the lands subject to these easements. There Refuge has therefore not examined the restoration and enhancement opportunities that may exist on these lands or determined compliance with easement terms.

Strategies:

- Continue to partner with the Oak Orchard Watershed Protection Alliance.
- Continue to partner with the USFWS Partners for Fish and Wildlife Program to provide technical assistance for habitat restoration projects in western New York.
- Continue to cooperate with the USFWS New York Field Office in Cortland, NY to manage trust resources on and off Refuge lands.
- Continue to work with the USFWS Lower Great Lakes Fisheries Resources Office on habitat restoration projects, fisheries inventory and outreach.
- Continue to partner with NYSDEC.

Objective 6.2 Support for Refuge Programs

Enhance Refuge programs and increase awareness and stewardship for the Refuge through support from partners that contribute to the Service mission, the Refuge purpose, and Refuge habitat, wildlife and recreation programs.

Rationale - Refuge staff and funds are limited. Without partners many of the Refuge programs would not be possible. Partners assist with public use, special events, outreach, biological and research activities.

The Friends of Iroquois NWR is a not-for-profit organization dedicated to increasing public awareness of Iroquois NWR and to helping the community understand the Refuge's mission and goals.

The Friends of Iroquois NWR has several priorities to achieve their mission:

- Conserve, protect and enhance fish and wildlife and their habitats for the continuing benefit of the American people.
- Support the stewardship of the National Wildlife Refuge System.
- Improve awareness, appreciation, conservation and responsible utilization of the Refuge.
- Provide assistance to Refuge programs by entering into agreements with the USFWS.
- Produce and make available to Refuge visitors, by sales or free distribution, suitable

  - interpretive and educational materials to increase the visitors' understanding of the Refuge, wildlife, and the environment, and
  - special materials, memorabilia and events that will enhance visitor enjoyment.
- Acquire materials, supplies, equipment and labor which may be retained by the Corporation, or donated to the service or Refuge to support operational, educational or maintenance projects.

The Friends of Iroquois NWR have secured funding from the Margaret L. Wendt Foundation, the National Fish and Wildlife Foundation Centennial Legacy Fund, the Wild Birds Unlimited Pathways to Nature Program, the USFWS, the Iroquois Job Corp, and Friends of Iroquois NWR members. The Friends of Iroquois NWR are able to raise funds to be allocated for specific, much-needed projects on the Refuge. Some projects and activities are: the Youth Fishing Derby and the Spring Into Nature Celebration, purchase of camera equipment for live views of the eagle and kestrel nests, rehabilitation of Swallow Hollow Nature Trail, purchase of trail benches, support for outreach and educational programs such as the Canisius Ambassadors in Conservation program, and the purchase and installation of a water control structure.

The Refuge is fortunate to have a dedicated group of individuals who voluntarily assist the Refuge in various ways. Thirty volunteers contributed over 5,000 hours in 2007 and 86 volunteers provided over 7,000 hours of volunteer time to Refuge activities in 2008 (Table 3-23). These volunteers assisted with environmental education programs and outreach events, conducted wildlife and habitat surveys, provided visitor services, banded birds, managed habitats and species, and carried out general maintenance tasks. In addition to helping the Refuge achieve its objectives and strategies, this group of volunteers serves as an important link with the community at large, promoting refuge messages and garnering support for the Refuge System.

Iroquois Job Corps Center has contributed significantly to projects and events on the Refuge. Carpentry students helped rebuild the 250-foot boardwalk on Kanyoo Nature Trail, participated in the rebuilding of Swallow Hollow Nature Trail, including 2,000 feet of boardwalk, and put a new roof and siding on Building 17 (a storage building located at Refuge Headquarters). These activities saved the Refuge more than $75,000. Students from Iroquois Job Corps Center have also assisted with the Refuge Spring into Nature Celebration helping visitors build bird houses, paint bird silhouettes and conduct face painting.

The Refuge works with many non-profit organizations to help facilitate Refuge programs to meet the demand of the public, to utilize their expertise, or to complete projects that would otherwise be delayed. Examples include with the Young Waterfowler's Orientation, the NYS Waterfowl Identification Course, and the waterfowl hunt program and summer internships.

Strategies:

- Continue to work with Friends of Iroquois NWR to promote Refuge programs and act as a local grassroots organization.
- Continue the Refuge Volunteer Program to assist with completion of Refuge projects.
- Continue to partner with the Iroquois Job Corps Center.
- Continue to partner with other non-profit organizations like Buffalo Audubon Society, Western New York and Finger Lakes Waterfowl Association, Lake Plains Waterfowl Association, Canisius College, and University of Buffalo.

Objective 6.3 Research
Conduct research activities using non-Service personnel from colleges, universities, federal, state, and local agencies, non-governmental organizations, and qualified members of the public to enhance our understanding of species requirements, habitat changes and effectiveness of management techniques.

Rationale – Some research activities on the Refuge are currently conducted by non-Service personnel including colleges, universities, federal, state, and local agencies, non-governmental organizations, and qualified members of the public. Such research furthers our understanding of the natural environment and improves the management of the Refuge's natural resources. The information research generates applies to management on and near the Refuge. Past research projects have studied species including neotropical migrants, marsh birds, and waterfowl. Habitat management techniques like mowing and prescribed fire have been examined to determine their effects on flora and fauna. Other projects have been broader in scale such as the surface-water/ground-water interaction study being conducted by USGS to understand how water flows through the entire Refuge.

The Service encourages and supports research and management studies on Refuge lands that will improve our understanding of and strengthen decisions on managing natural resources. The Refuge Manager encourages and seeks research that clearly relates to approved Refuge objectives, improves habitat management, and promotes adaptive management. Priority research addresses information on better managing the Nation's biological resources that generally are important to agencies of the Department of Interior, the National Wildlife Refuge System, and State Fish and Wildlife Agencies, which address important management issues, or demonstrate techniques for managing species or habitats.

We also consider research for other purposes that may not relate directly to Refuge-specific objectives, but contribute to the broader enhancement, protection, use, preservation or management of native populations of fish, wildlife and plants, and their natural diversity in the region or the Atlantic Flyway. All proposals must comply with Service policy on compatibility.

Strategies:

- Continue to encourage local college research projects on the Refuge to further obtain information regarding the success of management strategies.
- Continue to work with state and other federal agencies on research projects conducted on the Refuge.

Alternative B - Proposed Action

Introduction

The wetlands of Iroquois NWR support thousands of waterfowl during spring and fall migration, provide habitat for two pairs of nesting bald eagles, a heron rookery, and for many bird species of special concern in the State of New York including the black tern. Additionally, the Refuge's forested wetlands support many songbirds of conservation concern as well. The myriad wildlife values prompted Iroquois NWR to be identified as one of New York's first Important Bird Areas (IBA).

National Wildlife Refuges are important for both rare and common species and generally provide habitat for high concentrations of birds. This underscores the role of refuges to provide places where wildlife comes first (NWRSIA 1997). National Wildlife Refuges are also models and demonstration areas for habitat management. To succeed in that mission, refuges need to engage the public in understanding and participating in the stewardship of refuge resources. Hunting, fishing, trapping, and wildlife viewing have long traditions in western New York, including in and around Iroquois NWR. To ensure conservation and management of the resources entrusted to its care, the Refuge needs to capture the interest and good will of traditional users and new visitors. With enhanced public outreach interpretation, environmental education, and well-managed public use opportunities, traditional users and new visitors may become partners.

A refuge does not exist in isolation from its surrounding landscape. That is particularly true of the Iroquois NWR, located within the "Alabama Swamps" and in the heart of the Oak Orchard Watershed. Habitats and wildlife populations are affected by land uses within the watershed including the effects of water quantity and water quality. The Refuge needs to expand its work with adjacent landowners, watershed residents and conservation partners within the basin to ensure a healthy, functioning Refuge.

We believe Alternative B provides the best approach to meet Refuge challenges and opportunities. This alternative will result in an understanding of the Refuge resources used by threatened or endangered species, migratory birds, and resident wildlife; the protection and enhancement of those resources; the protection of water quality; the restoration of Refuge habitats; and the accessibility of the Refuge to the public for compatible, wildlife-dependent public uses. The result is a set of goals, objectives and strategies related to key issues that will guide management of the Refuge for the next 15 years. Students, interns, and volunteers, including Friends of Iroquois NWR, are valuable partners in helping the Refuge achieve the objectives set out in Alternative B.

Habitat Conditions

Under Alternative B, some Refuge habitat conditions will change in response to management decisions that focus on decreasing habitat fragmentation and restoring native habitats (Table 2-2 and Map 2-8). Management of Refuge impoundments will not change in respect to current management activities described in Alternative A. Therefore, there will be no expected changes in the amount of open water and emergent marsh available to wildlife under Alternative B. Early successional habitat including grasslands and shrublands will increase slightly compared to Alternative A as the Refuge removes remaining hedgerows and improves connectivity between these habitats. Forest acres will increase more than any other habitat under this alternative in response to the removal of 202 acres of non-native conifer plantations. Plantations will be replaced with native forest species best suited for individual sites. Some plantations that are in shrubland management areas will be converted to native shrub species as well.

Table 2-2 Alternative B Habitat Acres

Habitat Acres by Alternative and Difference from Alt. A			
Habitat	**Alternative A**	**Alternative B**	**Difference (Alt B – Alt A)**
Open Water	823	823	0.00
Emergent Marsh	2,581	2,581	0.00
Grassland	1,048	1,073	25
Shrubland	526	539	13
Forest	5,402	5,570	168
Conifer Plantation	200	0.00	-200
Developed	248	242	-6
Total	**10,828**	**10,828**	

Restrict Public Access to Designated Areas

Visitors are currently required to stay on designated trails from March 1 through July 14. This limits disturbance to spring migration, nesting and brood rearing seasons. People are currently allowed to wander unrestricted from July 15 through the end of February. We have seen an increase in the number of visitors accessing off-trail areas of the Refuge, particularly in the fall. Additionally, visitors are increasingly accessing wetland areas which in the past were left relatively undisturbed.

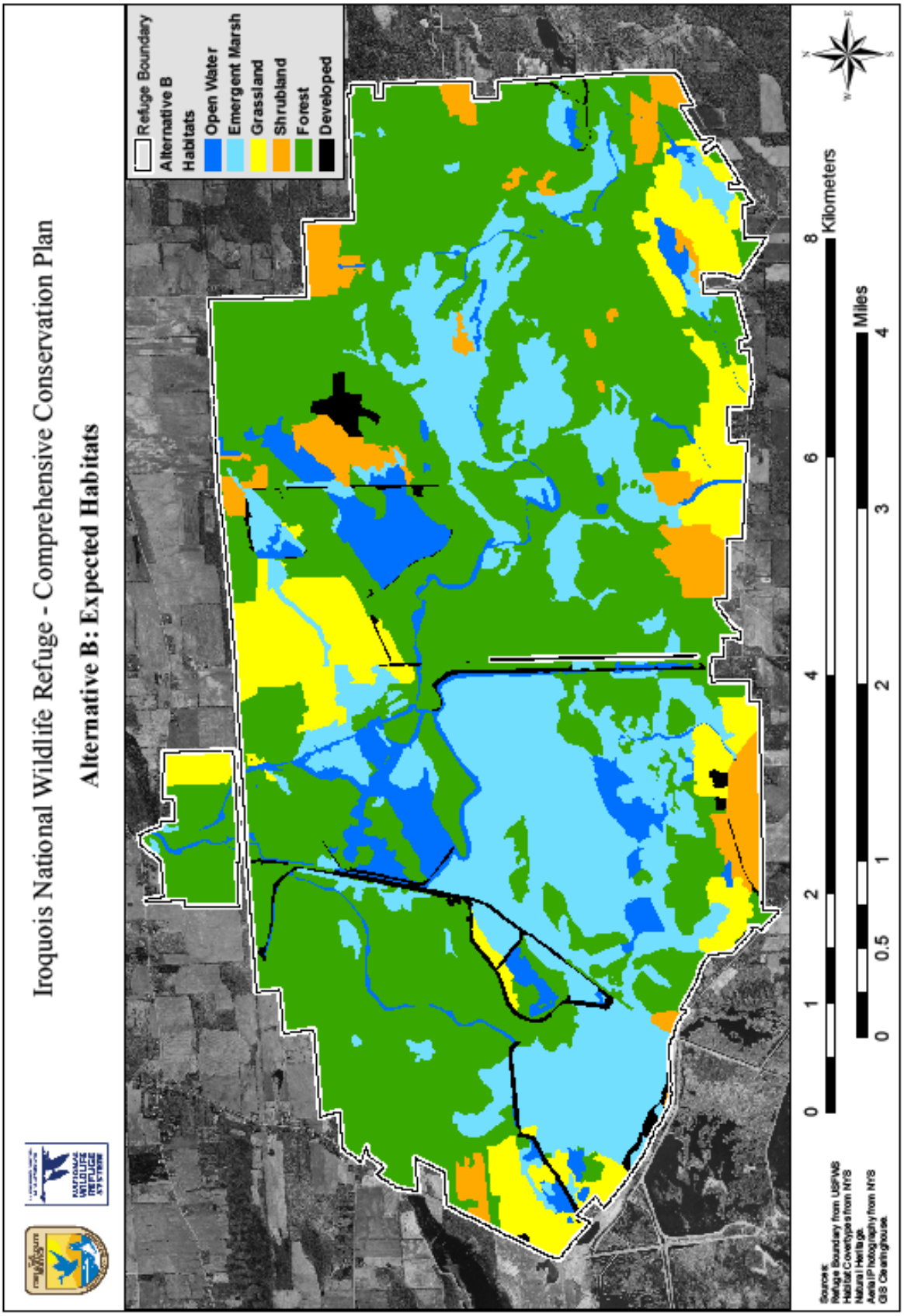
Under Alternative B, we propose to follow the lead of most other National Wildlife Refuges and restrict public access to designated areas of the Refuge year-round. The Refuge would allow wildlife observation/hiking/walking/etc. on established Refuge nature trails. Access to other parts of the Refuge would be restricted to hunters permitted under Refuge hunting programs. Parameters to accommodate scouting would be set as needed. Closing the Refuge to unrestricted wandering would eliminate human disturbance in Refuge impoundments when waterfowl and other migrating birds are using these wetlands to rest and feed. The Refuge is a significant migration stopover area for waterfowl and ongoing disturbance in impoundments directly impacts our ability to meet our wetland habitat objectives and adds to the cumulative impact of our waterfowl hunting program**.**

Refuge Activity, Hunting and Special Use Fees

Refuge lands offer many recreational opportunities. However, the costs to maintain those activities continue to increase while revenues continue to decline. Maintaining gravel roads and other facilities and structures requires increasing staff time and financial resources. To help offset the increasing administrative costs associated with managing and overseeing recreational uses, this alternative proposes to continue collecting fees associated with hunting activities and special use permits. In addition, we propose to modify hunting fee program. Eighty percent of revenues generated by the collection of fees for Refuge programs will be retained to enhance visitor services and maintain recreation facilities at Iroquois NWR. We use the remaining 20 percent in the Northeast Region for region-wide projects to improve and maintain visitor services, address visitor and staff health and safety, and pay for overhead associated with the recreation fee program and the Service in general.

The Refuge will implement a permit system where a general permit will be available for hunting upland game, other migratory birds, and big game hunting. A $5.00 application fee will be charged for all controlled hunts that involve a lottery system which includes the spring turkey hunt and waterfowl hunting. The Refuge will also investigate the effectiveness of conducting a lottery draw for high use days during the deer firearm season.

Golden Age Passport holders, Golden Access Passport, and certain America the Beautiful Interagency Senior Pass Holders will still be entitled to half-price hunting fees under Alternative B. The Refuge will continue to collect special use permit fees for haying, an activity that supports management of our grasslands. Currently, these permits are based on a minimum bid system that depends on how many acres


Map 2-8
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative B: Expected Habitats
Refuge Boundary
Alternative B
Habitats
Open Water
Emergent Marsh
Grassland
Shrubland
Forest
Developed
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Sources:
Refuge Boundary from USFWS
Habitat Covertypes from NYS
Natural Heritage
Aerial Photography from NYS
GIS Clearinghouse.

are available for haying. We may add or adjust activity, hunting, and special use permit fees over the 15-year period of this plan to reflect changes in administrative costs, management goals, or policy.

Fees will not be charged for certain programs including Refuge Youth Hunt Programs, special events like Spring into Nature and the Fishing Derby, and interpretive programs conducted by the Iroquois Observations (IO) program and Refuge staff.

In addition to the fee program mentioned above, we anticipate that the Friends of Iroquois NWR will continue to support the Refuge using a portion of the funds received from membership dues, the Flyway Nature Store, fund raising activities and grants. Visitors will be encouraged to make voluntary contributions at collection boxes at the visitor contact station and to Friends of Iroquois NWR to support special events.

Renovate Refuge Visitor Contact Station and Administration Building

The visitor contact station, located within the Refuge office building has exhibits and information about the Refuge including common wildlife species and wildlife dependant recreational opportunities. The 5,000 square foot visitor contact station and administration building currently houses six Refuge employees and two NYSDEC employees. The visitor contact station receives approximately 6,000 visits per year; most during the months of March, April and May. A 60-seat auditorium/multipurpose room serves as a meeting room and can accommodate school groups, civic groups and families for interpretive and environmental education programs. The Flyway Nature Store, operated by Friends of Iroquois NWR is also located within the visitor contact station.

Regional Director's Orders No. 06-02 established a system to co-locate Service offices that are in close proximity to each other. It is expected that co-location will provide improved service to customers and maximize efficiencies and cost savings, while at the same time enhancing coordination and cooperation among the various Services resource programs and administrative support functions. Co-location is a clear step to minimizing space and utility costs and increasing cross-program collaboration.

Under Alternative B we propose to colocate the Lower Great Lakes Fish and Wildlife Conservation Office currently located in Amherst, New York with a new visitor contact station and administration building at Iroquois NWR. The building will be developed in accordance with USFWS standard design facilities (Figure 2-1 and 2-2). The building will be approximately 10,609 square feet and include 5,484 square feet for administration and 5,125 square feet for the visitor contact area. The building will include a sales outlet for Friends of Iroquois NWR, exhibit hall, multi-purpose room, conference room and offices to house staff from Refuges, Fisheries, and NYSDEC.

The new building will be created by adding on to the existing building. The existing portion will be remodeled to serve as the visitor contact section of the new building. An architectural and engineering firm will be hired to develop a conceptual design that will blend the existing building in with the new, standard design. The new portion of the building will be placed in an area that has already been disturbed when the current building was built in the 1970's. As we move forward with the design of the building we will be looking at alternative energy sources to reduce consumption of petroleum products to heat buildings as well as electricity to power the building. We will investigate the possibility of geothermal heating, a wind (small single/double) turbine and solar energy.

Figure 2-1 Draft Conceptual Drawing of New Administrative Building

Figure 2-2 Draft Floor Plan for New Administrative Building Facilities

Refuge Goals, Objectives and Strategies

Strategies that apply to all goals in Alternative B:

Strategies have been developed to achieve objectives under each of the six Refuge goals. While most strategies are specific to each goal, a few apply to all goals in this alternative. These include:

- Continue to recruit, hire and train, students under the Student Career Experience Program and Student Temporary Employment Program to assist with all Refuge goals, programs, and operations.
- Continue to recruit and train interns and volunteers to assist with all Refuge goals, programs, and operations and provide housing where possible.
- Continue to encourage a broad-based Friends of Iroquois NWR group that supports Refuge goals, programs, and operations.
- Hire a permanent full-time Law Enforcement Officer (GS-0025-9) to provide visitor safety, protect resources, and ensure compliance with Refuge regulations.
- Hire a permanent full-time Maintenance Worker (WG-4749-8).
- Annually inspect approximately 20% of the Refuge boundary to ensure signs are visible, readable, have not been vandalized and are in good overall condition. Annually review that non-hunting areas are properly posted.
- Reach out to local communities and schools to build awareness, understanding, and support for Refuge biological and land protection programs and activities and demonstrate the role of Iroquois Refuge in the Refuge System.

Strategies that apply to all objectives under Goals 1, 2, 3:

- Continue to develop a comprehensive GIS database for the Refuge and the surrounding landscape to map and analyze habitat types and conditions, rare species populations, other ecological features, land use issues, and other relevant information for long-term planning and monitoring of resources.
- Continue to monitor and control non-native invasive species using a combination of mechanical, biological, and chemical techniques to restore native plant communities and healthy ecosystems; refine the protocol for prioritizing mapping, monitoring and control of invasive species to have the greatest impact on the highest priority habitat objectives.
- Within five years evaluate all data from baseline surveys of birds, amphibians, reptiles, mammals, plants, mussels and fish, and other species to identify additional baseline surveys needed to confirm presence/absence in respective habitat types and to address management questions.
- Continue current inventorying and monitoring protocols, which are listed under the strategy sections for each habitat objective. Within two years of the CCP's completion, develop more inventory and monitoring protocols as necessary based on recognized needs in the HMP and include in the IMP.
- Over a 15 year period, systematically remove the majority of artificial structures as appropriate. Wood duck nesting data should be evaluated to determine which boxes are not used and which

are used by undesirable species. These boxes should be removed sooner and the remainder phased out. Monitoring of wood duck boxes should be conducted by volunteers.

- Hire one permanent full-time Biological Technician (GS-7).
- Hire one permanent part-time Biological Technician (GS-5. 0.5 FTE).

GOAL 1. *Provide high quality freshwater wetland migration stopover and breeding habitat for waterfowl, marsh birds, shorebirds, and bald eagles in Refuge impoundments through water level control.*

Strategies that apply to all objectives under Goal 1:

- Remove and prevent mute swans from becoming established on or regular inhabitants of the refuge.
- Continue to allow management of marsh furbearers throughout the entire Refuge, with restrictions on muskrat trapping in marshes that have a large percentage of cattail coverage (Map 2-9).
- Continue to conduct furbearer management in marshes at the completion of the Refuge's waterfowl hunt season, by allowing up to 50 permits issued annually.
- Continue to charge $50.00 for the marsh furbearer management permit.
- Limit trappers to 25 traps each to reduce trapper competition while still maintaining furbearer populations at desired levels.
- Conduct annual counts of muskrat houses to ensure sustainable populations are retained for Refuge needs and base removal of animals on annual numbers. After annual evaluation, determine which marsh(s) to open and create zones according to impoundment boundaries.
- Complete bathymetry mapping of Refuge impoundments to better understand what the elevation changes are to ensure that the Refuge is achieving appropriate water depths to meet its objectives.

Background

Iroquois NWR lies within the Atlantic Coast Joint Venture (ACJV); one of the original joint ventures formed under the NAWMP. The ACJV initially focused on protecting and restoring habitat for the American black duck and other waterfowl species in the Atlantic Coast region of the United States. Much of its support is generated through grants provided by the North American Wetlands Conservation Act. While maintaining a strong focus on waterfowl, the ACJV mission has evolved to include the conservation of habitats for all birds. At the regional scale the ACJV is working on integrated planning efforts in eight BCRs. An important part of this planning effort is the development of Focus Area Plans. Focus Areas are discrete and distinguishable habitats or habitat complexes that are regionally important for one or more priority species during one or more life history stages. The Tonawanda-Iroquois-Oak Orchard Focus Area Plan (ACJV 1991) identified the rehabilitation of Mohawk and Oneida Pools on Iroquois NWR as a high priority project. The Service prepared an EA specifically for this project in 2002 (USFWS 2002). The initial phase of the project is complete; three new wetland sub-units in the Mohawk Pool provide significant improvement in wetland habitat.

Iroquois NWR lies within BCR 13, the Lower Great Lakes/St. Lawrence Plain (Map 1-5). BCR 13 encompasses the vast, low-lying lake plain region surrounding Lake Erie and Lake Ontario, the St. Lawrence River Valley, low-lying regions between the Adirondack Mountains and the Laurentian Highlands, and upper regions of the Hudson River Valley. In addition to providing important lakeshore

habitats and associated wetlands, this region was originally dominated by a mixture of oak-hickory, northern hardwood, and mixed-coniferous forests. Nearly 95% of the original habitat types have been lost and the landscape is now dominated by agriculture with interspersed wetlands and remnant forest stands. BCR 13 plays a critical role in providing important staging and migrating habitat for birds during the spring and fall migration (Hartley 2007).

Iroquois NWR is part of the 19,000-acre Tonawanda-Iroquois-Oak Orchard Wetland Complex. The creation of the Barge Canal System, beginning in the early 1800s, and the draining of wetlands for agriculture and other uses dramatically changed the hydrology of the "Alabama Swamps," as this area was known. The area continued to flood each spring creating thousands of acres of shallow wetlands, but the spring waters would recede quickly and only the lowest areas remained wet through the summer. Once the Refuge was established, farm ditches were plugged and several impoundments were created to allow managers to control water levels. Water level management provided wetland habitat throughout the year and restored variability to the hydrology of the region.

There are currently 19 wetland impoundments on the Refuge (Map 2-10), 15 of these are managed. These impoundments encompass nearly 4,000 acres of diverse wetland habitat. Because of the changes in topography within individual impoundments, often a single impoundment will help meet multiple objectives within the same year. Water levels are adjusted within and between years to mimic natural hydroperiods associated with unaltered wetlands and to provide the optimal habitat conditions for wetland dependent wildlife species.

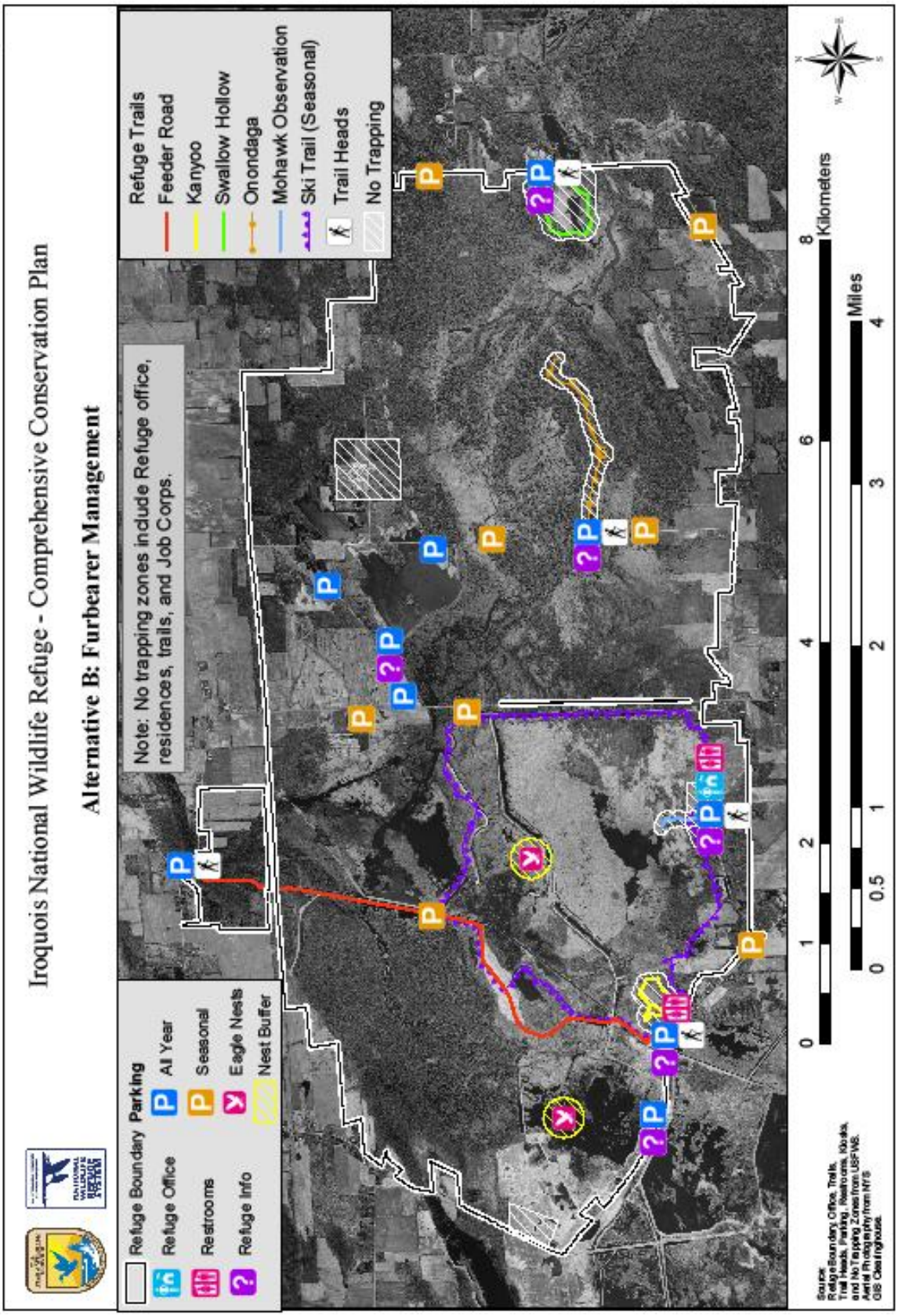
USFWS

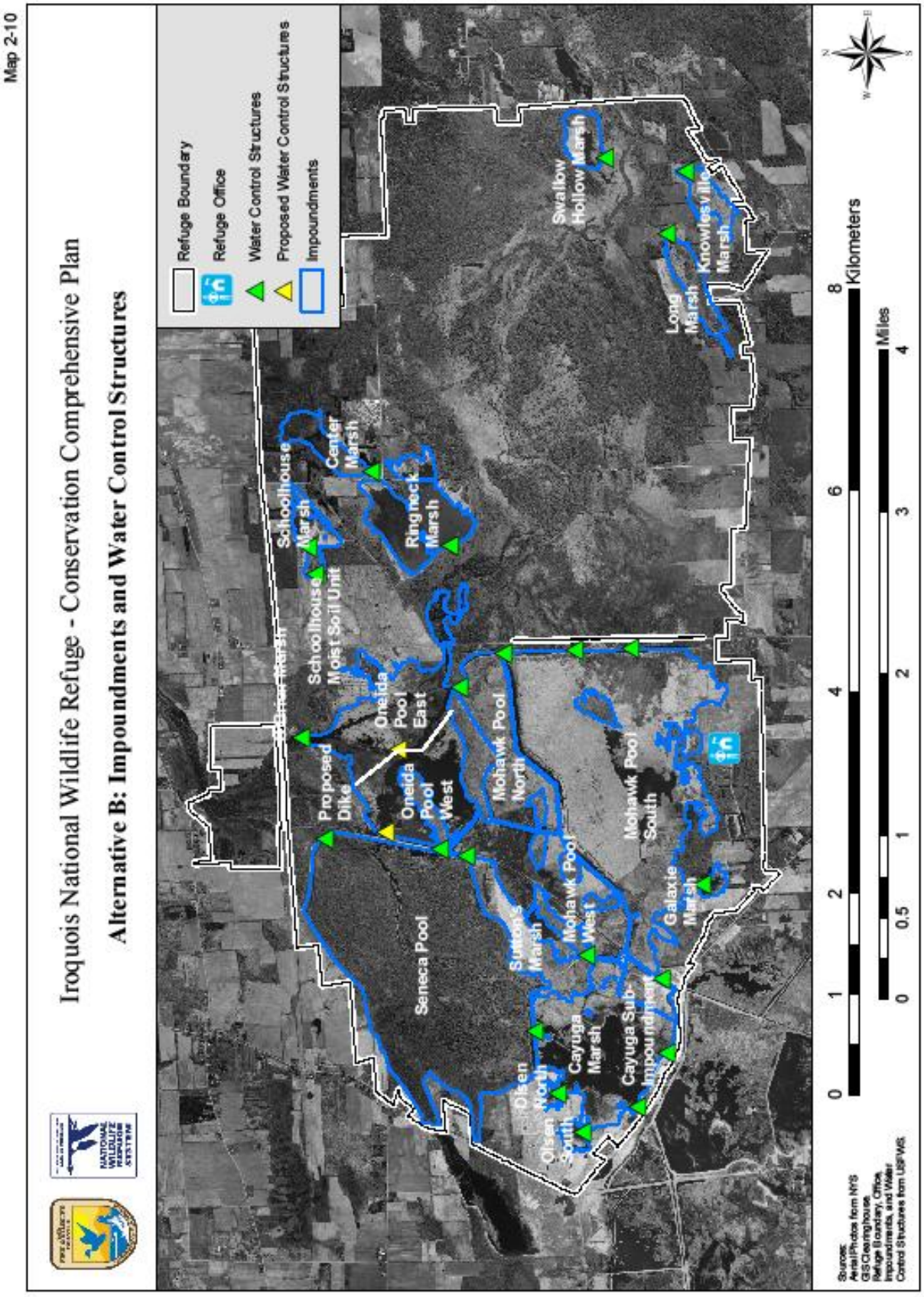
Eastern Box Turtle

Map 2-9

Iroquois National Wildlife Refuge - Comprehensive Conservation Plan

Alternative B: Furbearer Management




Map 2-10
Iroquois National Wildlife Refuge - Conservation Comprehensive Plan
Alternative B: Impoundments and Water Control Structures
Refuge Boundary
Refuge Office
Water Control Structures
Proposed Water Control Structures
Impoundments
Schoolhouse Marsh
Center Marsh
Ringneck Marsh
Schoolhouse Moist Soil Unit
Oneida Pool East
Proposed Dike
Oneida Pool West
Mohawk Pool North
Mohawk Pool South
Mohawk Pool West
Galaxie Marsh
Seneca Pool
Sunnies Marsh
Cayuga Marsh
Cayuga Sub-Impoundment
Olsen North
Olsen South
Swallow Hollow Marsh
Long Marsh
Knowlesville Marsh
Kilometers
Miles
Sources:
Aerial Photos from NYS GIS Clearinghouse
Refuge Boundary, Office, Impoundments, and Water Control Structures from USFWS

Each impoundment is drawn down approximately every three to six years; a few impoundments are scheduled for drawdown every year. These drawdowns mimic a drought in a natural marsh and allow the re-growth of natural vegetation in a "drawdown cycle". In the first year of the cycle, water is drained from the impoundment after the peak of waterfowl migration (early spring). The relatively cool soils in April and May favor the germination of annual moist soil plants such as sedges, smartweed and wild millet. The seeds of these plants provide waterfowl food when the impoundment is re-flooded in the fall. Organic material comprised of dead marsh vegetation accumulating over several years is exposed to oxygen during the drawdown and thus oxidizes (breaks down) and becomes nutrients for the growth of new marsh plants. As more of the water evaporates the bottom "firms up" and provides a rich bed for the new plant roots. Some perennials, such as cattail and bur-reed, germinate and grow. These plants usually will remain in the understory beneath the annual plant species. These perennials play an important role in future years of the cycle. If the water is drained off later in the year when the soil is warmer (June to August) it is likely that purple loosestrife will germinate. Purple loosestrife has become less of a problem due to expanding populations of *Galerucella* beetles, but the Refuge still tries to keep loosestrife germination to a minimum.

The second year of the cycle is a year of growth and re-colonization. Residual seeds from the annuals provide a rich carbohydrate food source for the northward migrating waterfowl in the spring. The dead and partially decomposing stalks of the first year plants become a food source for many kinds of invertebrates. Invertebrates provide a critical protein source for migrating birds, particularly female ducks that will soon lay eggs. The cattails and bur-reed grow vigorously in the second year and the impoundment quickly becomes colonized by muskrats which utilize the perennials as both a food source and a material for construction of their houses. Habitat cover provided by perennial vegetation interspersed with new open water areas created by increased muskrat activity provides ideal conditions for waterfowl broods and migrating waterfowl.

In subsequent years of the cycle the interspersion of small, irregular open water areas becomes greater as the perennials are used by muskrats and are stressed by higher, more constant water levels. Greater interspersion of open water results in habitat conditions suitable to marsh-nesting birds. Initially, the dense vegetation is ideal for rails. As it becomes more open, it becomes ideal for least bitterns and as the impoundment continues to open, black terns may begin to nest. The terns seem to favor old, sunken muskrat houses as nesting platforms. Eventually conditions become too open and the habitat value is greatly reduced for waterfowl and most marsh nesting species. The drawdown cycle starts over when Refuge managers determine that habitat value is relatively low. A typical cycle may last three to six years.

Furbearer management will be conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. (see Furbearer Management Compatibility Determination in Appendix B for more information on how program will be administered) By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions. Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.

Objective 1.1 Emergent Marsh – Migrating Waterfowl

Each year, provide a minimum of 800 acres of waterfowl stopover habitat in mid-March through early May (spring migration) and again in late September to early November (fall migration) consisting of shallow flooded wetlands (<18") dominated by annual moist soil vegetation such as sedges, Bidens *spp*., smartweed, and wild millet.

Rationale - Objective 1.1 will benefit many of the 20,000 ducks that pass through the Refuge during migration including several waterfowl species listed as priorities (highest, high, or medium) in the BCR 13 Plan: American black duck (highest), northern pintail (high), blue-winged teal (medium), and mallard (medium). The black duck, mallard, and northern pintail are species of management concern for the USFWS in the northeast region and are also listed in the New York Wildlife Action Plan (NYWAP) as species of greatest conservation concern. The New York Important Bird Area program listed a large concentration of migrating waterfowl as important criteria in designating Iroquois NWR as an IBA.

Fall migrant waterfowl require large amounts of carbohydrate rich foods to prepare them for their migration to the wintering grounds and also to replace the large amounts of energy needed to sustain them as cooler fall temperatures drain their energy reserves. Moist soil annual seeds produced as a result of wetland drawdowns provide a readily available source of carbohydrates. At Iroquois NWR, these drawdowns are conducted in the spring of the year to ensure the greatest amount of annual vegetation and highest species diversity will result. Most annual species need a minimum of 60 days growing period to produce seeds. Prior to fall migration, wetlands that have been drawn down are shallowly re-flooded in preparation for the arrival of fall migrant waterfowl. Water levels are kept to 18" or less as this depth has been found to provide the best foraging habitat for most waterfowl species. Waterfowl will forage on these areas until they leave to continue their fall migration or until ice conditions force them to move to open water elsewhere. In some cases, water is not available in the fall to allow flooding of drawn down wetlands. When this happens, these areas are shallowly re-flooded over the winter and early spring as melt waters become available. These shallow wetlands provide habitat for migrating waterfowl in the spring of the year.

Spring migrant waterfowl, particularly females, require large amounts of protein rich foods to prepare them for the remainder of their northward migration and to provide them with the nutrition necessary to successfully nest. Hens gather this protein by feeding heavily on aquatic invertebrates on the wintering grounds and on feeding areas along their migration corridors. Invertebrate populations thrive on the residual annual vegetation left over from the previous year's drawdown and invertebrates emerge as soon as temperatures rise enough to melt the ice. Additionally, seeds produced by these annual plants during the drawdown year are often still available the following spring to northward migrating waterfowl and provide a carbohydrate rich food source that supplements the protein being gathered while feeding on invertebrates.

Iroquois NWR is an important spring migratory stopover area for many species of waterfowl in the Atlantic Flyway as it contains a variety of wetland types and sizes. Active wetland management, including drawdowns and subsequent shallow flooding, allows the Refuge to provide the best possible migration habitat for spring migrant waterfowl. Wetlands that have undergone a drawdown in the

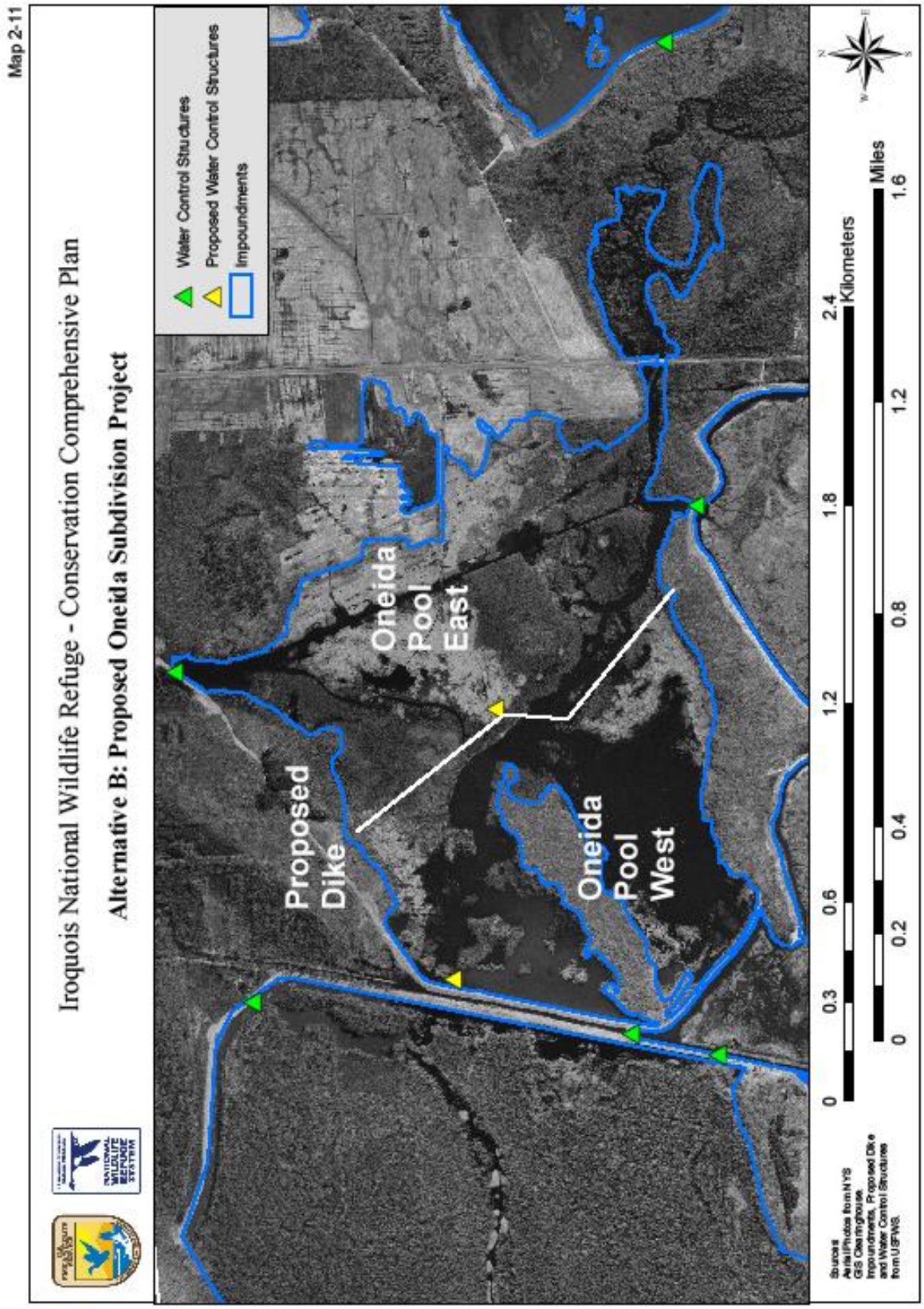
previous year and are shallowly flooded (<18") in the spring are of particular importance to waterfowl during spring migration.

The goal of the Refuge water management program is to provide high quality functioning wetlands that supply optimal stopover and breeding habitat for waterbirds and bald eagles. This program requires the manipulation of wetland water levels to provide high-energy plant and invertebrate foods and structural habitat diversity for feeding, resting, and breeding waterfowl and other migratory birds (USFWS 2005b). Waterfowl need appropriate nesting cover and substrate, as well as quality foraging areas.

Under Alternative B we will subdivide Oneida Pool into two smaller more manageable impoundments (Map 2-11) and also add an additional water control structure to increase the capacity to transfer water out of the impoundment during periods of high water. Oneida Pool is the second largest emergent marsh impoundment on the Refuge. This impoundment contains uneven topography resulting in both large areas of open water and large areas of dense, monotypic cattail (*Typha* spp.). Neither of these habitat types is desirable for Refuge objectives. We currently manage for lower water levels to reduce the areas of open water area but under the current conditions this also increases the area of dense, monotypic cattail. Managing water levels higher has the opposite effect. Neither management strategy provides overall improved wildlife habitat conditions. Over time, the areas of dense cattail are built up by sedimentation and decay of organic matter. This eutrophication further reduces the quality of the marsh for objective wildlife.

USFWS

Oneida Pool


Map 2-11
Iroquois National Wildlife Refuge - Conservation Comprehensive Plan
Alternative B: Proposed Oneida Subdivision Project
Water Control Structures
Proposed Water Control Structures
Impoundments
Proposed Dike
Oneida Pool East
Oneida Pool West
0 0.3 0.6 1.2 1.8 2.4 Kilometers
0 0.2 0.4 0.8 1.2 1.6 Miles
Sources
Aerial Photos from NYS GIS Clearinghouse.
Impoundments, Proposed Dike and Water Control Structures from USFWS.

Generally, dense stands of monotypic cattail are managed by increasing water levels and allowing water stress and muskrat foraging to reduce the amount of cattail. Additionally, mechanical means such as mowing, disking, burning, and chemical spraying can be used to control cattail. Past efforts to control the dense cattail stands in the higher elevation areas of Oneida Pool through increased water levels and burning have been unsuccessful. Mowing and disking in Oneida Pool can only be done in a small, previously farmed area due to the extensive tree stump and log debris covering the remaining areas. Chemical control has not been attempted because Oneida Pool is extremely large and a management strategy to control cattail stands that requires spraying such a large area makes chemical control undesirable.

To subdivide Oneida Pool, an approximately 4,000-foot dike will be built in a generally north-south alignment which will essentially divide the area in half along an existing elevation/vegetation contour. The area to the west of this dike is generally lower with more open water and will be managed with lower water levels. The area to the east of the dike, which is dominated by dense cattail, will be managed with slightly higher water levels to allow muskrats and water stress to thin out the cattail stands. Care will be taken to not increase the frequency of flooding to the east of the impoundment. The new dike will be built to a height that is lower than the current emergency spillway in Oneida to allow high water to spill over the new dike from east to west. A new water control structure will be added to Oneida Pool to allow greater transfer of water from Oneida to the Feeder Ditch. This will help to alleviate problems with flooding during high water events.

Strategies:

- In impoundments where robust perennial emergent vegetation makes up <40% of the total wetland acres, conduct early spring drawdowns and subsequent water level manipulations to promote the growth of annual wetland plants and minimize germination of perennial emergent vegetation. Percentage of emergent vegetation should be determined in the late fall/early winter with consideration given to expected impoundment conditions the following spring.
- Re-flood drawn down impoundments to coincide with waterfowl migration chronology.
- If necessary, induce physical/chemical disturbance to set back succession and promote growth of annual moist soil vegetation.
- Continue to implement the 3-6 year drawdown cycle through water level controls.
- Complete Mohawk/Oneida Marsh Restoration project with construction of Oneida dike.
- Incorporate all suggestions below into the Inventory and Monitoring Plan and Strategic Habitat Conservation Model.
- Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed).
- Continue to monitor the response of annual moist soil vegetation after each drawdown.
- Create and implement a protocol to monitor waterfowl trends during spring and fall migration.
- Work with conservation partners to monitor waterfowl use of Refuge impoundment habitats and enter the data into www.ebird.org.
- Monitor the response of purple loosestrife to herbivory by *Galerucella* beetles.

Objective 1.2 Emergent Marsh – Spring Migrating Geese

Each spring, provide a minimum of four patches of roosting habitat ≥50 acres in size, totaling at least 300 acres, for 75,000 or more migrating Canada geese from mid-March to May. Roosting habitat should consist of wetlands where open water makes up 50% or more of the wetland area.

Rationale - Over half of the Refuge is wetland (6,200 acres) with 4,000 of these wetland acres contained in 19 managed freshwater impoundments. Water levels are adjusted within and between years to mimic natural hydroperiods associated with unaltered wetlands to provide a variety of feeding, nesting, brood rearing, and resting habitats for migratory birds and resident wildlife. The interspersion of open water and aquatic and emergent plant communities provides resting and feeding habitat for over 120,000 waterfowl annually. The thousands of geese that migrate through the Iroquois Wetlands Complex each spring spend their day feeding in cornfields in the extensive agricultural lands surrounding the wetlands. The geese feed on waste corn left from the previous year's harvest before a new crop is planted later in the spring. At night the Refuge serves as a secure roosting area away from predators. The flocks of geese using the Refuge include birds from the Atlantic and Southern James Bay populations as well as geese from the resident population. Large numbers of resident geese are perceived to cause substantial resource and socioeconomic problems across the region, necessitating control programs. However, the Atlantic and Southern James Bay populations are of conservation concern because of significant population declines and are listed as highest priority in the BCR 13 Plan.

Large wetlands with substantial amounts of open water provide ideal roosting areas for Canada geese. The geese roost in these areas where they are safe from terrestrial predators. Additionally, these wetland areas provide the birds with another food source to compliment the high carbohydrate waste grains that they are feeding on in fields near the Refuge. Iroquois NWR was created in part for its value as a spring migration stopover area for Canada geese. To this day, tens of thousands of geese roost and feed on the Refuge during spring migration. Smaller numbers use the Refuge during fall migration and a few hundred geese spend the summer months breeding on the Refuge.

Strategies:

- Manipulate/maintain impoundment water levels >18" to control the germination or expansion of perennial emergent vegetation.
- Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed).
- Establish a monitoring protocol to evaluate changes in wetland vegetation composition.
- Limit visitor access near roosting areas to minimize disturbance by implementing the closure of the refuge to unrestricted access.
- Continue to provide spring roosting habitat with an emphasis on the Atlantic and Southern James Bay Canada goose populations.

Objective 1.3 Emergent Marsh – Deep Water Breeding Marsh Birds

Each year, provide a minimum of 800 acres of habitat for breeding marsh birds that use deeper water areas with specific emphasis on black tern, pied-billed grebe and least bittern. Target a 50:50 mix of vegetation and open water (hemi-marsh) with an average water depth of 18-20" and at least three muskrat lodges per acre. Additionally, this habitat should be provided in a minimum of three patches ≥100 acres each.

Rationale - Weller and Spatcher (1965) found the maximum number and diversity of marsh birds occurred in wetlands with a well interspersed vegetation cover to water ratio of 50:50. This habitat type

is usually referred to as a "hemi-marsh". At Iroquois NWR hemi-marsh habitat has been found to support robust populations of breeding marsh birds. This habitat usually occurs during the middle two or three years of an average drawdown cycle. Wetland management on most Refuge impoundments is designed to provide this habitat type.

Black tern, pied-billed grebe and least bittern are all priority species (medium) in the BCR 13 Plan and are species of greatest conservation concern in the NYWAP. The black tern is listed as an endangered species and pied-billed grebe and least bittern are listed as threatened in New York. The abundance of these three breeding species was included as important criteria in designating the Iroquois Wetlands Complex as an IBA in New York. The New York Natural Heritage Program describes the Iroquois deep emergent marsh as a significant ecological community.

Pied-billed grebe, least bittern and black tern are generally found in the deeper areas of hemi-marsh habitat with slightly more open vegetation. This habitat type allows these species more access to their preferred food resources and the optimal conditions for foraging. These species swim (pied-billed grebe), fly and dive (black tern), or grasp vegetation along the edge of open water (least bittern) to forage, thus allowing them to use deeper water areas of the marsh. Conversely, species such as American bittern and Virginia rail are usually associated with shallower water areas supporting a slightly more robust vegetation component with less open water. These species stand in water to forage, thus restricting them to areas where water levels are only a few inches deep.

Strategies:

- Continue all strategies under Alternative A Objective 1.3
- If necessary, induce physical/chemical disturbance to create additional openings when water manipulation and muskrat activity are not providing these openings.

Objective 1.4 Emergent Marsh – Shallow Water Breeding Marsh birds

Each year, provide a minimum of 400 acres of habitat for breeding marsh birds that use shallow water areas with an emphasis on American bittern and Virginia rail. Target a 70:30 mix of vegetation and open water with an average water depth of 10-12". Additionally, this habitat should be provided in a minimum of two patches $\geq$50 acres each.

Rationale - The American bittern is a high priority species in the BCR 13 Plan, the NYWAP, and the North American Waterfowl Management Plan. The Virginia rail is a medium priority in BCR 13. See the rationale under Objective 1.3 for habitat requirements of selected marsh bird species.

Strategies:

- Implement strategies listed in Alternative A Objective 1.4.

Objective 1.5 Emergent Marsh – Waterfowl Brood Rearing

Each year, provide a minimum of 400 acres of waterfowl (mallard, blue-winged teal and wood duck) brood rearing habitat consisting of 40% to 80% vegetative cover with an average water depth of 10-20". This habitat should be provided in a least four patches $\geq$50 acres each.

Rationale - Breeding (brood-rearing) habitat for mallard, blue-winged teal and wood duck is a high priority in the BCR 13 Plan and in the North American Waterfowl Management Plan. Waterfowl broods require habitat that provides an abundance of food (primarily protein) and safety from predators. At Iroquois NWR these needs can be met within impoundments in a hemi-marsh stage. Hemi-marsh habitat

provides needed cover through the interspersion of robust perennial vegetation and open water allowing ducklings to forage on aquatic invertebrates while never being very far from adequate cover. The presence of both emergent and submergent vegetation in these wetlands provides the necessary substrate for invertebrate reproduction and subsequently provides ducklings with the protein-rich food resources necessary for their growth and survival.

Many duck species found at Iroquois NWR nest in grasslands. Some nest sites can be a significant distance from water (> one mile). When a brood hatches the hen leads the ducklings to a wetland area where they can find food and safety. This overland trip from nest site to wetland has been found in some studies to result in a significant loss of ducklings (Dzubin and Gollop 1972). Providing brood rearing habitat adjacent to nesting grasslands should help reduce some of this duckling mortality. Impoundments used to meet Objectives 1.3 and 1.4 may also fulfill this objective, particularly if they are close to waterfowl nesting habitat.

Strategies:

- Where the coverage of perennial emergent vegetation is >80%, maintain flooded conditions with a minimum 18-20" water depth.
- When possible, locate brood rearing habitat adjacent to waterfowl nesting cover (grasslands).
- If necessary, induce physical/chemical disturbance to reduce vegetation cover.
- Evaluate wood duck nest structures and remove those that are not productive.

Objective 1.6 Open Water

Each year, provide bald eagle feeding habitat on a minimum of 250 acres, consisting of at least two patches ≥100 acres each of open water wetland for foraging bald eagles to coincide with their hatching and fledging period (April - June).

Rationale - The bald eagle is a New York State threatened species and a bird of management concern for the USFWS. The presence of three breeding pairs contributed to the designation of the Iroquois Wetland Complex as an IBA.

The USFWS *National Bald Eagle Management Guidelines* from 2007 state new recommendations for land management practices as well as how to avoid disturbance to the eagles. In general, activities should be kept as far away from nest trees as possible; loud and disruptive activities should be conducted when eagles are not nesting; and activity between the nest and the nearest foraging area should be minimized. Some disturbance categories listed in the guidelines that are relevant to Iroquois NWR are timber operations and forestry practices, off-road vehicle use, and non-motorized recreation and human entry

The previous mentioned categories are taken from the USFWS *National Bald Eagle Management Guidelines* and although off-road vehicle use is indicated, Iroquois NWR does not allow ORV use on the refuge. This category would cover vehicle use by researchers, volunteers, refuge staff, etc. in conducting official duties.

Strategies:

- Continue to implement USFWS 2007 *National Bald Eagle Management Guidelines* including:
  - **Category C – Timber Operations and Forestry Practices.** Avoid timber harvesting operations, including road construction and chain saw and yarding operations, during the breeding season within 660 feet of the nest. Selective thinning and other silviculture

management practices designed to conserve habitat, including prescribed burning close to the nest tree, should be undertaken outside the breeding season. If it is determined that a burn during the breeding season would be beneficial, then, to ensure that no take or disturbance will occur, these activities should be conducted only when neither adult eagles nor young are present at the nest tree. Appropriate Federal and state biologists should be consulted before any prescribed burning is conducted during the breeding season.

- **Category D – Off-road vehicle use.** No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet.
- **Category F - Non-motorized recreation and human entry** (e.g., hiking, camping, fishing, hunting, bird watching, kayaking, canoeing). No buffer is necessary around nest sites outside the breeding season. If the activity will be visible or highly audible from the nest, maintain a 330-foot buffer during the breeding season, particularly where eagles are unaccustomed to such activity (USFWS 2007b).

- Continue to restrict public access to eagle nesting areas during the breeding season by implementing the closure of the refuge to unrestricted access.
- Continue to coordinate with the NYSDEC on the protection, monitoring and management of the Iroquois Wetland Complex nesting eagles.
- Conduct spring/summer drawdowns to concentrate forage fish and make them more available to feeding bald eagles.
- Do not conduct complete drawdowns on Ringneck Marsh in years when drawdowns are conducted in impoundments containing eagle nests.

Objective 1.7 Mudflats

Provide up to 40 acres of mudflats with shallow water (<3"), sparse (<25%) vegetation and high invertebrate biomass annually during fall (August - September) to benefit migrating shorebirds including least, pectoral, semipalmated and solitary sandpipers and Wilson's snipe.

Rationale- Most shorebirds using the Great Lakes region are long-distance migrants that require stopover sites to replenish their fat reserves and meet the high energy demands of migration. These "staging" areas require shallow water and/or mudflat habitats with sparse vegetation, undisturbed roosting areas, and abundant invertebrate food resources. In this region these conditions can occur in various habitats including natural and managed wetlands, lakeshore, sand and gravel bars, reservoirs, and flooded agricultural fields.

Researchers are just beginning to understand the importance of habitats in the interior U.S. to shorebirds. However, variable climatic conditions common to inland areas make shorebird habitat unpredictable compared to coastal regions. Precipitation and hydrology patterns are highly variable from year to year and in different locations. In addition, loss of wetlands from urban development, hydrological disturbance, and agriculture has reduced the amount of habitat in the region. With the ability to manage water levels, Iroquois NWR can contribute to providing habitat for migrating shorebirds.

Many shorebirds species are of conservation concern in the Upper Mississippi Valley/Great Lakes (UMVGL) Shorebird Plan. The populations of these species are known or believed to be small and/or declining, and they are experiencing other known or potential threats (de Szalay et al. 2000). More

information on the regional abundance, distribution, chronology, and population trends of shorebirds; responses of shorebirds and their invertebrate food base to management activities; wetland distribution and habitat conditions during a variety of climatic patterns; and effects of human disturbance on shorebirds is needed to guide shorebird habitat management on Iroquois NWR.

Strategies:

- Conduct early drawdowns, mechanical manipulation (when needed to reduce vegetation cover), and subsequent flooding of impoundments at least four weeks prior to peak shorebird migration to allow aquatic invertebrates to develop.
- Maintain high water levels, near full pool levels, through early summer and slowly lower levels during late summer to expose mudflats.
- Continue to manage the 41-acre Cayuga sub-impoundment and the 10-acre Schoolhouse sub-impoundment for fall migrating shorebirds using water level controls to create mudflats with shallow water areas less than three inches deep.
- Work with conservation partners to monitor shorebird use of Refuge mudflat habitats and enter the data into www.ebird.org.

Objective 1.8 Seneca Pool Forested Wetland

Maintain the 935-acre Seneca Pool as a forested wetland dominated by red and silver maples, green ash, American elm, swamp white oak, and willow species to provide breeding habitat for cavity nesting waterfowl (primarily wood duck) and migratory songbirds (especially cerulean warbler).

Rationale - Red and silver maple and green ash dominate the 3,300 acres of forested wetland habitat on the Refuge. Second growth mature trees 75+ years old dominate most of this habitat. More than 900 acres of forested wetland habitat are contained in Seneca Pool, an impoundment that was originally built and managed as a green tree impoundment. This pool is a red maple/green ash swamp, which has been purposely flooded in the past. Long periods of flooding have stressed and killed mature trees and prevented germination and survival of seeds and seedlings. Due to this negative effect on the forested wetland habitat, the pool level is now allowed to fluctuate with the level of Oak Orchard Creek. Fluctuating with the creek level reduces the amount of water in this pool and limits the amount of water stress put on the trees, while still providing wetland habitat during spring migration. This pool provides a large contiguous tract of forested wetland habitat managed for species such as the wood duck and cerulean warbler.

The floodplain forest and forested wetlands associated with Oak Orchard Creek support migrating and nesting species of conservation concern within BCR 13 including cerulean warbler, prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker and wood duck. The Cerulean Warbler Atlas Project identified Iroquois as an important area for ceruleans. The NYWAP identifies several species of bats (eastern red, eastern small-footed and hoary bats) and the river otter as priority species; all of which use the floodplain forest habitat within the Oak Orchard Watershed.

Typically riparian or floodplain forests support a high diversity of plant species and food resources that are particularly important to migrating songbirds. An abundance of dead and dying trees of various sizes in floodplain forested wetlands are critical to cavity nesting ducks including wood duck and hooded merganser. Some songbird species (e.g., prothonotary warbler) require natural cavities as well. The USFWS is shifting away from artificial cavity nesting structures to a greater reliance on natural cavities.

Strategies:

- Allow water levels in Seneca Pool to fluctuate with the level of Oak Orchard Creek.
- Monitor Seneca Pool's water control structure to ensure that debris does not obstruct the flow of water into or out of the impoundment.
- Continue to monitor avian species of conservation concern through landbird surveys.
- Create a diversity of tree age classes to provide a sustainable forested wetland community by regulating water levels.
- Create an annual inventory and monitoring plan to guide management and increase nesting success of migratory waterfowl and other wildlife.
- Complete vegetative inventory of Seneca Pool.
- Within 5 years, remove the northeast dike to restore natural hydrology to the greatest extent possible.

GOAL 2. *Maintain the environmental health and integrity of Oak Orchard Creek and associated forested wetlands as a natural free-flowing habitat with a diverse assemblage of native plants and animals.*

Background

The Refuge contains the 523-acre Oak Orchard Creek Marsh National Natural Landmark (NNL, Map 1-4). The marsh encompasses a pristine stretch of the sluggish and meandering creek that varies in width from 20 to 150 feet. The surrounding terrain is low and flat and floods annually. Broad-leaved cattail grows in marshy areas at the bends in the creek. Buttonbush and water willow are common shrubs along the creek edges, accompanied by a diversity of other plant species including red osier dogwood, flowering dogwood, swamp rose, purple nightshade, watercress, water hemlock, swamp milkweed, lizards tail, cardinal flower, broad-fruited bur reed, and forget-me-nots. A forested swamp dominated by silver maple with some green ash, swamp white oak and slippery elm with a dense understory of sensitive fern borders the creek channel (Vogelmann 1972). When this landmark was established in 1974 it also included the 15-acre Milford Posson Natural Area.

Furbearer management will be conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions (see Furbearer Management Compatibility Determination in Appendix B for more information on how program will be administered). Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.

Strategies that apply to all objectives under this goal:

- Allow management of marsh furbearers throughout the entire Refuge, with restrictions on muskrat trapping in marshes that have a large percentage of cattail coverage (Map 2-9).
- Conduct furbearer management in marshes at the completion of the Refuge's waterfowl hunt season, by allowing up to 50 permits issued annually.
- Continue to charge $50.00 for the marsh furbearer management permit.
- Limit trappers to 25 traps each to promote recruitment and retention of new trappers by reducing trapper competition while still maintaining furbearer populations at desired levels.

Objective 2.1 Oak Orchard Creek and Associated Emergent Marsh and Forested Wetlands
Maintain, and restore as necessary, the water quality, natural flow regimes, and biological integrity of Oak Orchard Creek in the eastern portion of the Refuge, relying on natural processes when possible.

Rationale - Oak Orchard Creek enters the Refuge from the east and meanders sluggishly and unimpeded through the Refuge east of Route 63. This area includes the Oak Orchard Creek Marsh NNL and supports many of the native plants and animals found in this region. While this section of the Creek is impacted by invasive species and upstream land use practices that degrade water quality, it offers some semblance of the watershed's historic condition before ditching and diking.

Most of the natural emergent marsh habitat on the Refuge is located along Oak Orchard Creek, east of Sour Springs Road. In this area the creek is essentially uncontrolled. The only constrictions are Sour Springs Road itself, which may back water up during flood events, and transient beaver dams. These dams alter hydrology and ultimately change the vegetative characteristics of the creek.

A healthy riparian ecosystem provides migration, breeding and wintering habitat for many migratory birds and resident fish and wildlife species. Very few unmanaged, unaltered wetland systems still exist in western New York. While this section of Oak Orchard Creek is not wholly unaltered, it is essentially unmanaged. It is also in a condition where water management control is not critical to maintaining the quality of the wetland habitat. Preserving this section of the Creek in this "natural" condition allows the Refuge to provide a significant amount of riparian habitat for fish and wildlife with a minimum expenditure of resources.

Strategies:

- Monitor the condition of the Oak Orchard Creek Marsh NNL every five years to record the representative native plant species and condition (e.g., presence of invasive species).
- Continue to monitor colonial nesting bird rookery along Route 63.
- Work with partners to improve upstream land use practices to enhance water quality within Oak Orchard Creek as it enters the Refuge.
- Work with local road agents to prevent runoff (salt, sand, and pollutants) into Oak Orchard Creek.
- Develop an index of biological integrity for the Oak Orchard Creek to be used by the Refuge to monitor restoration and maintenance of this ecosystem.
- Conduct water quality, invertebrate and fish surveys to gather baseline data and then every five years to detect trends over time.

- Within the un-impounded floodplain forest in the Oak Orchard Watershed, rely on natural tree cavities for nest sites for wood duck, hooded merganser, and other cavity nesters; remove any artificial nest structures in this area.
- Identify the locations of invasive species within the floodplain.
- Remove invasive species using mechanical methods wherever possible.
- Identify and map the vernal pools within the floodplain forest.
- Monitor and inventory vernal pools across the entire Refuge for species of conservation concern.

Objective 2.2 Natural Forested Wetlands

Maintain a minimum of 2,300 acres of mature forested wetland dominated by red and silver maples, green ash, American elm, swamp white oak, and willow species by allowing natural processes and controlling non-native invasive species to provide breeding habitat for cavity nesting birds (e.g. wood duck and prothonotary warbler) and other migratory songbirds (especially cerulean warbler).

Rationale - The floodplain forest and forested wetlands associated with Oak Orchard Creek support migrating and nesting species of conservation concern within BCR 13 including cerulean warbler, prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker and wood duck. The Cerulean Warbler Atlas Project identified Iroquois as an important area for ceruleans. The NYWAP identifies several species of bats (eastern red, eastern small-footed and hoary bats) and the river otter as priority species; all of which use the floodplain forest habitat within the Oak Orchard Watershed.

Typically riparian or floodplain forests support a high diversity of plant species and food resources that are particularly important to migrating songbirds. An abundance of dead and dying trees of various sizes in floodplain forested wetlands are critical to cavity nesting ducks including wood duck and hooded merganser. Some songbird species (e.g., prothonotary warbler) require natural cavities as well. The USFWS is shifting away from artificial cavity nesting structures to a greater reliance on natural cavities.

Strategies:

- Identify and map forested wetlands for rare plant species and natural communities to document their occurrence.
- Conduct an inventory of fauna.
- Develop and conduct a refuge wide forest inventory and establish permanent vegetation monitoring plots.
- Evaluate implications for management based on the habitat requirements of species of conservation concern.
- Conduct annual surveys of exotic invasive plants and control as necessary.
- Consult with the NY Natural Heritage Program on suitable management strategies to maintain natural forested wetland communities.
- Maintain and conserve vernal pools to sustain populations of species of conservation concern including obligate amphibians..

GOAL 3. *Provide a diverse mix of grassland, shrubland and forested upland habitats arranged to reduce fragmentation and edge effects, and enhance habitat quality for priority species of conservation concern.*

Strategies that apply to all objectives under this goal:

- Continue to conduct an upland furbearer management program that will help keep mammalian predator numbers in check decreasing the potential for predation on nesting migratory birds and reducing the spread of some density dependent diseases such as distemper, parvo, and rabies (Map 2-9).
- Continue to issue up to 50 permits for upland furbearer management across the entire Refuge except in on no trapping zones (Refuge office, residences, trails, dikes and Job Corps).
- Continue to not charge for an upland furbearer management permit.

Background

Iroquois NWR lies within BCR 13, the Lower Great Lakes/St. Lawrence Plain (Map 1-5). In addition to providing important lakeshore habitats and associated wetlands, this region was originally dominated by a mixture of oak-hickory, northern hardwood, and mixed-coniferous forests. Nearly 95% of the original habitat types have been lost and the landscape is now dominated by agriculture with interspersed wetlands and remnant forest stands. The BCR 13 plan highlights specific sites or areas that are considered important for bird conservation. Iroquois NWR together with Oak Orchard WMA are highlighted as an important area for landbirds including: bobolink, Henslow sparrow, sedge wren, cerulean warbler and Northern harrier. This focus area is one of the most important areas for migratory landbird habitats including grassland, shrubland and forest in Western New York.

Approximately half of the 4,000 acres of upland habitat at Iroquois NWR is currently maintained in an early successional stage as grassland or shrubland through active management. Grasslands are mowed or burned according to a multi-year rotation schedule to suppress encroachment of broadleaf forbs and woody plants. Shrubland management consists of vegetation manipulation through the use of mechanical or chemical treatment. The remaining acres of upland habitat are comprised of forest including Northern hardwoods (beech, sugar maple, yellow birch and hemlock) and Allegheny hardwoods (black cherry, tulip poplar and white ash). These types are rarely distinct from one another and tend to blend together with other species such as hickories, butternuts and red or white oak. Much of the forest on the Refuge is in second growth with a few isolated older stands.

Furbearer management will be conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions. Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.

Objective 3.1 Grasslands

Provide a minimum of 800 acres of grassland habitat in patches >20 acres including two grassland areas >100 acres. Maintain a diverse mix of grass and forb species with < 2% shrub cover and ≤ 30% forb cover to provide breeding and nesting habitat for grassland nesting birds such as bobolink, Henslow's sparrow, grasshopper sparrow, sedge wren, and waterfowl, and to benefit other native wildlife including pollinating bees, butterflies and other insects.

Rationale - Grasslands provide breeding habitat for a variety of migratory birds. Many grassland-nesting songbirds are area-sensitive and each species prefers a slightly different mix of grass, forb and bare ground. The Henslow's sparrow is one of the highest priority species in BCR 13; bobolink and grasshopper sparrow are also priorities (medium). Larger grasslands (e.g., > 100 acres) will generally provide habitat for a larger suite of grassland bird species than will smaller (e.g., <20 acres), isolated grassland patches (Sample and Mossman 1989).

Populations of grassland birds are declining as their habitats are converted to agricultural, residential, and other urban uses. Norment (2002) identifies a need to approach grassland bird conservation in the northeast with "particular wisdom and care." He notes that despite the relatively recent (last 200 years) rise and fall of grassland habitats and associated birds in the northeast, the region may still be important for these species given their continental decline and habitat loss in the core of their ranges in the Midwest.

Refuge grasslands are a mix of managed warm and cool season fields and unmanaged forb dominated fields. Switchgrass, smooth brome, and goldenrod dominate the grasslands. Grasslands are currently managed using a combination of mowing, chemical spraying and prescribed burns to control unwanted vegetation and to maintain nesting habitat for waterfowl and other grassland nesting birds. Haying, conducted through a cooperative farming program is also used as a grassland management tool (USFWS 2002). Approximately 450 acres of upland habitat have been planted to warm season grasses (primarily switchgrass, big bluestem and indiangrass) and succession is suppressed in these units (USFWS 2000c).

Refuge grassland units range in size from one to 250 acres. Patch size is often the most important factor limiting use and nest success of grassland nesting birds. Generally, the larger the grassland, the more it will be used and the higher the nest success. The goal of the Refuge's grassland management program is to provide a few large grassland units and eliminate the smaller fragmented grasslands that are providing very little habitat to targeted wildlife species.

Strategies:

- Continue to use mowing, haying, prescribed fire and herbicide application as tools to maintain grassland conditions. Schedule mowing every one to three years to occur between July 15 and October 15 depending on the desired vegetation structure. Mowing later in the season will provide added benefits to pollinators.
- Schedule prescribed fires between April 1 to June 15 to take advantage of adequate site conditions for burning toachieve the desired vegetation results.
- Conduct herbicide applications to provide maximum control of undesirable vegetation.
- Evaluate and determine the feasibility of using Refuge grasslands for Karner blue butterfly reintroduction.
- Evaluate and refine bird and vegetation monitoring program for grassland units.
- Remove hedgerows within grassland areas to increase the size of grassland patches.
- Optimize the configuration (size and shape) of designated grassland units.

Objective 3.2 Shrublands
Provide 538 acres of mesic to dry shrubland habitat throughout the Refuge to provide breeding, nesting, and migrating habitat for American woodcock, golden and blue-winged warblers, field sparrow, and black-billed cuckoo and to provide food sources for migrating songbirds. These shrublands should be dominated by native shrubs including willows, dogwoods, viburnums and alders with less than 5% non-native invasive species.

Rationale - A range of habitat types are included under shrubland habitat ranging from brushy old field conditions to regenerating forests to more naturally maintained, relatively stable shrublands associated with wetlands. Shrublands support many high priority bird species in the BCR 13 Plan including blue and golden-winged warblers and field sparrow. Managing small areas (< 20 acres) of shrubland habitat can be effective for many shrubland-dependent birds. Consolidating and clustering patches and maintaining some large patches of shrubland habitat will provide habitat for a range of wildlife associated with these habitats.

Many of the shrublands on the Refuge have matured to a stage where they are moving from shrubland to forest habitat. The Refuge is identifying those shrubland areas that would be best kept as shrubland management units and those areas that would be better left to revert to forest. A more active shrubland management program is necessary to maintain a significant quantity of shrubland habitat.

Strategies:

- Increase shrubland acres managed annually to 20-30 acres via hydroaxing in the winter on frozen ground or in mid-summer on dry ground.
- Treat shrubland units that have become dominated by non-native invasive species.
- Treat shrubland units that have become dominated by trees as necessary to retard succession into young forest.
- Conduct shrub management in winter on frozen ground or in mid-summer on dry ground.
- Develop a shrubland management treatment rotation schedule.
- Evaluate results of ongoing study on wildlife use of different shrubland types including native dogwood, non-native honeysuckle, and seedling green ash.
- Work with partners to develop cost-efficient methods for managing and maintaining shrublands dominated by native shrub species with few or no invasive species.
- Monitor avian composition annually for priority BCR species.

Objective 3.3 Upland Forests (Early, Mid and Late Successional)
Provide 2,100 acres of early, mid and late (>150 years old) successional upland forest in blocks > 75 acres dominated by hemlock, sugar maple, black cherry, hickory and oaks to benefit migratory breeding birds including wood thrush, cerulean warbler and black-billed cuckoo.

Rationale - Although once dominated by a mix of oak-hickory, northern hardwood, and hemlock-northern hardwood forests, the upland areas adjacent to Iroquois NWR are now dominated by agricultural land interspersed with wetlands and remnant forest stands. Thus, Iroquois NWR offers some of the best, remaining blocks of upland forest in this region. Currently, the late successional forest habitats on the Refuge are not actively managed. The upland forests are relatively intact with a diversity of canopy tree species and some midstory and understory plant associates and light impact from invasive species. These

forests support BCR 13 priority bird species including wood thrush and cerulean warbler (highest), and black-billed cuckoo (high). These three species are also birds of management concern for the USFWS in the Northeast Region and are noted as species of greatest conservation concern need in the NYWAP.

Over 46% of the Refuge is covered by forest, 66% of which is forested wetland. Species composition of the forest varies across the Refuge with mixed hardwood stands predominated by elm, maple, aspen, and upland species such as beech, hickory and oak. Most conifers occur in plantations and include white pine, white spruce, Norway spruce, Scotch pine, red pine, Austrian pine and Douglas fir. Several natural hemlock stands are found in small pockets.

Large blocks of upland forests and forested wetland habitats are unique to the present day landscape of the Western Lake Plain. Landuse or landcover data for northwestern New York was developed by the U.S. Geological Survey (USGS) as part of the Geographic Information Retrieval Analysis System (GIRAS) during the 1970's. Of the entire area displayed (1,469,706 acres), 1.6% of the land cover (23,709 acres) is mapped as forested wetlands and 6% (8,417 acres) as upland forest. Sizes of these forested areas vary, but the largest block of forested wetlands (20% of the total forested wetland cover) is within the Iroquois NWR boundary.

During the 1960s and 1970s logging was conducted on the Refuge for both production of wood products and firewood. Habitat degradation due to cutting outside specified areas and lack of staff time to monitor these areas caused an end to cutting in 1978. Currently, there is little to no management within the forested areas. Many species such as woodcock, grouse, turkey, wood duck and hooded mergansers use the forested areas on the Refuge.

Strategies:

- Implement all strategies listed for Objective 3.4 in Alternative A.
- Develop and conduct a refuge wide forest inventory and establish permanent vegetation monitoring plots.
- Develop forest management techniques for forested uplands for species of conservation concern.
- Implement a commercial forest management program to assist in maintaining early successional forest habitat in accessible areas using existing protocols for hiring contractors.
- Maintain a no-cut buffer of at least 100 feet along each side of perennial streams, rivers and extensive forested wetlands.
- Develop a protocol for monitoring and control of invasive plant species including garlic mustard and honeysuckle along woodland trails.
- Evaluate the juxtaposition of early successional openings and upland forests to determine if restoration is needed and feasible to promote reforestation of artificial forest openings, areas surrounding forest peninsulas, gaps between isolated forest tracks, and riparian corridors to create more forest interior for area-sensitive species.
- Give restoration and management priority to those areas currently adjacent to large tracts of mature forest, thus increasing the overall size of the forest patch.
  Restore selected grasslands to forest by either natural regeneration or planting.

Objective 3.4 Plantations

Restore 202 acres of conifer plantations from the highest priority areas of the Refuge to encourage development of natural forest (oak-hickory, northern hardwoods, hemlock-northern hardwoods) and/or

shrubland (willows, dogwoods, viburnums and alders), communities that are more beneficial for Refuge priority resources of concern including wood thrush, cerulean warbler, and black-billed cuckoo.

Rationale - Conifers are a relatively small component of the forest types on the Refuge. The only naturally occurring, native conifer is the eastern hemlock which is often found in association with sugar maple and American beech. All other conifers on the Refuge are planted stock. Conifer planting peaked during the 1960's and early 1970's. Species planted include white spruce, white pine, red pine, Austrian pine, Scotch pine, Douglas fir and Norway spruce.

The conifer plantations on the Refuge are either monocultures or have only a few different species associated with them. This has caused a lack of diversity not only in the overstory and understory tree composition, but in age classes as well. The closely planted conifers restrict the amount of light that reaches the forest floor and therefore causes impoverished flora and fauna. The acidity from the conifer foliage also limits growth on the forest floor.

Plantations cause unnatural edges in the forest where naturally there would be transition zones between two different forest types. While edges can in general increase wildlife species richness and abundance, it can have a negative effect on species which the Refuge is managing for including nesting migratory songbirds. Negative effects include but are not limited to: nest predation and parasitism, decrease in forest interior nesting birds, and an absence of shade tolerant plant species (Hunter 1990).

Plantation areas will be prioritized for removal and depending on location and outcome, different techniques maybe used as described in the Commercial Forest Harvest Compatibility Determination or through girdling and nature regeneration. Restoring these non-native conifer plantations will result in more diverse forest communities and reduce the edge effect which will both result in better habitats for Refuge species of conservation concern.

Strategies:

- Conduct annual surveys of exotic invasive plants and control as necessary.
- Evaluate current bird survey transects in conifer plantations and establish new surveys as needed to monitor for species of conservation concern as plantations convert to a more natural state.
- Prioritize plantations for removal.
- Implement a commercial forest management program to remove conifer plantations in accessible areas using existing protocols for hiring contractors.
- Determine if reforestation is needed or if natural seeding is sufficient in areas where conifer plantations have been removed.
- Incorporate survey results, habitat treatments, treatment responses, and future prescriptions into GIS database.

Goal 4. *Refuge visitors will understand and appreciate fish and wildlife conservation through high quality recreation, education and interpretive programs.*

Strategies that apply to all objectives under this goal:

- Continue to replace outdated and faded signs (e.g. boundary, hunt zones, closed areas, primary entrance, secondary entrance) using current standard Service signs.
- Maintain consistency when posting "no hunting" signs along the Refuge boundary.

- Hire one permanent full-time Park Ranger (GS-0025-5).

Background

The Improvement Act identifies six priority public uses for Refuges: hunting, fishing, wildlife observation, photography, environmental education, and interpretation. Interpretation and hunting have regionally been identified as the top two priority Areas of Emphasis at the Iroquois NWR. These two activities will be given highest priority to ensure wise use of staff and funding resources and enable the Refuge to provide fewer, but higher quality, visitor opportunities. Public use opportunities will be provided to the extent that they are compatible with the Refuge System mission and the purposes of Iroquois NWR. Goal 4 addresses wildlife observation, wildlife photography, environmental education and interpretation. Goal 5 addresses hunting and fishing recreation.

We develop our wildlife-dependent recreation programs in consultation with state fish and wildlife agencies and stakeholders. Refuge recreation programs must

- promote safety of participants, other visitors and facilities;
- promote compliance with applicable laws and regulations and responsible behavior;
- minimize or eliminate conflict with fish and wildlife population or habitat goals or objectives in an approved plan;
- minimize or eliminate conflicts with other compatible wildlife-dependent recreation;
- minimize conflicts with neighboring landowners;
- promote accessibility and availability to a broad spectrum of the public;
- promote resource stewardship and conservation;
- promote public understanding and increase public appreciation of America's natural resources and our role in managing and conserving these resources;
- provide reliable/reasonable opportunities to experience wildlife;
- use facilities that are accessible to people and blend into the natural setting; and
- use visitor satisfaction to help define and evaluate programs.

A Visitor Services Assessment and Review was completed in March 2009 (USFWS 2009a). This review was completed by visitor services managers in Region 5 to provide an objective view about Refuge resources and visitor services programs. Their recommendations included example themes and key messages the Refuge could integrate into interpretation, outreach, and education activities. The themes and key messages are listed below and will be used to help form our messages to the public.

Biodiversity

Biodiversity was as crucial to the survival of the Native Americans who historically inhabited this area as it is to the people, wildlife, and wildlands inhabiting it today.

Wildlife

The Refuge is a significant stop-over point for migrating waterfowl and other birds and has been key in the recovery of the bald eagle and the comeback of nesting black terns while also providing critical habitat for other wildlife (mammals, reptiles, amphibians, fish).

Habitat

Iroquois NWR and the adjacent state wildlife management areas provide the largest contiguous block of wildlife habitat between the Allegheny Plateau and Lake Ontario. The size and diversity of this natural area provides a variety of habitats to benefit wildlife and for enjoyment and appreciation by people. The management of such habitat diversity provides a wildlife oasis within a landscape fragmented by development and farming.

People
Iroquois NWR is not only a refuge for wildlife, but also a refuge for people – a place where people connect with nature, rest, restore, and build health – before continuing on the day's or life's, journey.

A program called "Connecting Children with Nature" is part of the Service's "Connecting People with Nature: Ensuring a Conservation Legacy Strategy". It was established to address the American public's declining interaction with nature and the threat this decline poses to the mission of the USFWS. Connecting Children with Nature addresses the fact that children today spend less time playing outdoors than any previous generation. Today, kids reportedly spend an average of 6.5 hours per day with television, computers and video games. This lack of connection with nature has been linked to a number of health problems, both physical and emotional (Children and Nature 2009). In order to accomplish the USFWS Directorate priority to connect people with nature, Northeast Region personnel have established the following goals:

- Educate ourselves and others about the benefits of connecting people, particularly children, with nature.
- Identify and share existing or new Service success stories.
- Facilitate new, and refine existing, opportunities.
- Network with other staff, partners, and other organizations to optimize opportunities.
- Identify, reduce and remove barriers to connect people with nature.
- Identify and implement tools for accountability.
- Seek new funding and leverage existing funding for projects.
- Demonstrate federal leadership in connecting people with nature.

The Service has also adopted the slogan "Let's Go Outside" to promote events, programs and activities for the Connecting People/Children with Nature initiative. Each service unit can modify the slogan to suit the event or activity they have planned. For example, "Let's Go Birding" or "Let's Go Fishing" or "Let's Go Outside to Restore Habitat for Wildlife." Many of the Refuge programs are designed to connect with kids to continue the conservation initiatives.

Objective 4.1 Interpretive Programs
Provide high quality, compatible interpretive programs with a focus on the Refuge System mission and the purpose of the Refuge**.**

Rationale - Interpretation is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on Refuges. Individuals, families or small groups have the option to attend scheduled weekend programs presented in partnership with the Buffalo Audubon Society. Interpretive messages are also presented through special events and non-personal interpretation including printed Refuge brochures, stationary interpretive panels in kiosks, wayside panels at Cayuga Overlook, and interpretive signs and materials at Kanyoo, Onondaga, and Swallow Hollow Nature Trails. Interpretation is one of the two Areas of Emphasis for the Refuge.

Refuge visitors include students from pre-K to college, area tourists, local conservation groups, wildlife photographers and observers, and hunters and fishermen. Annual visitation ranges from 35,000 to 45,000 people. To help address a shortage of Refuge staff, the Refuge partners with Buffalo Audubon Society to conduct interpretive programs on the Refuge mostly during the spring and fall. These programs include a "scope watch" on the eagle nest from Cayuga Overlook, birding tours, nature walks to identify plants, butterflies and trees, bat programs, "owl prowls," and canoe trips down Oak Orchard Creek. These programs are attended by 1,000 to 1,800 people each year. Participation in these programs has been increasing over the years and we expect that trend to continue.

Refuge staff conducts interpretive programs both on and off site. Onsite interpretive programs presented by Refuge staff and volunteers include formal programs and presentation and guided trail walks. In fiscal year 2009 the Refuge received eight requests from local schools, scouts, and church groups for guided visits which totaled 172 visitors. The Refuge conducts two major interpretive events: Spring into Nature and the Youth Fishing Derby. Spring into Nature is a one-day event hosted at the Refuge visitor contact station and is usually attended by over 1,000 people. This event provides interpretive programs, kid's activities and provides additional information on wildlife, habitats, conservation and stewardship. The Youth Fishing Derby is held at Ringneck Marsh and incorporates interpretive information into a fishing contest for kids under the age of 16 years. In addition to these two events, the Buffalo Audubon Society presents interpretive programs called Iroquois Observations. In fiscal year 2009, Iroquois Observations documented 829 visits for programs including eagle watches, birding field trips, guest speakers, woodcock walks, owl prowls, canoe treks, and themed nature walks.

Offsite programs include Conservation Field Days in three counties (Orleans, Niagara and Monroe) as well as local festivals and other events. At Conservation Field Days the Refuge provides one of many learning stations for over 200 students in each of the counties. Local festivals and other events include Plantaisia in Buffalo, Earth Day at Beaver Meadow Nature Center, the University of Buffalo Enviro Fair, EcoFest in Batavia, Ducks Unlimited's Green Wing events, and interpretive programs at local schools. These programs record nearly 800 contacts.

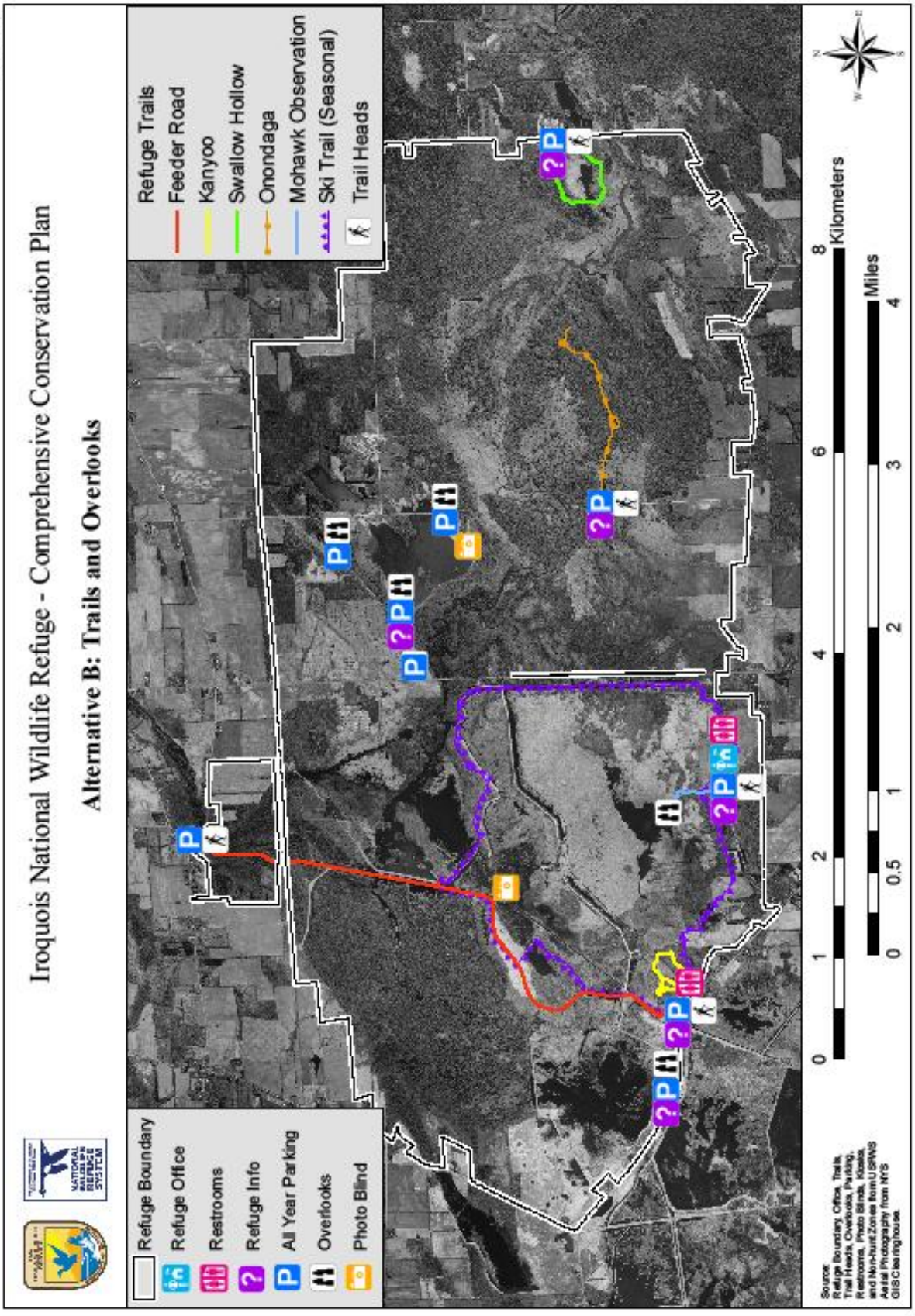
Under Alternative B we propose to continue existing interpretive programs and add new opportunities. Providing high-quality interpretation programs on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for our interpretation programs include the following:

- Promote visitor understanding of, and increase appreciation for, America's natural and cultural resources and conservation history by providing safe, informative, enjoyable, and accessible interpretive opportunities, products and facilities.
- Develop a sense of stewardship leading to actions and attitudes that reflect interest and respect for wildlife resources and the environment.
- Provide quality interpretive experiences that help people understand and appreciate Iroquois NWR and its role in the Refuge System.
- Provide opportunities for quality recreation and interpretive experiences consistent with criteria describing quality found in 605 FW 1.6(*Service Manual*).
- Assist Refuge staff, volunteers, and community in attaining knowledge, skills, and abilities in support of interpretation.
- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreational activities.

The Refuge maintains a series of nature trails open to the public year-round, including Kanyoo, Onondaga, and Swallow Hollow (See Map 2-12). Kanyoo and Swallow Hollow Nature trails are used extensively for school groups for field trips to experience nature and wildlife. Over the past couple of years these trails have been enhanced to ensure adequate access and to provide interpretative panels. We will continue to ensure that the trails are maintained and free from obstruction to allow easy access to the trails. Under this Alternative we are proposing a new trail that will begin at the refuge headquarters (Map 2-12).

Strategies:

- Implement all strategies listed for Objective 4.1 in Alternative A.
- Develop three to five power point programs that focus on different themes associated with Refuge goals and objectives such as habitat wildlife and visitor services.
- Develop thematic programs for guided trail walks using the method described in the Certified Interpretive Guide Course to develop outlines which have theme, target audience, goals, mission-based behavioral objectives, introduction, sub-themes and conclusion.
- Conduct two to four outdoor-related workshops such as Orienteering and Map Reading, Women in the Outdoors, and New Hunters to Iroquois NWR.
- Rewrite the Kanyoo Nature Trail guide and install six interpretive panels on the blue loop of Kanyoo Trail.
- Standardize the six Refuge kiosks and the messages they provide regarding Refuge goals, objectives and management.
- In locations where there are more than one kiosk for interpretation and hunting, determine if they can be combined into one kiosk.
- Conduct research on the demographics of Refuge visitors and their activities.
- Renovate interpretive displays in the visitor contact station to integrate CCP goals and objectives.


Map 2-12
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative B: Trails and Overlooks
Refuge Boundary
Refuge Office
Restrooms
Refuge Info
All Year Parking
Overlooks
Photo Blind
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Mohawk Observation
Ski Trail (Seasonal)
Trail Heads
0
1
2
4
6
8
Kilometers
0
0.5
1
2
3
4
Miles
Source:
Refuge Boundary, Office, Trails, Trail Heads, Overlooks, Parking, Restrooms, Photo Blinds, Kiosks, and Non-Hunt Zones from USFWS
Aerial Photography from NYS GIS Clearinghouse.

- Revise Refuge publications to current USFWS design standards and to reflect the updated rules and regulations.
- Investigate new technologies that can be incorporated into interpretive programs such as podcasts, virtual technologies and www.ebird.com.
- Update cultural resource interpretive displays to incorporate the history of the eastern elk and displays the antlers recently discovered on the Refuge.
- Utilize *National Association of Interpreters Standards and Practices for Interpretive Methods, Interpretive Organizations, and Planning*.

Objective 4.2 Outreach

Provide at least 10 opportunities annually for the local communities and visitors to learn about Iroquois NWR and the role of the Refuge System in protecting and managing our natural resources.

Rationale - The Service is America's voice for wildlife, speaking for the wild creatures that cannot speak for themselves. To be effective, we must do so in a way that facilitates public understanding and inspires support (USFWS National Outreach Strategy). Outreach is two-way communication between the Service and the public to establish mutual understanding, promote involvement, and influence attitudes and actions to improve joint stewardship of our natural resources. Communication is essential to the Refuge mission. Frequent communication facilitates understanding and helps the public make informed decisions about the future of fish and wildlife resources. Marketing research shows a clear correlation between positive awareness and a willingness to act on behalf of a particular product or service.

Objective 4.2 focuses on achieving positive awareness for the Refuge through better communications. Although the Refuge must manage many controversial issues, it also enjoys significant strengths including dedicated staff and volunteers, and strong public interest in fish and wildlife. To meet Refuge challenges and take advantage of its strengths, the strategies under this objective recommend a more unified and strategic communications program that will help the Refuge carry out its resource conservation mission. Our approach is to make the most effective use of staff time and resources by focusing our messages into something people can easily understand and making sure it delivers that message to concerned people in a timely way.

The Refuge is located between two major cities, Buffalo and Rochester, with a number of small towns and hamlets in between. The Refuge is also only an hour away from Niagara Falls, which receives many visitors from across the nation as well as other countries. The location of the Refuge provides an ideal place to reach local, national and international visitors and educate them about the Refuge and the Refuge System.

Strategies:

- Implement all strategies listed for Objective 4.2 in Alternative A.
- Continue to develop and distribute news releases to local papers, television, radio, schools, local tourism about the Refuge and wildlife activity.
- Develop targeted outreach based on research findings conducted under Objective 4.1 and connect outreach goals to Refuge messages and key resource needs.
- Develop an introductory video about the Refuge.
- Update the Refuge website to provide interactive management and natural resources games and ensure consistency with new website standards.

- Develop outreach program with Iroquois Job Corps Center (interpretation, environmental education, and partnerships).
- Develop a comprehensive outreach strategy.
- Within five years of completion of the CCP, conduct an evaluation of the effectiveness of current outreach techniques and identify at least two specific audiences for outreach goals that have thus been unexplored.
- Explore opportunities to work with the Buffalo and Rochester zoos to partner on outreach programs.
- Obtain training in tourism and eco-tourism and explore opportunities to connect with Niagara Falls tourism organizations.
- Update the Refuge website to provide more information on the Refuge's biological resources, recreational opportunities, regulations and policies, and the mission of the Service and the Refuge.

Objective 4.3 Environmental Education

Reach 2,000 school-age (K-12) students annually with environmental education programs that coincide with NYS standards of learning. These programs should be conducted by staff, volunteers, partners and members of Friends of Iroquois NWR on or off Refuge property and integrate Refuge outreach and interpretive objectives and messages.

Rationale - Environmental Education is one of the six priority public uses required by the 1997 Refuge Improvement Act and is one of the most important ways we can raise visibility, convey Refuge messages, and communicate the significant contribution the Refuge makes to natural resource conservation. Objective 4.3 focuses on creating curriculums or other structured programs on and off the Refuge in association with local schools and teachers and other educational programs.

Local schools are incorporating wildlife and wetland topics into their curriculums to meet science-based standards of learning and help students understand scientific concepts, principles and theories pertaining to their physical setting and living environment. The Refuge can provide educational materials as well as an outdoor laboratory to augment the teachers existing curriculum and tie into NYS learning standards.

Providing high-quality environmental education on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for environmental education include:

- Teach awareness, understanding, and appreciation of our natural and cultural resources and conservation history;
- Allow program participants to demonstrate learning through Refuge-specific stewardship tasks and projects that they can carry over into their everyday lives;
- Establish partnerships to support environmental education both on-and off-site;
- Support local, State, and National education standards through environmental education on Refuges;
- Assist Refuge staff, volunteers, and other partners in obtaining the knowledge, skills, and abilities to support environmental education;
- Provide appropriate materials, equipment, facilities, and study locations to support environmental education
- Give refuges a way to serve as role models in the community for environmental stewardship; and

- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreation activities.

We currently partner with Canisius College to provide educational programs on the Refuge. The Canisius Ambassadors for Conservation (CAC) is a program that has been operating at the Refuge since 2005 teaching intermediate-grade student about the mission of the Service and the natural resources of Iroquois NWR emphasizing wetlands and migratory birds. Between 700 and 2,000 students participate in this program each year. The programs are developed to ensure that specific elements are delivered and retained by the students.

Strategies:

- Implement all strategies listed for Objective 4.3 in Alternative A.
- Work with Friends of Iroquois NWR (FINWR) and Canisius College to find secure funding for the CAC program.
- Continue to provide annual busing assistance to the CAC program.
- Develop three to five key environmental education curricula/messages for CAC teachers to evaluate their pre- and post-visit knowledge of Refuge resources and management actions.
- Develop a program that provides environmental education options for the NY State School for the Blind focusing on non-visual teaching methods.
- In conjunction with the CAC, conduct a conservation camp or after school camp such as the Junior Refuge Manager Program.
- Look for opportunities to incorporate the Shorebird Sister Schools Program, Jr. Duck Stamp education materials, and Project Webfoot into environmental education activities.

Objective 4.4 Wildlife Observation and Photography

Provide access to unique and unusual habitats on the Refuge for wildlife observation and photography compatible with wildlife habitat management needs. Encourage wildlife photographers to use the Refuge by providing at least two well-placed photography blind.

Rationale - Wildlife observation and photography are two of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. The Refuge provides opportunities to view and photograph wildlife in natural settings at nature trails and overlooks. Historically the Refuge been a popular birding site and has been recognized as an IBA by the National Audubon Society. The Refuge is a stopover point for migratory waterfowl and attracts hundreds of thousands of birds during migration. The Refuge's diverse habitat also attracts songbirds, shorebirds, raptors, marsh birds, reptiles, amphibians and over forty species of mammals.

The 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation indicates that over 3.8 million people participated in wildlife-watching activities in the State of New York during 2006 and spent more than $1.5 billion on activities and equipment related to wildlife watching (USFWS 2006b).

Providing a high-quality wildlife observation and photography on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for these two programs include:

- Provide safe, enjoyable, and accessible wildlife viewing opportunities and facilities.
- Promote visitor understanding of, and increase visitor appreciation for, America's natural resources;

- Provide opportunities for quality recreational and educational experiences consistent with criteria describing quality found in 605 FW 1.6; and
- Minimize conflict with visitors participating in other compatible wildlife-dependent recreation activities.

The Refuge facilitates opportunities for wildlife observations and photography at nature trails including Kanyoo, Onondaga and Swallow Hollow, and at Cayuga, Ringneck, Mallard, and Schoolhouse Overlooks (Map 2-12). Wildlife observation is the most common visitor activity at Iroquois NWR.

The new office building housing several Divisions in the USFWS proposed in this Alternative will increase visitation to the Headquarters area. Due to the anticipated increase in use and the desire by visitors to have access to a nature trail from the Headquarters location, we are proposing to use an existing waterfowl hunt trail as a wildlife observation trail and provide access to a new observation platform. This platform will be similar to the existing one at Cayuga Overlook and will allow visitors to observe wetland-dependent wildlife in Mohawk Pool. This area may be restricted to public access during the waterfowl hunt season.

Several non-wildlife dependent activities facilitate wildlife observations and are considered acceptable methods for visitors to experience wildlife. These include the following:

Cross-country Skiing/Snowshoeing - Although not a priority public use, skiing and snowshoeing are often used by Refuge visitors to enjoy the solitude of the Refuge's natural areas and to view winter wildlife. Many skiers and snowshoers stop at the visitor contact station to obtain Refuge and wildlife viewing information. The light amount of use that is received by the Refuge for these activities will not interfere with the Refuge purpose since very few species of birds are present during the winter season. Cross-country skiing/snow shoeing is permitted on Onondaga and Kanyoo Nature Trails and the Mohawk Ski Trail. The Mohawk Ski Trail closes on March 1 to limit disturbance during spring migration, nesting and brood rearing seasons.

Hiking and Walking - Hiking and walking are permitted on the Refuge's designated trail system which includes Kanyoo, Onondaga and Swallow Hollow Trails and the Feeder Road, and along public roads adjacent to the Refuge. Hiking and walking allow visitors to enjoy the solitude of the Refuge and view and photograph wildlife. Under Alternative B we propose to restrict public access for hiking and walking to designated trails year-round.

Jogging and Bicycling - Jogging and bicycling will be permitted but not encouraged on the Refuge. Jogging and bicycling are not priority public uses but they can facilitate priority public uses on the Refuge. Although jogging and bicycling are classified as non-wildlife activity, most participants use the Refuge for the "wildlands" experience it provides. Jogging and bicycling generally occur between March and September. Some bicyclist stop at the visitor contact station to obtain Refuge or wildlife viewing information. Most visitors bike on Feeder Road which is open for a variety of public use activities and is the main service road used by Refuge staff for management functions. Bicycling is also permitted on other public roads that go around and through the Refuge. Bikes are not permitted on nature trails due to damage they may cause to the trail surface.

The Refuge is used by amateur photographers, family members taking photos and tourists documenting their travels. Providing high quality opportunities for the public to engage in nature photography promotes visitor appreciation and support for Refuge programs. Approximately 400 visitors participate in photography-related activities each year. Under Alternative B, we propose to replace the two existing photo blinds with new blinds in different locations to provide a greater opportunity for the public to view

and photograph wildlife (Map 2-12). One photo blind will be placed on the south side of Ringneck Marsh near Mallard Overlook and the second will be a combination photo/hunting blind that will be located in our waterfowl hunting area and used for both activities.

Strategies:

- Continue to maintain Kanyoo, Onondaga, and Swallow Hollow Nature Trails and Feeder Road to provide opportunities for wildlife observation and photography.
- Continue to maintain Cayuga, Mallard, Ringneck and Schoolhouse Overlooks.
- Continue to promote Oak Orchard Creek as a canoe/kayak route to provide additional unique opportunities for wildlife viewing and photography.
- Continue to loan binoculars which can be checked out at the visitor contact station.
- Continue to operate the live kestrel cam to provide a unique opportunity to view an active kestrel nest. The live feed can be viewed via a monitor in the visitor contact station and on the web.
- Continue to permit cross-country skiing on the Mohawk Ski Trail from December 1 until the last day in February.
- Continue to allow biking on Feeder Road.
- Continue to allow jogging on nature trails and Feeder Road.
- Continue to update Refuge publications and brochures regarding wildlife observation and photography opportunities every three years (e.g., fact sheets, wildlife lists, general brochure).
- Open existing trail used for waterfowl hunting access behind headquarters and create an overlook platform.
- Provide one designated photo blind and one combination photo/hunt blind.
- Provide one canoe launch for accessing Oak Orchard Creek.
- Develop a Refuge rack card for distribution at key tourism and highway information sites.
- Partner with Friends of Iroquois NWR and others to offer an annual or a regular wildlife photography contest.
- Encourage and promote the use of www.ebird.org by publicizing it and adding an internet linked kiosk on station so that birders can consult previous sightings and add their own sightings.
- Incorporate the Mohawk Ski Trail into other Refuge maps and create a fact sheet about the trail.
- On Feeder Road, where biking is allowed, ensure trail is properly posted showing bike access.
- Reestablish an eagle camera when technology and an appropriate nesting tree are available.

Objective 4.5 Other Recreation

Discontinue berry picking, a non-wildlife dependent recreational activity.

Rational - Berry picking is an example of a visitor activity on the Refuge that is not a priority public use and may also result in disturbance to wildlife. In accordance with 605 FW1, General Guidance and 603 FW 1, Appropriate Refuge Uses, we will only permit non-priority uses when we determine that they are legally mandated, provide a benefit to the Service, occur due to special circumstances or facilitate one of the priority wildlife-dependent recreational uses.

In Alternative B we propose closing the Refuge to berry picking for several reasons. Under this alternative the Refuge is being closed down to visitors just wandering through Refuge habitats from July 15 through the end of February. Also, the majority of the berry species on the refuge ripen in early summer when birds are still in the nesting and brood rearing season (March 1 – July 15). There may be a few species that carry their fruits into the late summer.

Strategies:

- Close Refuge to berry picking upon approval of CCP.

Goal 5. *Hunters and anglers will enjoy and support programs designed to provide high quality hunting and fishing experiences.*

Background

The Improvement Act identifies six priority public uses for refuges: hunting, fishing, wildlife observations, photography, environmental education and interpretation. Hunting and interpretation have regionally been identified as the top two priority Areas of Emphasis at the Refuge. These two activities will be given highest priority to ensure wise use of staff and funding resources and enable the Refuge to provide fewer, but higher quality, visitor opportunities. Iroquois NWR is popular among all hunting groups, but most notably deer and waterfowl hunters. The Refuge is becoming increasingly popular for these hunting activities and we are experiencing greater law enforcement challenges such as illegal deer stands, access into closed areas, littering, conflicts among user groups, and failure to abide by permit regulations.

We develop our wildlife-dependent recreation programs, including hunting, in consultation with state fish and wildlife agencies and stakeholders. Refuge recreation programs must

- promote safety of participants, other visitors and facilities;
- promote compliance with applicable laws and regulations and responsible behavior;
- minimize or eliminate conflict with fish and wildlife population or habitat goals or objectives in an approved plan;
- minimize or eliminate conflicts with other compatible wildlife-dependent recreation;
- minimize conflicts with neighboring landowners;
- promote accessibility and availability to a broad spectrum of the public;
- promote resource stewardship and conservation;
- promote public understanding and increase public appreciation of America's natural resources and our role in managing and conserving these resources;
- provide reliable/reasonable opportunities to experience wildlife;
- use facilities that are accessible to people and blend into the natural setting; and
- use visitor satisfaction to help define and evaluate programs.

Objective 5.1 Hunting

Allow access for hunting of small game, deer, turkey, waterfowl and other migratory birds in accordance with New York State regulations and consistent with sound biological principles to provide participants with reasonable harvest opportunities, uncrowded conditions and minimal conflicts with other users.

Rationale - Hunting is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. Hunting is a popular and traditional activity in the area and a management tool to keep wildlife populations at healthy numbers to maintain healthy habitats. When managed appropriately, hunting can instill a unique understanding and appreciation of wildlife, their behavior, and their habitat needs.

According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation approximately 566,000 residents and non-residents participated in hunting in New York in 2006. That group spent more than $715 million on activities and equipment related to hunting (USFWS 2006b).

Current hunting activities and methods permitted on the Refuge were established in the Refuge Hunting Plan. This plan was approved in the mid-1980's and has had few modifications. In 2008 the Refuge received approximately six visits for migratory bird hunting (non waterfowl), 432 visits for waterfowl hunting, 453 for upland game, and 4,656 for deer hunting. The Refuge provides information regarding annual hunt programs through Refuge brochures, hunting maps, fact sheets and websites.

The Refuge is open to hunting during most NYS hunting seasons and in accordance with NYS Hunting laws and Refuge specific regulations. All hunting requires a Refuge permit. Except for the spring turkey season which is open during the month of May, hunting is restricted on the Refuge from March 1 through September 30. The Refuge is closed to turkey hunting in the fall. Waterfowl hunting ends after the first split or when the regular (gun) deer season begins, whichever comes first. Waterfowl hunting is only allowed on Tuesdays, Thursdays and Saturdays from legal start time until noon. All hunters must check out no later than 1:00 p.m. Night hunting is not permitted on the Refuge.

As part of the Refuge's commitment to young hunters, we accommodate two youth orientation programs and two youth-only hunt days each year. Youth orientation programs are followed by a single youth-only hunt day the first Sunday of the spring turkey season and the first Sunday of the waterfowl season. These youth events are coordinated with the National Wild Turkey Federation and Lake Plains Waterfowl Association and are limited to 25 junior hunters.

Providing a high-quality hunt on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for the Refuge hunt program include the following:

- Manage wildlife populations consistent with the Refuge System, specific management plans approved after 1997, to the extent practicable, state fish and wildlife conservation plans.
- Promote visitor understanding of, and increase visitor appreciation for, America's natural resources.
- Provide opportunities for quality recreation and interpretive experiences consistent with criteria describing quality found in 605 FW 1.6 (*Service Manual*).
- Encourage participation in hunting to help preserve it as a tradition deeply rooted in America's natural heritage and conservation history.
- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreational activities.

Deer hunting is the most common form of hunting pressure on the Refuge. More than 400 hunters use the Refuge on opening day of the regular deer season and on Thanksgiving, and 100-200 people hunt the Refuge on other days during the season. This level of hunting pressure creates potentially unsafe, overcrowded hunting conditions. The number of reported deer hunter visits increased significantly from 2007 (3,227 hunters) to 2008 (4,500 hunters).

Relative to many areas in New York State, Iroquois NWR does not have a large population of wild turkeys nor the habitat to support them. The Refuge is concerned about the conflict of allowing hunting during the spring when most of the Refuge is closed to all other uses to protect nesting and brood rearing wildlife species. Many species of birds, such as the wood duck and bald eagle are well into their nesting cycle by the month of May, when turkey hunting is allowed in New York. Others, such as the wood thrush and cerulean warbler arrive on the Refuge a bit later and are in the process of establishing nesting territories during May. Still others, such as many northern nesting warblers, do not nest on the refuge, but rather use the areas abundant food sources to gather energy for the last leg of their northward migration. These birds are particularly abundant on the Refuge during the later half of May. Most turkey hunting takes place in forest, shrub, or grassland habitats, the same areas used by most of the previously mentioned migratory birds.

Iroquois NWR is one of four sites in New York with exceptional numbers of cerulean warblers, recorded during the Cerulean Warbler Atlas Project conducted from 1997 to 2000. The Refuge has the third highest concentration of ceruleans in New York. This warbler is among the highest priority landbirds for conservation in the U.S. based on a small total population size and a significant decline (-4.2% per year since 1966) in the Breeding Bird Survey (BBS) trend throughout its range (Rosenberg et al. 2000). The cerulean warbler occurs in riparian, forested wetlands, a common habitat type on the Refuge.

Refuge areas of known nest sites for rare and conspicuous species sensitive to human disturbance, such as the bald eagle, are closed to hunting and other disturbance during their nesting season. However, this is not practical for many other species of birds where the nest location is not obvious until after it has been disturbed. Therefore, it is necessary to limit disturbance using other methods.

Historically, most turkey hunters use the Refuge primarily during the first two weeks of the season and average three days of hunting per hunter. In Alternative B we propose to continue the pre-season lottery draw, but cut the season into three sessions. This would allow individuals to hunt for either 10 or 11 days depending on the session for which they are drawn. This lottery draw would allow hunters to rank the sessions in their order of preference. Session 1 will run from May 1 to May 10, Session 2 from May 11 to May 20 and Session 3 from May 21 to May 31. The number of permits per session would be set at Session 1: 50; Session 2: 25; Session 3: 10. This new system would allow for more permits being issued per year, thus allowing more hunters to participate. Additionally, reducing the number of permits throughout the month will help reduce potential conflict with nesting birds, especially later in the month as the number of both migrating and nesting birds increases. The Refuge's Youth Turkey Hunt which has been conducted on the first Sunday after the opening of the spring turkey season will be moved to align with New York State's designated Youth Hunting Days in late April.

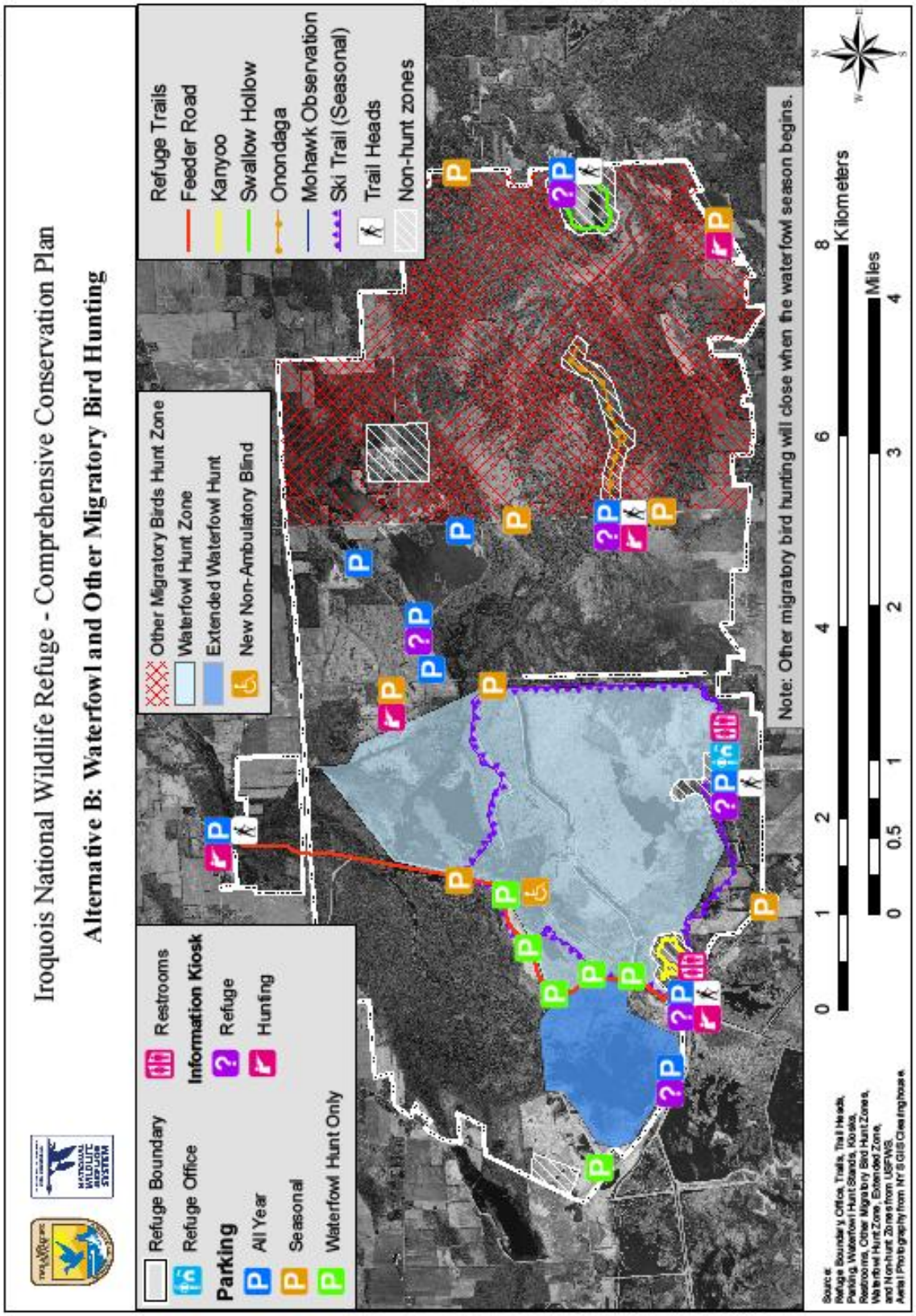
The lands and waters of Iroquois NWR were purchased through the sale of Duck Stamps under the Migratory Bird Hunting and Conservations Stamp Act as an "inviolate sanctuary for migratory birds and other wildlife uses". In 1958 an amendment to the Migratory Bird Hunting and Conservation Stamp Act increased the total area of a Refuge that could be opened for hunting migratory game birds from 25 percent up to 40 percent. Because the Refuge was acquired as an inviolate sanctuary, only 40 percent of the Refuge area may be opened at one time for hunting waterfowl and other migratory birds (woodcock, snipe and rail). After reevaluating the areas which are open to waterfowl and other migratory bird hunting we found that we exceed the 40% limit when the New York State seasons for hunting waterfowl and other migratory birds overlap (Map 2-13). Waterfowl hunting is the second most popular hunt on the Refuge with an average of 400 hunt visits per year over the past five years. Hunting of other migratory birds reports an average of 17 hunt visits per year over the past five years. Based on our evaluation of the current hunting program we propose several strategies (see below) that will change waterfowl and other migratory bird hunting and bring the Refuge into compliance.

Traditionally, Refuge waterfowl hunting has been closed on the Thursday prior to the opening of the deer firearm season. Since the Refuge hunts waterfowl only Tuesday, Thursday and Saturdays, this has limited the number of hunt days to about nine waterfowl hunting days each year. We propose to extend the Refuge waterfowl hunting season in Cayuga Pool only until the end of New York State's first split or December 1, which ever is earlier.. This will provide additional hunting days for waterfowl hunters. The structure of Cayuga Pool and its surrounding areas will maintain separation between waterfowl hunters and deer hunters. Youth waterfowl hunting usually takes place the Sunday after the opening of the season. The New York State Youth Hunting days are almost two weeks earlier. The Refuge proposes to move these days to align the Refuge youth hunt with State Youth Hunting days and allow young hunters the first opportunity to harvest birds.

The Refuge will implement a Refuge permit system where a general permit will be available for hunting of upland game, other migratory birds, and big game hunting. A $5.00 application fee will be charged for all controlled hunts that are determined through a lottery system; this will include the spring turkey hunt and waterfowl hunting. The Refuge will also investigate the effectiveness of conducting a lottery draw for high use days during the deer firearm season.

USFWS

Cayuga Pool


Map 2-13
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative B: Waterfowl and Other Migratory Bird Hunting
Refuge Boundary
Refuge Office
Restrooms
Information Kiosk
Parking
All Year
Seasonal
Waterfowl Hunt Only
Refuge
Hunting
Other Migratory Birds Hunt Zone
Waterfowl Hunt Zone
Extended Waterfowl Hunt
New Non-Ambulatory Blind
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Mohawk Observation
Ski Trail (Seasonal)
Trail Heads
Non-hunt zones
Note: Other migratory bird hunting will close when the waterfowl season begins.
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
N
W E
S
Source:
Refuge Boundary, Office, Trails, Trail Heads, Parking, Waterfowl Hunt Stands, Kiosks, Restrooms, Other Migratory Bird Hunt Zones, Waterfowl Hunt Zone, Extended Zone, and Non-hunt Zones from USFWS.
Aerial Photography from NYSGIS Clearinghouse.

Strategies – All Hunting:

- Create a general permit for the Refuge hunting program. Under a general permit, hunters may chose to apply for hunts that require a lottery system and submit the required fee/fees.
- All lottery hunts will require an application fee.

Strategies – Deer Hunting:

- Continue current management of the archery and muzzleloader season and evaluate each year.
- Conduct a lottery hunt for high use days to provide uncrowded conditions and ensure quality hunting. An increase in hunters may require a quota hunt where the number of hunters would be limited to a specified number as necessary.
- Create a separate lottery system for non-ambulatory hunters as demand for these areas increase.
- Post Onondaga Trail as a "no hunting zone" to restrict hunting and hunter access. This will make it consistent with the other nature trails on the Refuge and allow use by other visitors during the regular (gun) deer hunting season (Map 2-14).
- Develop parameters and guidelines to allow scouting.

Strategies – Turkey Hunting:

- Issue turkey permits through a preseason lottery draw. The lottery draw would allow hunters to be considered for three separate sessions they wish to hunt; Session 1 - May 1 to May 10; Session 2 - May 11 to May 20; or Session 3 - May 21 to May 31.
- Increase hunting permits up to 85, divided into the 3 different hunt sessions as follows: Session 1: 50 permits; Session 2: 25 permits; Session 3: 10 permits.
- Reschedule youth turkey hunt program to align with the New York State Youth Hunting Weekend.
- Continue to require and provide a youth only orientation and hunt in cooperation with the local chapter of the National Wild Turkey Federation prior to hunt weekend.

Strategies – Waterfowl Hunting:

- Establish the same permit fee for weekdays and Saturdays.
- Continue to hunt in the same marshes that are currently open to hunting.
- Continue to provide hunt stands and add an opportunity to hunt in "free roam" areas. Use habitat conditions to determine the exact locations of stands and free roam areas.
- Allow canoeing for both free roam areas as well as stand areas as appropriate.
- Continue to allow waterfowl hunting on Tuesdays, Thursdays and Saturdays until noon.
- Extend waterfowl hunting season no later than December 1 in Cayuga Pool only.
- Develop parameters and guidelines to allow scouting.
- Continue to host the Young Waterfowler's Program with a youth only hunt day. Reschedule youth waterfowl hunt program to align with the New York State Youth Hunting days.
- Hold a pre-season lottery drawing for expected high use waterfowl hunt days prior to the hunt season. Allow stand-by hunters for no shows as long as the hunter has a Refuge permit and other required documents.

- Continue to require and host waterfowl identification courses in cooperation with the NYSDEC and the Finger Lakes and Western New York Waterfowl Association.
- Create a permanent, accessible hunt blind.
- Continue to provide a 50% discount on permit fees for Golden Age and America the Beautiful – Interagency Senior Pass Holders.

Strategies - Other Migratory Bird Hunting:

- Continue to hunt under general permits with no associated fees.
- Allow hunting of woodcock, snipe and rail prior to the opening of waterfowl season. Discontinue during waterfowl season to maintain the 40% acreage requirement discussed above.

Strategies – Small/Upland Game:

- Continue to hunt under general permits with no associated fees.

Objective 5.2 Fishing

Provide opportunities for fishing on the Refuge in a manner that minimizes conflicts between fishing and biological resources, particularly nesting birds and provide participants with reasonable harvest opportunities, uncrowded conditions and minimal conflict with other users.

Rationale - Fishing is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. Fishing is also a popular and traditional activity in the area. Fishing on the Refuge is permitted in accordance with federal and state regulations. The Refuge received 1,073 visits in 2008 for recreational fishing.

According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation approximately 741,000 residents and non-residents participated in fishing in New York during 2006. Approximately 247,000 more anglers fished in the Great Lakes. Anglers spent more than $925 million on activities and equipment related to fishing during 2006 (USFWS 2006b).

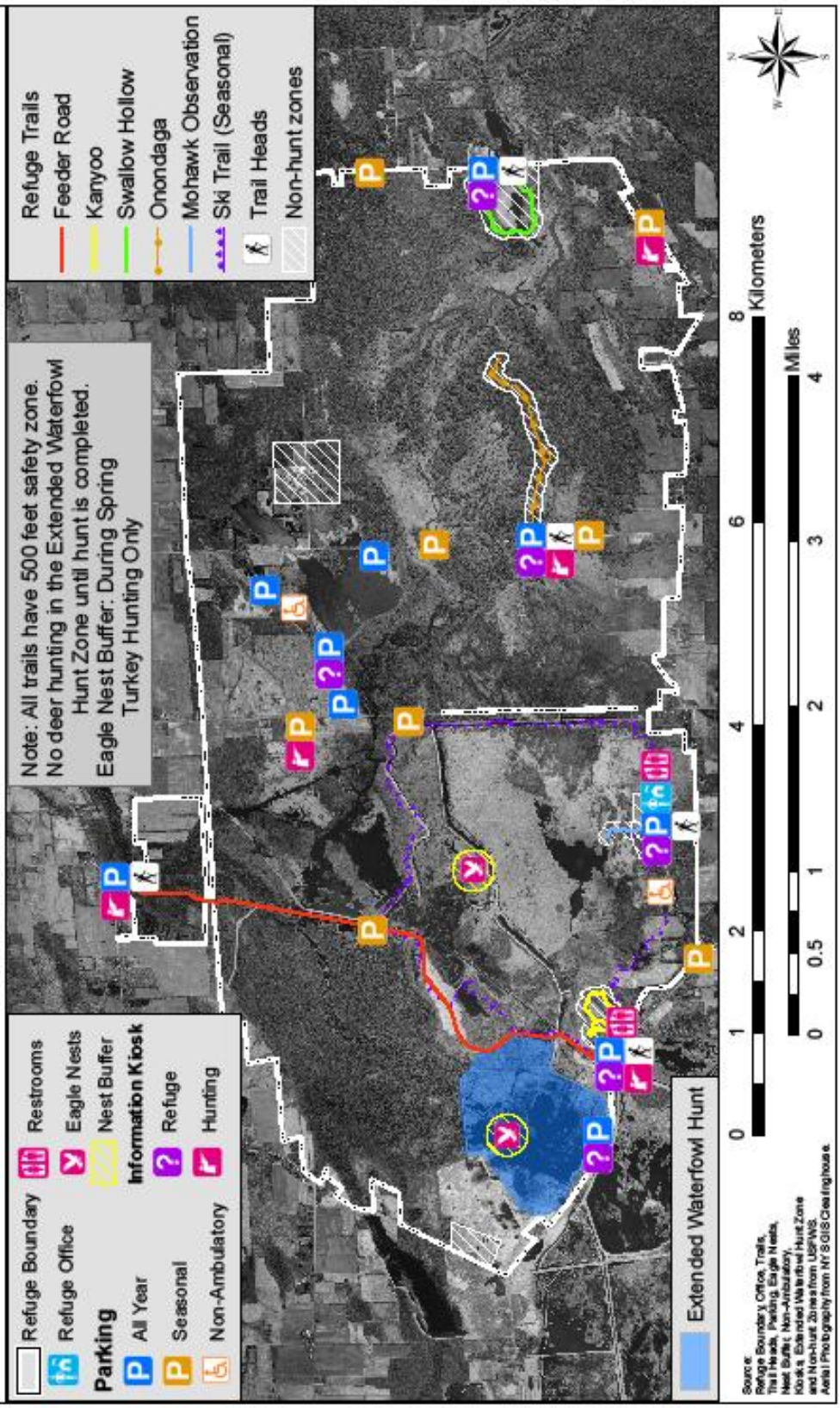
Providing high-quality fishing opportunities on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for our fishing program include the following:

- Maximize safety for anglers and other visitors.
- Cause no adverse impact on populations of resident or migratory species, native species, threatened and endangered species, or habitat.
- Encourage the highest standards of ethical behavior in regard to catching, attempting to catch, and releasing fish.
- Provides opportunities to a broad spectrum of the public that visits, or potentially would visit, the Refuge.
- Provide reasonable accommodations for individuals with disabilities to participate in Refuge fishing activities.
- Reflect positively on the Refuge System.
- Provide uncrowded conditions.
- Create minimal conflict with other priority, wildlife-dependent recreational uses or Refuge operations.

Map 2-14

Iroquois National Wildlife Refuge - Comprehensive Conservation Plan

Alternative B: Big and Small Game Hunting



- Provide reasonable challenges and harvest opportunities.
- Increase visitor understanding and appreciation for the fishery resource.

Fishing is currently permitted year-round from sunrise to sunset from the shore of Ringneck Marsh and in Oak Orchard Creek from the shore at Route 63, Sour Springs Road and Knowlesville Road or by non-motorized boat between Route 63 and Knowlesville Road (Map 2-15). Frogging would be continued on the refuge for bullfrogs only, per state fishing regulations.

Strategies:

- Continue frogging for bullfrogs only on the Refuge.
- Continue to allow fishing at Ringneck Marsh and Oak Orchard Creek open year-round.
- Continue to host the youth fishing derby on the first Saturday in June as part of National Fishing and Boating Week.
- Partner with the USFWS Fisheries Office to conduct a fisheries inventory on the Refuge.
- Evaluate the quality of fishing opportunities at Ringneck Marsh.
- Develop an accessible fishing pier at Ringneck Marsh or in Oak Orchard Creek along Sour Springs Road.
- Prohibit the use of lead sinkers and other lead tackle to prevent their ingestion by wildlife and possible lead poisoning.
- Develop an outreach program to minimize conflicts among user groups, help control aquatic invasive plants and lead in the environment, reduce the introduction of nonnative fish species, and minimize the disturbance to wildlife and habitat.

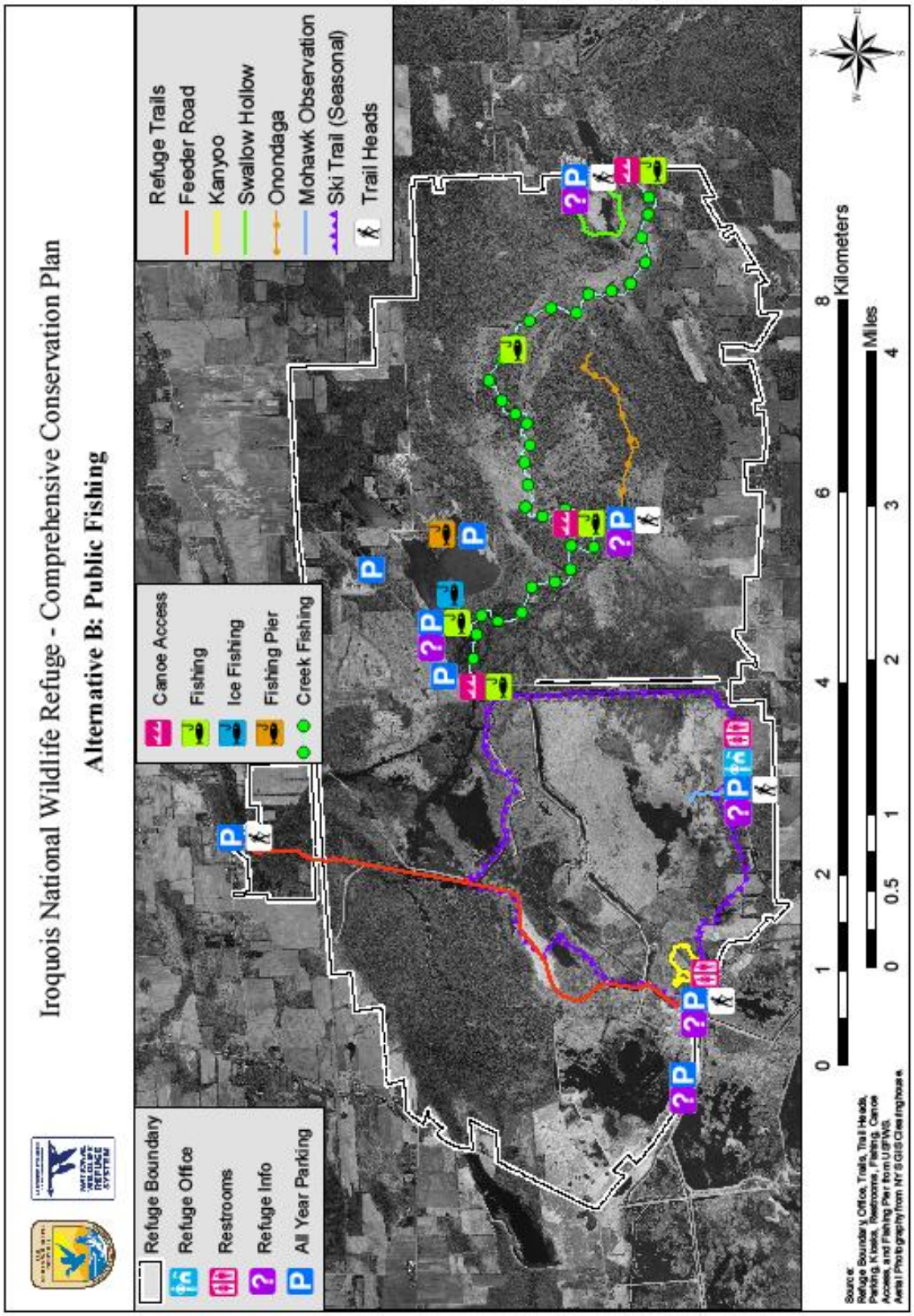
Goal 6. *Enhance partnerships with local communities and various organizations to garner support and promote Refuge programs and resources.*

Objective 6.1 Landscape-Scale Conservation
Enhance the conservation and management of fish and wildlife resources in western New York through partnerships with public and private conservation groups, private landowners, state and local entities including Oak Orchard Watershed Protection Alliance, NYSDEC and other USFWS offices.

Rationale - The Refuge has benefited from existing partnerships in a variety of ways. These include: sharing of technical expertise to support wildlife and public resources; collaborative land conservation planning to ensure that important wildlife habitat is conserved throughout western New York; and cooperative outreach and enforcement of Refuge regulations. We conduct biological and environmental research and monitoring through partnerships with colleges, local schools, Ducks Unlimited (DU), other NGO's, and NYSDEC. The lack of Refuge staffing and funding is the limiting factor in developing and maintaining partners and partner programs.

The Refuge and the NYSDEC have been in partnership for management of the Iroquois Wetland Complex which includes Iroquois NWR, Oak Orchard State Wildlife Management Area (WMA) and Tonawanda State WMA since the Refuge was established. The Refuge and the NYSDEC work together to manage the wetlands and other habitats and cooperate on shared projects and activities. In addition, NYSDEC Environmental Conservation Officers provide law enforcement coverage on the Refuge and NYSDEC trains and provides instructors for the waterfowl identification classes held at Iroquois NWR.

Map 2-15


Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative B: Public Fishing
Refuge Boundary
Refuge Office
Restrooms
Refuge Info
All Year Parking
Canoe Access
Fishing
Ice Fishing
Fishing Pier
Creek Fishing
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Mohawk Observation
Ski Trail (Seasonal)
Trail Heads
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Source:
Refuge Boundary, Office, Trails, Trail Heads, Parking, Kiosks, Restrooms, Fishing, Canoe Access, and Fishing Pier from USFWS.
Aerial Photography from NYSGIS Clearinghouse.

Iroquois NWR will work closely with other agency, NGO and private partners to initiate a private lands habitat restoration program in the Oak Orchard Creek Watershed. Water flowing into Oak Orchard Creek upstream of the Refuge has a direct effect on Refuge water quality. Additionally, wildlife habitat on private lands near the Refuge can complement the habitats provided on the Refuge and improve the quality of the watershed as a whole. Much of the property adjacent to the Refuge and State Wildlife Management Areas has been developed for agriculture or residential and commercial uses. Any restoration activities on these private lands will increase the natural buffer around the Refuge and directly improve the water and habitat quality of the Refuge.

We intend to work within existing USFWS or Natural Resource Conservation Service (NRCS) private lands programs to help facilitate private land project on land near the Refuge. Currently, most government sponsored private land habitat improvement programs have many more applicants than can be accommodated by existing resources. The additional assistance the Refuge can provide by facilitating these programs on our neighbor's lands will help the private landowners, the agency overseeing the program and the Refuge itself.

Additionally, the Refuge currently oversees 23 conservation easements on lands throughout western New York. These easements were transferred to the Refuge from the U.S. Department of Agriculture (USDA) through the Farm and Home Administration (FmHA) loans. Generally, these easements protect relatively small wetlands located on agricultural lands. Under Alternative B the Refuge will visit and catalogue the biological resources on these easements and determine any restoration and enhancement opportunities that may exist on these lands as well as determining compliance with easement requirements. While visiting, Refuge staff will also record any potential wetland restoration or habitat/water quality improvement opportunities that exist on the adjacent lands not currently covered under the easement and contact landowners to determine their interest in private land programs.

Strategies:

- Implement all strategies listed for Objective 6.1 in Alternative A.
- Enhance partnership with the Oak Orchard Watershed Alliance which was established in August of 2004 to guide the development of the State of the Basin Report for the Oak Orchard Watershed. The State of the Basin Report is the first step in the development of a comprehensive watershed management plan. The Orleans and Genesee County Soil and Water Conservation Districts sponsor this watershed planning effort.
- Co-locate with the Lower Great Lakes Fish and Wildlife Conservation Office currently located in Amherst, New York into a new Refuge visitor contact station and administration building (See discussion at beginning of chapter).

Objective 6.2 Support for Refuge Programs

Enhance Refuge programs and increase awareness and stewardship for the Refuge through support from partners that contribute to the Service mission, the Refuge purpose, and Refuge habitat, wildlife and recreation programs.

Rationale – Due to our limited staff and funding, many Refuge programs would not be possible without partners. Partners help with public use, special events, outreach, and research.

Friends of Iroquois NWR is a not-for-profit organization dedicated to increasing public awareness of Iroquois NWR and to helping the community understand the Refuge's mission and goals.

The Friends of Iroquois NWR has several priorities to achieve their mission:

- Conserve, protect and enhance fish and wildlife and their habitats for the continuing benefit of the American people.
- Support the stewardship of the National Wildlife Refuge System.
- Improve awareness, appreciation, conservation and responsible utilization of the Refuge.
- Provide assistance to Refuge programs by entering into agreements with the USFWS.
- Produce and make available to Refuge visitors, by sales or free distribution, suitable
    - interpretive and educational materials to increase the visitors' understanding of the Refuge, wildlife, and the environment, and
    - special materials, memorabilia and events that will enhance visitor enjoyment.
- Acquire materials, supplies, equipment and labor which may be retained by the Corporation, or donated to the Service or Refuge to support operational, educational or maintenance projects.

Friends of Iroquois NWR have secured funding from the Margaret L. Wendt Foundation, the National Fish and Wildlife Foundation ***Centennial Legacy Fund***, the Wild Birds Unlimited ***Pathways to Nature Program***, the USFWS, the Iroquois Job Corp, and Friends of Iroquois NWR members. Friends of Iroquois NWR are able to raise funds to be allocated for specific, much-needed projects on the Refuge. Some projects and activities are: the Youth Fishing Derby and the Spring Into Nature Celebration, purchase of camera equipment for live views of the eagle and kestrel nests, rehabilitation of Swallow Hollow Nature Trail, purchase of trail benches, support for outreach and educational programs such as the Canisius Ambassadors in Conservation program, and the purchase and installation of a water control structure.

The Refuge is fortunate to have a dedicated group of individuals who voluntarily assist the Refuge in various ways. Thirty volunteers contributed over 5,000 hours in 2007 and 86 volunteers provided over 7,000 hours of volunteer time to Refuge activities in 2008 (Table 3-23). These volunteers assisted with environmental education programs and outreach events, conducted wildlife and habitat surveys, provided visitor services, banded birds, managed habitats and species, and carried out general maintenance tasks. In addition to helping the Refuge achieve its objectives and strategies, this group of volunteers serves as an important link with the community at large, promoting refuge messages and garnering support for the Refuge System.

Iroquois Job Corps Center has contributed significantly to projects and events on the Refuge. Carpentry students helped rebuild the 250-foot boardwalk on Kanyoo Nature Trail, participated in the rebuilding of Swallow Hollow Nature Trail, including 2,000 feet of boardwalk, and put a new roof and siding on Building 17 (a storage building located at Refuge Headquarters). These activities saved the Refuge more than $75,000. Students from Iroquois Job Corps Center have also assisted with the Refuge Spring into Nature Celebration helping visitors build bird houses, paint bird silhouettes and conduct face painting.

The Refuge works with many non-profit organizations to help facilitate Refuge programs to meet the demand of the public, to utilize their expertise, or to complete projects that would otherwise be delayed. Examples include with the Young Waterfowler's Orientation, the NYS Waterfowl Identification Course, the waterfowl hunt program and summer internships.

Strategies:

- Increase support for activities of Friends of Iroquois NWR to promote Refuge programs and act as a local grassroots organization through interpretation and educations programs.

- Enhance Refuge volunteer program to assist with the completion of Refuge projects.
- Enhance partnership with the Iroquois Job Corps Center by engaging in at least one cooperative project per year with the center.
- Continue to partner with other non-profit organizations like Buffalo Audubon Society, Western New York and Finger Lakes Waterfowl Association, Lake Plains Waterfowl Association, Canisius College, and University of Buffalo.
- Develop an RV pad with hookups on the Refuge to accommodate seasonal volunteers.

Objective 6.3 Research

Conduct research activities using non-Service personnel from colleges, universities, federal, state, and local agencies, non-governmental organizations, and qualified members of the public to enhance our understanding of species requirements, habitat changes and effectiveness of management techniques.

Rationale - Some research activities on the Refuge are currently conducted by non-Service personnel including colleges, universities, federal, state, and local agencies, non-governmental organizations, and qualified members of the public. Such research furthers our understanding of the natural environment and improves the management of the Refuge's natural resources. The information research generates applies to management on and near the Refuge. Past research projects have studied species including neotropical migrants, marsh birds, and waterfowl. Habitat management techniques like mowing and prescribed fire have been examined to determine their effects on flora and fauna. Other projects have been broader in scale such as the surface-water/ground-water interaction study being conducted by USGS to understand how water flows through the entire Refuge.

The Service encourages and supports research and management studies on Refuge lands that will improve our understanding of and strengthen decisions on managing natural resources. The Refuge Manager encourages and seeks research that clearly relates to approved Refuge objectives, improves habitat management, and promotes adaptive management. Priority research addresses information on better managing the Nation's biological resources that generally are important to agencies of the Department of Interior, the National Wildlife Refuge System, and State Fish and Wildlife Agencies, which address important management issues, or demonstrate techniques for managing species or habitats.

We also consider research for other purposes that may not relate directly to Refuge-specific objectives, but contribute to the broader enhancement, protection, use, preservation or management of native populations of fish, wildlife and plants, and their natural diversity in the region or the Atlantic Flyway. All proposals must comply with Service policy on compatibility.

Strategies:

- Implement all strategies listed for Objective 6.3 in Alternative A.
- Develop a database of research needs that is updated each year to allow the Refuge to respond quickly to funding opportunities.

Alternative C - Natural Systems

Introduction

The wetlands of Iroquois NWR support thousands of waterfowl during spring and fall migration, provide habitat for two pairs of nesting bald eagles, a heron rookery, and for many bird species of special concern in the State of New York including the black tern. Additionally, the Refuge's forested wetlands support many songbirds of conservation concern as well. The myriad wildlife values prompted Iroquois NWR to be identified as one of New York's first Important Bird Areas (IBA).

National wildlife refuges are important for both rare and common species and generally provide habitat for high concentrations of birds. This underscores the role of refuges to provide places where wildlife comes first (NWRSIA 1997). National wildlife refuges are also models and demonstration areas for habitat management. To succeed in that mission, refuges need to engage the public in understanding and participating in the stewardship of refuge resources. Hunting, fishing, trapping, and wildlife viewing have long traditions in western New York, including in and around Iroquois NWR. To ensure conservation and management of the resources entrusted to its care, the Refuge needs to capture the interest and good will of traditional users and new visitors. With enhanced public outreach interpretation, environmental education, and well-managed public use opportunities, traditional users and new visitors may become partners.

A refuge does not exist in isolation from its surrounding landscape. That is particularly true of the Iroquois NWR, located within the "Alabama Swamps" and in the heart of the Oak Orchard Watershed. Habitats and wildlife populations are affected by land uses within the watershed including the effects of water quantity and water quality. The Refuge needs to expand its work with adjacent landowners, watershed residents and conservation partners within the basin to ensure a healthy, functioning Refuge.

Alternative C provides a third way to meet Refuge challenges and opportunities. This alternative will result in an understanding of the Refuge resources used by threatened or endangered species, migratory birds, and resident wildlife; the protection and enhancement of those resources; the protection of water quality; the restoration of Refuge habitats; and the accessibility of the Refuge to the public for compatible, wildlife-dependent public uses. The result is a set of goals, objectives and strategies related to key issues that will guide management of the Refuge for the next 15 years. Students, interns, and volunteers, including the Friends of Iroquois NWR are valuable partners in helping the Refuge achieve the objectives set out in Alternative C.

Habitat Conditions

Under Alternative C, the Refuge habitat conditions would change as a result of management decisions that target a more natural state (less management) and emphasize restoration to native habitats (Table 2-3 and Map 2-16). Refuge impoundments will no longer be actively managed and some will be removed. This will result in a decrease of approximately 329 acres of open water and emergent marsh habitat. Grassland acres will be reduced by 50% as only the two largest grassland units will be managed. Management of shrublands will be discontinued and the only shrub habitats that will remain are small native shrub swamps. Forest cover will increase (1,548 additional acres) under this alternative in response to the reversion, succession and conversion of conifer plantations, grasslands, shrublands, emergent marsh and open water to forest.

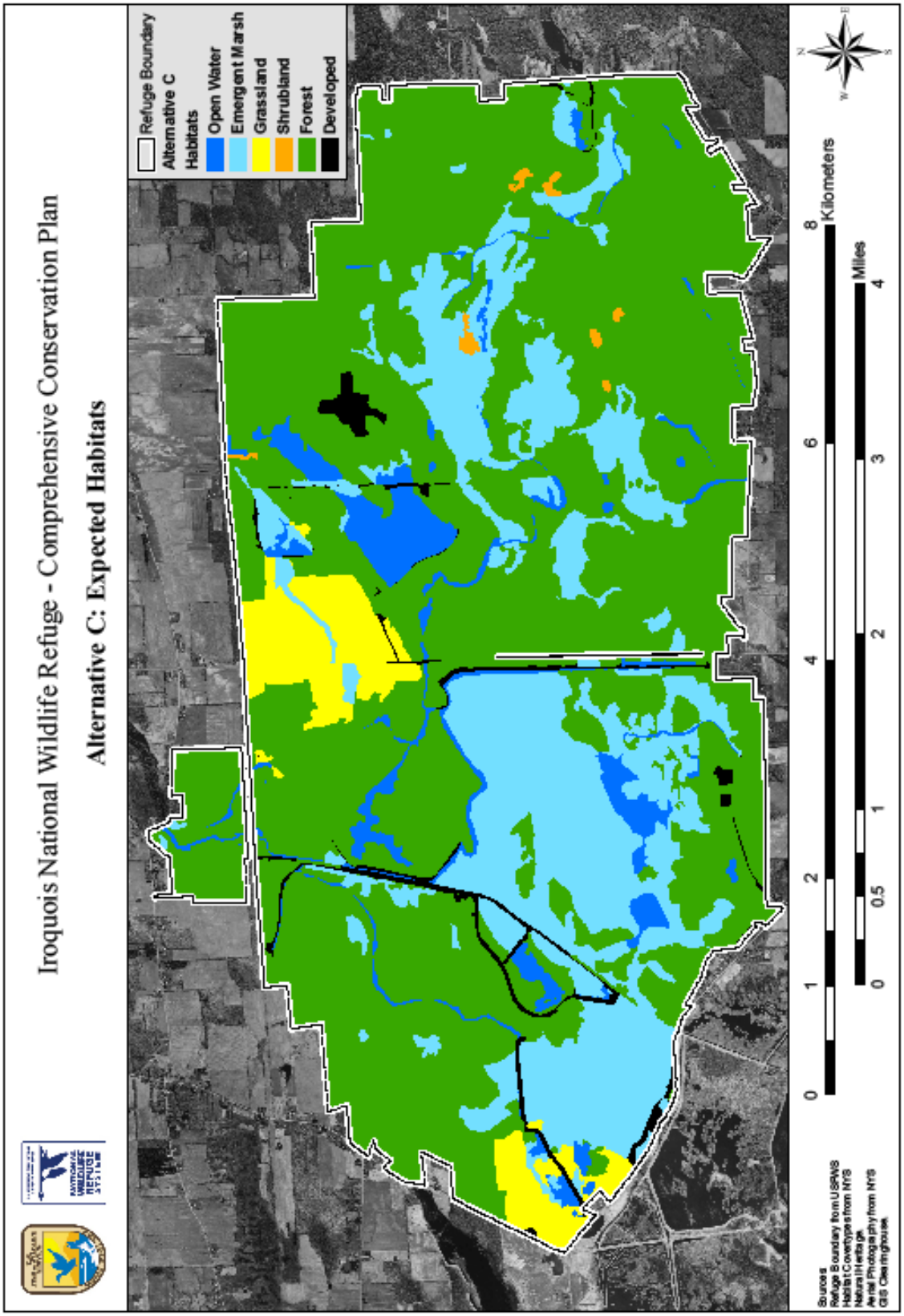

Map 2-16
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative C: Expected Habitats
Refuge Boundary
Alternative C Habitats
Open Water
Emergent Marsh
Grassland
Shrubland
Forest
Developed
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Sources
Refuge Boundary from USFWS
Habitat Coverages from NYS Natural Heritage
Aerial Photography from NYS GIS Clearinghouse

Table 2-3 Alternative C Habitat Acres

Habitat Acres by Alternative and Difference from Alt. A			
Habitat	**Alternative A**	**Alternative C**	**Difference (Alt C – Alt A)**
Open Water	823	663	-160
Emergent Marsh	2,581	2,412	-169
Grassland	1,048	535	-513
Shrubland	526	25	-501
Forest	5,402	6,951	1,549
Conifer Plantation	200	0.00	-200
Developed	248	242	-6
Total	10,828	10,828	

Eliminate Unrestricted Public Access

Visitors are currently required to stay on designated trails from March 1 through July 14. This limits disturbance to spring migration, nesting and brood rearing seasons. People are currently allowed to wander unrestricted from July 15 through the end of February. We have seen an increase in the number of visitors accessing off-trail areas of the Refuge, particularly in the fall. Additionally, visitors are increasingly accessing wetland areas which in the past were left relatively undisturbed.

Under Alternative C, we propose to follow the lead of most other National Wildlife Refuges and restrict public access to designated areas of the Refuge year-round. The Refuge would still allow wildlife observation/hiking/walking/etc. on established Refuge nature trails year round. Access to other parts of the Refuge would be restricted to hunters permitted under Refuge hunting programs. Parameters to accommodate scouting would be set as needed. Closing the Refuge to unrestricted wandering would eliminate human disturbance in Refuge impoundments when waterfowl and other migrating birds are using these wetlands to rest and feed. The Refuge is a significant migration stopover area for waterfowl and ongoing disturbance in impoundments directly impacts our ability to meet our wetland habitat objectives and adds to the cumulative impact of our waterfowl hunting program**.**

Refuge Activity, Hunting and Special Use Fees

Refuge lands offer many recreational opportunities. However, the costs to maintain those activities continue to increase while revenues continue to decline. Maintaining gravel roads and other facilities and structures requires increasing staff time and financial resources. To help offset the increasing administrative costs associated with managing and overseeing recreational uses, Alternative C proposes to continue collecting fees associated with hunting activities and special use permits. In addition, we propose to modify the hunting fee program. Eighty percent of revenues generated by the collection of fees for Refuge programs will be retained to enhance visitor services and maintain recreation facilities at Iroquois NWR. We use the remaining 20 percent in the Northeast Region for region-wide projects to improve and maintain visitor services, address visitor and staff health and safety, and pay for overhead associated with the recreation fee program and the Service in general.

The Refuge will implement a permit system where a general permit will be available for hunting upland game, other migratory birds, and big game hunting. A $5.00 application fee will be charged for all controlled hunts that involve a lottery system which includes the spring turkey hunt and waterfowl hunting. The Refuge will also investigate the effectiveness of conducting a lottery draw for high use days during the deer firearm season.

Golden Age Passport holders, Golden Access Passport, and certain America the Beautiful Interagency Senior Pass Holders will still be entitled to half-price hunting fees under Alternative C. The Refuge will continue to collect special use permit fees for haying, an activity that supports management of our grasslands. Currently, these permits are based on a minimum bid system that depends on how many acres

are available for haying. We may adjust activity, hunting, and special use permit fees over the 15-year period of this plan to reflect changes in administrative costs, management goals, or policy.

Fees will not be charged for certain programs including Refuge Youth Hunt Programs, special events like Spring into Nature and the Fishing Derby, and interpretive programs conducted by the Iroquois Observations (IO) program and the Refuge.

In addition to the fee program mentioned above, we anticipate that Friends of Iroquois NWR, Inc. will continue to support the Refuge using a portion of the funds received from membership dues, the Flyway Nature Store, fund raising activities and grants. Visitors will be encouraged to make voluntary contributions at collection boxes at the visitor contact station and to the Friends of Iroquois NWR to support special events.

Renovate Refuge Visitor Contact Station and Administration Building

The visitor contact station, located within the Refuge office building has exhibits and information about the Refuge including common wildlife species and wildlife dependant recreational opportunities. The 5,000 square foot visitor contact station and administration building that currently houses six Refuge employees and two NYSDEC employees. The visitor contact station receives approximately 6,000 visits per year; most during the months of March, April and May. A 60-seat auditorium/multipurpose room serves as a meeting room and can accommodate school groups, civic groups and families for interpretive and environmental education programs. The Flyway Nature Store, operated by Friends of Iroquois NWR is also located within the visitor contact station.

Regional Director's Orders No. 06-02 established a system to co-locate Service offices that are in close proximity to each other. It is expected that co-location will provide improved service to customers and maximize efficiencies and cost savings, while at the same time enhancing coordination and cooperation among the various Services resource programs and administrative support functions. Co-location is a clear step to minimizing space and utility costs and increasing cross-program collaboration.

Under Alternative C we propose to co-locate the Lower Great Lakes Fish and Wildlife Conservation Office, Division of Law Enforcement currently located in Amherst, New York with a new visitor contact station and administration building at Iroquois NWR. The building will be developed in accordance with USFWS standard design facilities (Figure 2-1). The building will be approximately 10,609 square feet and include 5,484 square feet for administration and 5,125 square feet for the visitor contact area. The building will include a sales outlet for Friends of Iroquois NWR, exhibit hall, multi-purpose room, conference room and offices to house staff from Refuges, Fisheries, and NYSDEC.

The new building will be created by adding on to the existing building. The existing portion will be remodeled to serve as the visitor contact section of the new building. An architectural and engineering firm will be hired to develop a conceptual design that will blend the existing building in with the new, standard design. The new portion of the building will be placed in an area that has already been disturbed when the current building was built in the 1970's. As we move forward with the design of the building we will be looking at alternative energy sources to reduce consumption of petroleum products to heat buildings as well as electricity to power the building. We will investigate the possibility of geothermal heating, a wind (small single/double) turbine and solar energy.

Refuge Goals, Objectives and Strategies

Strategies that apply to all goals in Alternative C:

Strategies have been developed to achieve objectives under each of the six Refuge goals. While most strategies are specific to each goal, a few apply to all goals in this alternative. These include:

- Continue to recruit, hire and train, students under the Student Career Experience Program and Student Temporary Employment Program to assist with all Refuge goals, programs, and operations.
- Continue to recruit and train interns and volunteers to assist with all Refuge goals, programs, and operations and provide housing where possible.
- Continue to encourage a broad-based Friends of Iroquois NWR group that supports Refuge goals, programs, and operations.
- Hire a permanent full-time Law Enforcement Officer (GS-0025-9) to provide visitor safety, protect resources, and ensure compliance with Refuge regulations.
- Hire a permanent full-time Maintenance Worker (WG-4749-8)
- Annually inspect approximately 20% of the Refuge boundary to ensure signs are visible, readable, have not been vandalized and are in good overall condition. Annually review that non-hunting areas are properly posted.
- Reach out to local communities and schools to build awareness, understanding, and support for Refuge biological and land protection programs and activities and demonstrate the role of Iroquois Refuge in the Refuge System.

Strategies that apply to Goals 1, 2, and 3:

- Reduce staff time spent on active management of Refuge resources and allow a natural cycle to prevail to the greatest extent possible.
- Continue to develop a comprehensive GIS database for Iroquois NWR and the surrounding landscape to map and track habitat types and conditions, rare species populations, other ecological features, land use issues, and other relevant information for long-term planning and monitoring of resources.
- Continue to monitor and control non-native invasive species using a combination of mechanical, biological, and chemical techniques to restore native plant communities and healthy ecosystems; Refine the protocol for prioritizing mapping, monitoring and control of invasive species to have the greatest impact on the highest priority habitat objectives.
- Within five years evaluate all the data from completed baseline surveys of birds, amphibians, reptiles, mammals, plants, mussels and fish, and other species to identify additional baseline surveys necessary to determine presence/absence in respective habitat types and to address management questions.
- Over a 15 year period, systematically remove artificial structures as appropriate. Wood duck nesting data should be evaluated to determine if certain boxes are not used at all should be removed sooner and the remainder phased out. Monitoring of wood duck boxes should be conducted by volunteers.
- Hire one permanent full-time Biological Technician (GS-7).

- Hire one permanent part-time Biological Technician (GS-5. 0.5 FTE).

GOAL 1. *Provide high quality freshwater wetland migration stopover and breeding habitat for waterfowl, marsh birds, shorebirds, and bald eagles in Refuge impoundments.*

Strategies that apply to all objectives under Goal 1:

- Remove and prevent mute swans from becoming established on or regular inhabitants of the refuge.
- Allow management of marsh furbearers except in no trapping zones around the Refuge headquarters, houses, trails and Job Corps **(**Map 2-17).
- Allow up to three trappers per unit for trapping units 1, 2, 3, and 4. All other trappers will distribute themselves through trapping unit 5.
- Conduct yearly snapping turtle surveys.

Background

Iroquois NWR is part of the 19,000-acre Tonawanda-Iroquois-Oak Orchard Wetland Complex. The creation of the Barge Canal System, beginning in the early 1800s, and the draining of wetlands for agriculture and other uses dramatically changed the hydrology of the "Alabama Swamps," as this area was known. The area continued to flood each spring creating thousands of acres of shallow wetlands, but the spring waters would recede quickly and only the lowest areas remained wet through the summer. Once the Refuge was established, farm ditches were plugged and several impoundments were created to allow managers to control water levels. Water level management provided wetland habitat throughout the year and restored variability to the hydrology of the region.

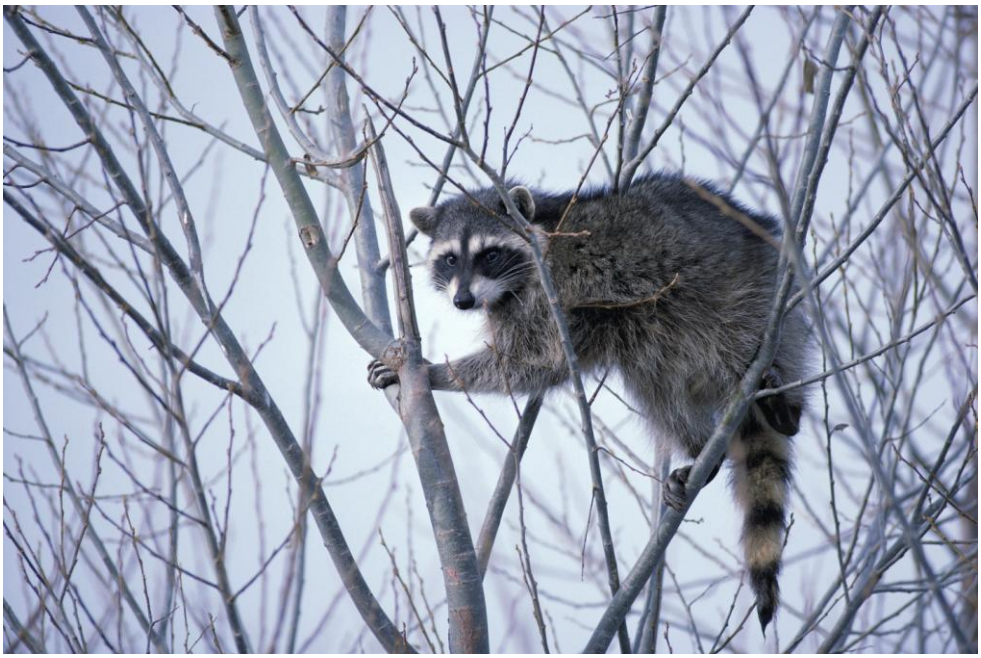
There are currently 19 wetland impoundments on the Refuge (Map 2-18). These impoundments encompass nearly 4,000 acres of diverse wetland habitat. Because of the uneven topography within individual impoundments, often a single impoundment will help meet multiple objectives within the same year. Water levels are adjusted within and between years to mimic natural hydroperiods associated with unaltered wetlands and to provide the optimal habitat conditions for wetland dependent wildlife species.

Under this alternative, water levels will not be managed by Refuge staff and any fluctuations will be a result of precipitation and evapotranspiration. Most impoundment water levels will be set at an optimal level based on past experience and the best available science. Other impoundments will have the boards entirely removed from their water control structures and water will be allowed to flow freely in and out of the impoundment.

Currently, most impoundments are drawn down approximately every three to six years; a few impoundments are scheduled for drawdown every year. Managing this drawdown cycle requires a significant investment of staff time for planning and implementation. The reduced management alternative proposed here will only require planning and implementation at the onset and all future time will be devoted to more consistent monitoring and maintenance with no additional time necessary for water level management. This alternative will result in a more static hydroperiod. The vegetative community within impoundments will eventually stabilize with the most likely scenario being open water areas in the deeper water sections of the marsh surrounded by dense stands of perennial emergent vegetation around the shallow periphery. If the initial impoundment water levels are set lower, the result will likely be very little open water, dense stands of perennial emergent vegetation across the interior of the impoundments and an encroachment of forested wetland plants along the periphery.

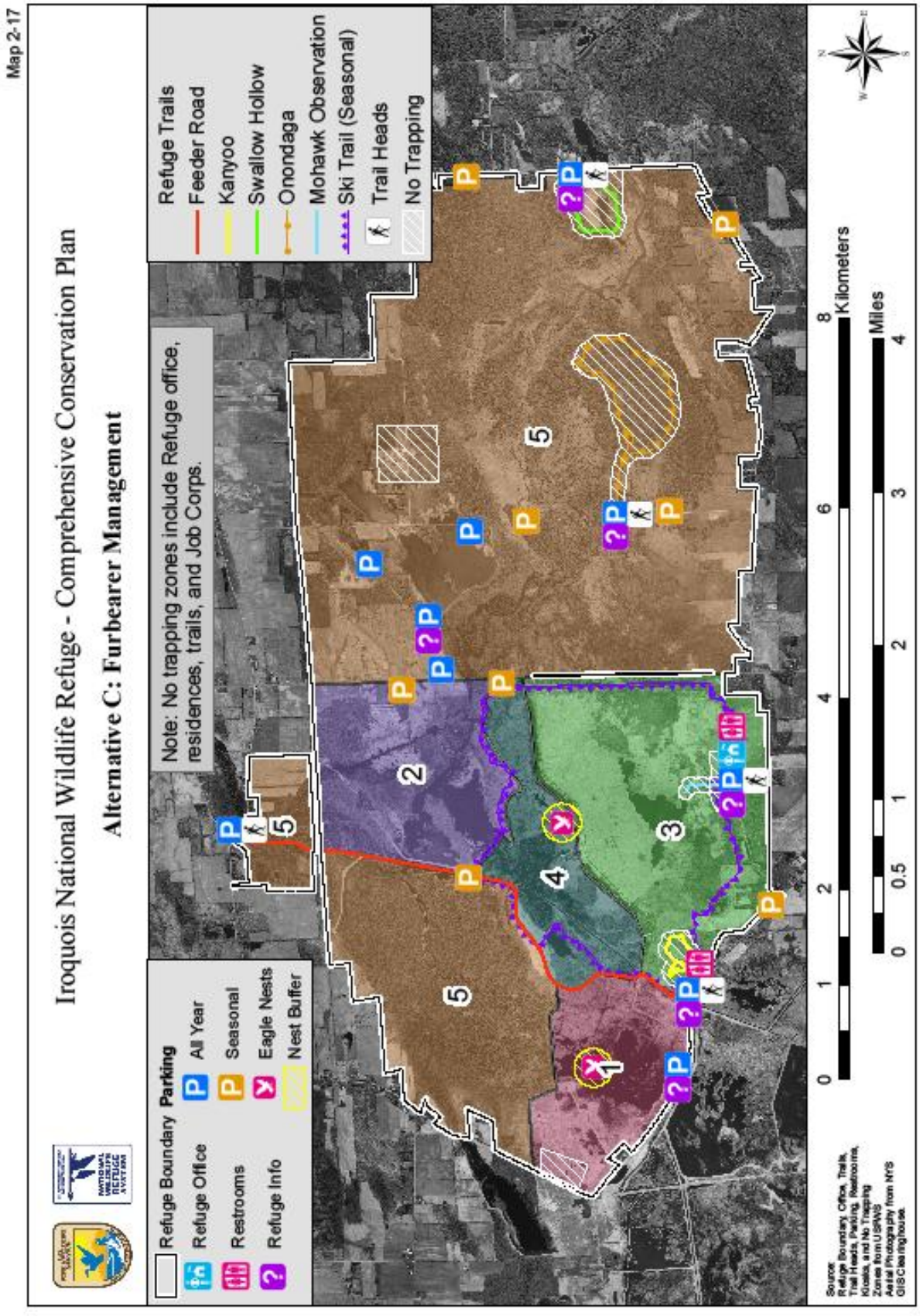
Furbearer management will be conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions. Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

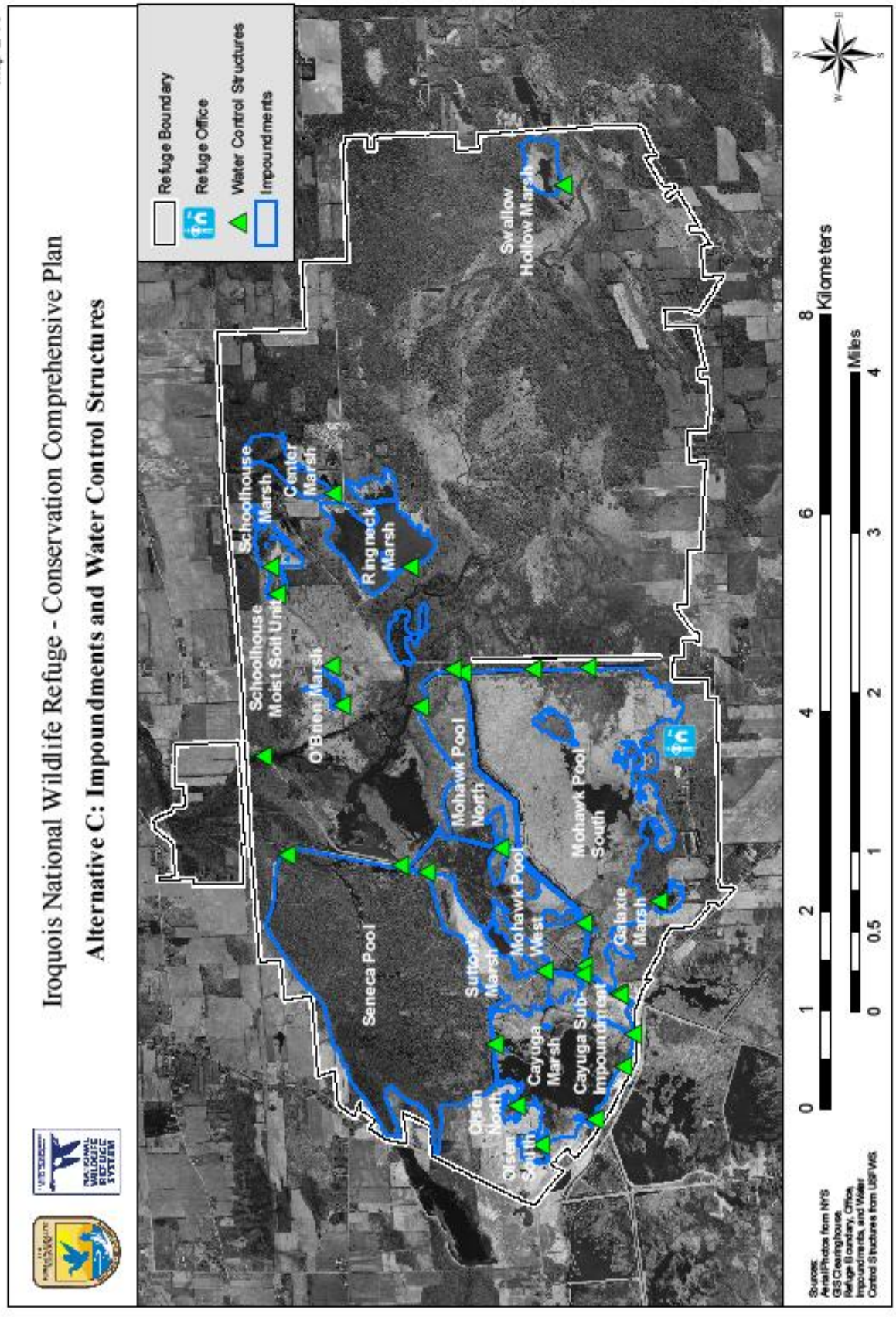
Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.



Dave Menke/USFWS

Raccoon


Map 2-17
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative C: Furbearer Management
Refuge Boundary
Parking
All Year
Seasonal
Refuge Office
Restrooms
Refuge Info
Eagle Nests
Nest Buffer
Note: No trapping zones include Refuge office, residences, trails, and Job Corps.
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Mohawk Observation
Ski Trail (Seasonal)
Trail Heads
No Trapping
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Source:
Refuge Boundary, Office, Trails, Trail Heads, Parking, Restrooms, Kiosks, and No Trapping Zones from USFWS
Aerial Photography from NYS GIS Clearinghouse.


Map 2-18
Iroquois National Wildlife Refuge - Conservation Comprehensive Plan
Alternative C: Impoundments and Water Control Structures
Refuge Boundary
Refuge Office
Water Control Structures
Impoundments
Schoolhouse Marsh
Center Marsh
Ringneck Marsh
Schoolhouse Moist Soil Unit
O'Brien Marsh
Swallow Hollow Marsh
Mohawk Pool North
Mohawk Pool
Mohawk Pool South
Seneca Pool
Suttons Marsh
Mohawk Pool West
Galaxie Marsh
Olsen North
Olsen South
Cayuga Marsh
Cayuga Sub Impoundment
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
N
W
E
S
Sources:
Aerial Photos from NYS GIS Clearinghouse,
Refuge Boundary, Office, Impoundments, and Water Control Structures from USFWS

Objective 1.1 Emergent Marsh – Migrating Waterfowl

Each year, provide a minimum of 800 acres of waterfowl stopover habitat in mid-March through early May (spring migration) and again in late September to early November (fall migration) consisting of shallow flooded wetlands (<18") dominated by annual moist soil vegetation such as sedges, Bidens *spp*., smartweed, and wild millet.

Rationale - Objective 1.1 will benefit many of the 20,000 ducks that pass through the Refuge during migration including several waterfowl species listed as priorities (highest, high, or medium) in the BCR 13 Plan: American black duck (highest), northern pintail (high), blue-winged teal (medium), and mallard (medium). The black duck, mallard, and northern pintail are species of management concern for the USFWS in the northeast region and are also listed in the New York Wildlife Action Plan (NYWAP) as species of greatest conservation concern. The New York Important Bird Area program listed a large concentration of migrating waterfowl as important criteria in designating Iroquois NWR as an IBA.

Fall migrant waterfowl require large amounts of carbohydrate rich foods to prepare them for their migration to the wintering grounds and also to replace the large amounts of energy needed to sustain them as cooler fall temperatures drain their energy reserves. Currently, moist soil annual seeds are produced as a result of wetland drawdowns and provide a readily available source of carbohydrates. Under Alternative C, moist soil plants will only be available as a result of seasonal droughts. In years of high summer precipitation, little to no moist soil plants will grow. In other years, these plants will germinate and grow along the vegetation/open water interface that has dried out as a result of summer evapotranspiration. During severe drought, most open water areas will dry down enough to support the growth of these annual plants. Most annual plant species need a minimum of 60 days growing period to produce seeds. Moist soil plants need to be re-flooded to provide habitat for waterfowl. This re-flooding will occur as a result of fall rains, or in years with lower than average fall precipitation, re-flooding will occur the following spring. Waterfowl will forage on these areas until they leave to continue their fall migration or until ice conditions force them to move to open water elsewhere.

Spring migrant waterfowl, particularly females, require large amounts of protein rich foods to prepare them for the remainder of their northward migration and to provide them with the nutrition necessary to successfully nest. Hens gather this protein by feeding heavily on aquatic invertebrates on the wintering grounds and on feeding areas along their migration corridors. Invertebrate populations thrive on the residual annual vegetation left over from the previous year's drawdown and invertebrates emerge as soon as temperatures rise enough to melt the ice. Additionally, seeds produced by annual plants during dryer years will still be available the following spring to northward migrating waterfowl and provide a carbohydrate rich food source that supplements the protein being gathered while feeding on invertebrates. Iroquois NWR is an important spring migratory stopover area for many species of waterfowl in the Atlantic Flyway as it contains a variety of wetland types and sizes. Passive wetland management proposed under this alternative will likely result in lower quality waterfowl migration habitat, but will result in more stable water levels and a reduction in the resources necessary to manage those water levels.

Strategies:

- Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change.
- Remove all boards in Structure L (Oneida Pool) to allow water levels to fluctuate "naturally" with a less restrictive flow.
- Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed).
- Establish monitoring protocol to evaluate changes in wetland vegetation composition.

- Monitor the response of annual moist soil vegetation to this reduced-management alternative.
- Create and implement a protocol to monitor waterfowl trends during spring and fall migration.
- Continue to monitor the response of purple loosestrife to herbivory by *Galerucella* beetles.

Objective 1.2 Emergent Marsh – Spring Migrating Geese

Each spring, provide a minimum of four patches of roosting habitat ≥50 acres in size, totaling at least 300 acres, for 75,000 or more migrating Canada geese from mid-March to May. Roosting habitat should consist of wetlands where open water makes up 50% or more of the wetland area.

Rationale - Over half of the Refuge is wetland (6,200 acres) with 4,000 of these wetland acres contained in 19 managed freshwater impoundments. Water levels are adjusted within and between years to mimic natural hydroperiods associated with unaltered wetlands to provide a variety of feeding, nesting, brood rearing, and resting habitats for migratory birds and resident wildlife. The interspersion of open water and aquatic and emergent plant communities provides resting and feeding habitat for over 120,000 waterfowl annually. The thousands of geese that migrate through the Iroquois Wetlands Complex each spring spend their day feeding in cornfields in the extensive agricultural lands surrounding the wetlands. The geese feed on waste corn left from the previous year's harvest before a new crop is planted later in the spring. At night the Refuge serves as a secure roosting area away from predators. The flocks of geese using the Refuge include birds from the Atlantic and Southern James Bay populations as well as geese from the resident population. Large numbers of resident geese are perceived to cause substantial resource and socioeconomic problems across the region, necessitating control programs. However, the Atlantic and Southern James Bay populations are of conservation concern because of significant population declines and are listed as highest priority in the BCR 13 Plan.

Large wetlands with substantial amounts of open water provide ideal roosting areas for Canada geese. The geese roost in these areas where they are safe from terrestrial predators. Additionally, these wetland areas provide the birds with another food source to compliment the high carbohydrate waste grains that they are feeding on in fields near the Refuge. Iroquois NWR was created in part for its value as a spring migration stopover area for Canada geese. To this day, tens of thousands of geese roost and feed on the Refuge during spring migration. Smaller numbers use the Refuge during fall migration and a few hundred geese spend the summer months breeding on the Refuge.

Strategies:

- Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Set level in some impoundments high enough to ensure open water areas in all but the driest years.
- Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed).
- Establish a monitoring protocol to evaluate changes in wetland vegetation composition.

Objective 1.3 Emergent Marsh – Deep Water Breeding Marsh birds

Each year, provide a minimum of 800 acres of habitat for breeding marsh birds that use deeper water areas with specific emphasis on black tern, pied-billed grebe and least bittern. Target a 50:50 mix of vegetation and open water (hemi-marsh) with an average water depth of 18-20" and at least three muskrat lodges per acre. Additionally, this habitat should be provided in a minimum of three patches ≥100 acres each.

Rationale - Weller and Spatcher (1965) found the maximum number and diversity of marsh birds occurred in wetlands with a well interspersed vegetation cover to water ratio of 50:50. This habitat type is usually referred to as a "hemi-marsh". At Iroquois NWR hemi-marsh habitat has been found to support robust populations of breeding marsh birds. In the past, this habitat usually occurred during the middle two or three years of an average drawdown cycle. Under this Alternative, initial impoundment water levels will need to be set to aim at providing hemi-marsh along the open water/vegetation interface. The location and size of this interface area will shift from year to year.

Black tern, pied-billed grebe and least bittern are all priority species (medium) in the BCR 13 Plan and are species of greatest conservation concern in the NYWAP. The black tern is listed as an endangered species and pied-billed grebe and least bittern are listed as threatened in New York. The abundance of these three breeding species was included as important criteria in designating the Iroquois Wetlands Complex as an IBA in New York. The New York Natural Heritage Program describes the Iroquois deep emergent marsh as a significant ecological community.

Pied-billed grebe, least bittern and black tern are generally found in the deeper areas of hemi-marsh habitat with slightly more open vegetation. This habitat type allows these species more access to their preferred food resources and the optimal conditions for foraging. These species swim (pied-billed grebe), fly and dive (black tern), or grasp vegetation along the edge of open water (least bittern) to forage, thus allowing them to use deeper water areas of the marsh. Conversely, species such as American bittern and Virginia rail are usually associated with shallower water areas supporting a slightly more robust vegetation component with less open water. These species stand in water to forage, thus restricting them to areas where water levels are only a few inches deep.

Strategies:

- Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Set level in some impoundments to ensure some hemi-marsh habitat is available under normal precipitation conditions.
- Monitor black terns and least bitterns every three years to provide an index of what the breeding population is doing.

Objective 1.4 Emergent Marsh – Shallow Water Breeding Marsh birds

Each year, provide a minimum of 400 acres of habitat for breeding marsh birds that use shallow water areas with an emphasis on American bittern and Virginia rail. Target a 70:30 mix of vegetation and open water with an average water depth of 10-12". Additionally, this habitat should be provided in a minimum of two patches $\geq$50 acres each.

Rationale - The American bittern is a high priority species in the BCR 13 Plan, the NYWAP, and the North American Waterfowl Management Plan. The Virginia rail is a medium priority in BCR 13. See the rationale under Objective 1.3 for habitat requirements of selected marsh bird species.

Strategies:

- Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Set level in some impoundments to ensure some heavily vegetated habitat is available under normal precipitation conditions.

- Conduct call-back and nest surveys according to regional protocol for pied-billed grebe (Region 5 species of concern) and American Bittern.

Objective 1.5 Emergent Marsh – Waterfowl Brood Rearing
Each year, provide a minimum of 400 acres of waterfowl brood rearing habitat consisting of 40% to 80% vegetative cover with an average water depth of 10-20". This habitat should be provided in a least four patches ≥50 acres each.

Rationale - Breeding (brood-rearing) habitat for mallard, blue-winged teal and wood duck is a high priority in the BCR 13 Plan and in the North American Waterfowl Management Plan. Waterfowl broods require habitat that provides an abundance of food (primarily protein) and safety from predators. At Iroquois NWR, these needs can be met within impoundments in a hemi-marsh stage. Hemi-marsh habitat provides needed cover through the interspersion of robust perennial vegetation and open water allowing ducklings to forage on aquatic invertebrates while never being very far from adequate cover. The presence of both emergent and submergent vegetation in these wetlands provides the necessary substrate for invertebrate reproduction and subsequently provided ducklings with the protein-rich food resources necessary for their growth and survival.

Many duck species found at Iroquois NWR nest in grasslands. Some nest sites can be a significant distance from water (> one mile). When a brood hatches the hen leads the ducklings to a wetland area where they can find food and safety. This overland trip from nest site to wetland has been found in some studies to result in a significant loss of ducklings (Dzubin and Gollop 1972). Providing brood rearing habitat in close proximity to nesting grasslands should help reduce some of this duckling mortality. Impoundments used to meet Objectives 1.3 and 1.4 may also fulfill this objective, particularly if they are close to waterfowl nesting habitat.

Strategies:

- Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Set level in some impoundments (particularly those close to grasslands) to ensure some hemi-marsh habitat is available under normal precipitation conditions.
- Reduce predators by increasing emphasis on upland furbearer management and initiating a snapping turtle management program.
- Over the next five years, remove all artificial nesting structures.

Objective 1.6 Open Water
Each year, provide bald eagle feeding habitat on a minimum of 250 acres, consisting of at least two patches ≥100 acres each of open water wetland for foraging bald eagles to coincide with their hatching and fledging period (April - June).

Rationale - The bald eagle is a New York State threatened species and a bird of management concern for the USFWS. The presence of three breeding pairs contributed to the designation of the Iroquois Wetland Complex as an IBA.

The USFWS *National Bald Eagle Management Guidelines* from 2007 state new recommendations for land management practices as well as how to avoid disturbance to the eagles. In general, activities should be kept as far away from nest trees as possible; loud and disruptive activities should be conducted when eagles are not nesting; and activity between the nest and the nearest foraging area should be minimized.

Some disturbance categories listed in the guidelines that are relevant to Iroquois NWR are timber operations and forestry practices, off-road vehicle use, and non-motorized recreation and human entry

The above categories are taken from the USFWS *National Bald Eagle Management Guidelines* and although off-road vehicle use is indicated, Iroquois NWR does not allow ORV use on the refuge. This category would cover vehicle use by researchers, volunteers, refuge staff, etc. in conducting official duties.

Strategies:

- Continue to implement USFWS 2007 *National Bald Eagle Management Guidelines* including:
  - **Category C – Timber Operations and Forestry Practices.** Avoid timber harvesting operations, including road construction and chain saw and yarding operations, during the breeding season within 660 feet of the nest. Selective thinning and other silviculture management practices designed to conserve habitat, including prescribed burning close to the nest tree, should be undertaken outside the breeding season. If it is determined that a burn during the breeding season would be beneficial, then, to ensure that no take or disturbance will occur, these activities should be conducted only when neither adult eagles nor young are present at the nest tree. Appropriate Federal and state biologists should be consulted before any prescribed burning is conducted during the breeding season.
  - **Category D – Off-road vehicle use.** No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet.
  - **Category F - Non-motorized recreation and human entry** (e.g., hiking, camping, fishing, hunting, bird watching, kayaking, canoeing). No buffer is necessary around nest sites outside the breeding season. If the activity will be visible or highly audible from the nest, maintain a 330-foot buffer during the breeding season, particularly wher**e** eagles are unaccustomed to such activity (USFWS 2007b).
- Continue to restrict public access to eagle nesting areas during the breeding season by implementing the closure of the refuge to unrestricted access.
- Continue to coordinate with the NYSDEC on the protection, monitoring and management of the Iroquois Wetland Complex nesting eagles.
- Maintain water levels in all impoundments at their optimum levels to ensure adequate open water areas in all years.

Objective 1.7 Mudflats

Provide up to 40 acres of mudflats with shallow water (<3"), sparse (<25%) vegetation and high invertebrate biomass annually during fall (August - September) to benefit migrating shorebirds including least, pectoral, semipalmated and solitary sandpipers and Wilson's snipe.

Rationale - Most shorebirds using the Great Lakes region are long-distance migrants that require stopover sites to replenish their fat reserves and meet the high energy demands of migration. These "staging" areas require shallow water and/or mudflat habitats with sparse vegetation, undisturbed roosting areas, and abundant invertebrate food resources. In this region these conditions can occur in various

habitats including natural and managed wetlands, lakeshore, sand and gravel bars, reservoirs, and flooded agricultural fields.

Researchers are just beginning to understand the importance of habitats in the interior U.S. to shorebirds. However, variable climatic conditions common to inland areas make shorebird habitat unpredictable compared to coastal regions. Precipitation and hydrology patterns are highly variable from year to year and in different locations. In addition, loss of wetlands from urban development, hydrological disturbance, and agriculture has reduced the amount of habitat in the region.

Many shorebirds species are of conservation concern in the Upper Mississippi Valley/Great Lakes (UMVGL) Shorebird Plan. The populations of these species are known or believed to be small and/or declining, and they are experiencing other known or potential threats (de Szalay et al. 2000). More information on the regional abundance, distribution, chronology, and population trends of shorebirds; responses of shorebirds and their invertebrate food base to management activities; wetland distribution and habitat conditions during a variety of climatic patterns; and effects of human disturbance on shorebirds is needed to guide shorebird habitat management on Iroquois NWR.

Strategies:

- Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Set levels in impoundments different from one another to ensure some mudflat areas in all but the wettest years.
- Conduct herbicide spraying of wetland vegetation to meet open water requirements.

Objective 1.8 Seneca Pool Forested Wetland

Maintain the 935-acre Seneca Pool as a forested wetland dominated by red and silver maples, green ash, American elm, swamp white oak, and willow species to provide breeding habitat for cavity nesting waterfowl (primarily wood duck) and migratory songbirds (especially cerulean warbler).

Rationale- Red and silver maple and green ash dominate the 3,300 acres of forested wetland habitat on the Refuge. Second growth mature trees 75+ years old dominate most of this habitat. More than 900 acres of forested wetland habitat are contained in Seneca Pool, an impoundment that was originally built and managed as a green tree impoundment. This pool is a red maple/green ash swamp, which has been purposely flooded in the past. Long periods of flooding have stressed and killed mature trees and prevented germination and survival of seeds and seedlings. Due to this negative effect on the forested wetland habitat, the pool level is now allowed to fluctuate with the level of Oak Orchard Creek. Fluctuating with the creek level reduces the amount of water in this pool and limits the amount of water stress put on the trees, while still providing wetland habitat during spring migration. This pool provides a large contiguous tract of forested wetland habitat managed for species such as the wood duck and cerulean warbler.

The floodplain forest and forested wetlands associated with Oak Orchard Creek supports migrating and nesting species of conservation concern within BCR 13 including cerulean warbler, prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker and wood duck. The Cerulean Warbler Atlas Project identified Iroquois as an important area for ceruleans. The NYWAP identifies several species of bats (eastern red, eastern small-footed and hoary bats) and the river otter as priority species; all of which use the floodplain forest habitat within the Oak Orchard Watershed.

Typically riparian or floodplain forests support a high diversity of plant species and food resources that are particularly important to migrating songbirds. An abundance of dead and dying trees of various sizes in floodplain forested wetlands are critical to cavity nesting ducks including wood duck and hooded merganser. Some songbird species (e.g., prothonotary warbler) require natural cavities as well. The USFWS is shifting away from artificial cavity nesting structures to a greater reliance on natural cavities.

Strategies:

- Allow water levels in Seneca Pool to fluctuate with the level of Oak Orchard Creek.
- Install several culverts under Feeder Road to increase connectivity between Seneca Pool and Oak Orchard Creek.
- Continue to monitor avian species of conservation concern through landbird surveys.
- Complete vegetative inventory of Seneca Pool.
- Within 5 years, remove the northeast dike to restore hydrology to the greatest extent possible.

GOAL 2. *Maintain the environmental health and integrity of Oak Orchard Creek and associated bottomland floodplain forests and wetlands as a natural free-flowing habitat with a diverse assemblage of native plants and animals.*

Background

The Refuge contains the 523-acre Oak Orchard Creek Marsh National Natural Landmark (NNL, Map 1-4). The marsh encompasses a pristine stretch of the sluggish and meandering creek that varies in width from 20 to 150 feet. The surrounding terrain is low and flat and floods annually. Broad-leaved cattail grows in marshy areas at the bends in the creek. Buttonbush and water willow are common shrubs along the creek edges, accompanied by a diversity of other plant species including red osier dogwood, flowering dogwood, swamp rose, purple nightshade, watercress, water hemlock, swamp milkweed, lizards tail, cardinal flower, broad-fruited bur reed, and forget-me-nots. A forested swamp dominated by silver maple with some green ash, swamp white oak and slippery elm with a dense understory of sensitive fern borders the creek channel (Vogelmann 1972). When this landmark was established in 1974 it also included the 15-acre Milford Posson Natural Area.

Furbearer management will be conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions. Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.

Strategies that apply to all objectives under this goal:

- Allow management of marsh furbearers except in no trapping zones around the Refuge headquarters, houses, trails and Job Corps **(**Map 2-17).
- Allow up to three trappers per unit for trapping units 1, 2, 3, and 4. All other trappers will distribute themselves through trapping unit 5.

Objective 2.1 Oak Orchard Creek and Associated Emergent Marsh and Forested Wetlands
Maintain, and restore as necessary, the water quality, natural flow regimes, and biological integrity of the Oak Orchard Creek in the eastern portion of the Refuge, relying on natural processes when possible.

Rationale - Oak Orchard Creek enters the Refuge from the east and meanders sluggishly and unimpeded through the Refuge east of Route 63. This area includes the Oak Orchard Creek Marsh NNL and supports many of the native plants and animals found in this region. While this section of the Creek is impacted by invasive species and upstream land use practices that degrade water quality, it offers some semblance of the watershed's historic condition before ditching and diking.

Most of the natural emergent marsh habitat on the Refuge is located along Oak Orchard Creek, east of Sour Springs Road. In this area the creek is essentially uncontrolled. The only constrictions are Sour Springs Road itself, which may back water up during flood events, and transient beaver dams. These dams alter hydrology and ultimately change the vegetative characteristics of the creek.

A healthy riparian ecosystem provides migration, breeding and wintering habitat for many migratory birds and resident fish and wildlife species. Very few unmanaged, unaltered wetland systems still exist in western New York. While this section of Oak Orchard Creek is not wholly unaltered, it is essentially unmanaged. It is also in a condition where water management control is not critical to maintaining the quality of the wetland habitat. Preserving this section of the Creek in this "natural" condition allows the Refuge to provide a significant amount of riparian habitat for fish and wildlife with a minimum expenditure of resources.

Strategies:

- Implement all strategies for Objective 2.1 in Alternative B.
- Restore channelized portions of Oak Orchard Creek to restore natural hydrology.
- Restore Knowlesville and Long Marshes which drain into Oak Orchard Creek to pre-settlement conditions when possible. This means removing water control structures and dikes and replanting to forests.

Objective 2.2 Natural Forested Wetlands
Maintain a minimum of 2,800 acres of mature forested wetland dominated by red and silver maples, green ash, American elm, swamp white oak, and willow species by allowing natural processes and controlling non-native invasive species to provide breeding habitat for cavity nesting waterfowl (primarily wood duck) and migratory songbirds (especially cerulean warbler).

Rationale - The floodplain forest and forested wetlands associated with Oak Orchard Creek supports migrating and nesting species of conservation concern within BCR 13 including cerulean warbler, prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker and wood duck. The Cerulean Warbler Atlas Project identified Iroquois as an important area for ceruleans. The NYWAP identifies

several species of bats (eastern red, eastern small-footed and hoary bats) and the river otter as priority species; all of which use the floodplain forest habitat within the Oak Orchard Watershed.

Typically riparian or floodplain forests support a high diversity of plant species and food resources that are particularly important to migrating songbirds. An abundance of dead and dying trees of various sizes in floodplain forested wetlands are critical to cavity nesting ducks including wood duck and hooded merganser. Some songbird species (e.g., prothonotary warbler) require natural cavities as well. The USFWS is shifting away from artificial cavity nesting structures to a greater reliance on natural cavities.

Strategies:

- Identify and map forested wetlands for rare plant species and natural communities to document their occurrence.
- Conduct an inventory of fauna.
- Conduct annual surveys of exotic invasive plants and control as necessary.
- Consult with the NY Natural Heritage Program on suitable management strategies to maintain natural forested wetland communities.
- Maintain and conserve vernal pools to sustain populations of species of conservation concern including obligate amphibians across the entire Refuge.

GOAL 3. *Provide a diverse mix of grassland, shrubland and forested upland habitats arranged to reduce fragmentation and edge effects, and enhance habitat quality for priority species of conservation concern.*

Strategies that apply to all objectives under this goal:

- Allow management of upland furbearer species according to New York State trapping regulations in trapping zone 5
- Allow management of upland furbearer species according to New York State trapping regulations in trapping zones 1, 2, 3, and 4 after the refuge waterfowl season closes.

Background

Approximately half of the 4,000 acres of upland habitat at Iroquois NWR is currently maintained in an early successional stage as grassland or shrubland through active management. Grasslands are mowed or burned according to a multi-year rotation schedule to suppress encroachment of broadleaf forbs and woody plants.

Furbearer management will be conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions. Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.

Objective 3.1 Grasslands

Provide approximately 450 acres of grassland habitat in two separate grassland units (one unit is ~300 acres and the other is ~150 acres) with a diversity of grass and forb species and 1-2% shrub cover and less than or equal to 30% forb cover to provide breeding and nesting habitat for grassland nesting birds such as bobolink, Henslow's sparrow, grasshopper sparrow, sedge wren, waterfowl, and to benefit other native wildlife including pollinating bees, butterflies, and other insects.

Rationale - Grasslands provide breeding habitat for songbirds and waterfowl. Many grassland-nesting songbirds are area-sensitive and each species prefers a slightly different mix of grass, forb and bare ground. The Henslow's sparrow is one of the highest priority species in BCR 13; bobolink and grasshopper sparrow are also priorities (medium). Grasslands of 100 acres or more will provide habitat for a larger suite of grassland bird species than will small (<20 acres), isolated grassland patches.

Populations of grassland birds are declining as their habitats are converted to agricultural, residential, and other urban uses. Norment (2002) identifies a need to approach grassland bird conservation in the northeast with "particular wisdom and care." He notes that despite the relatively recent (last 200 years) rise and fall of grassland habitats and associated birds in the northeast, the region may still be important for these species given their continental decline and habitat loss in the core of their ranges in the Midwest.

Refuge grasslands are a mix of managed warm and cool season fields and unmanaged forb dominated fields. Switchgrass, smooth brome, and goldenrod dominate the grasslands. Grasslands are currently managed using a combination of mowing, chemical spraying and prescribed burns to control unwanted vegetation and to maintain nesting habitat for waterfowl and other grassland nesting birds. Haying, conducted through a cooperative farming program is also used as a grassland management tool (USFWS 2002).

Patch size is often the most important factor limiting use and nest success of grassland nesting birds. Generally, the larger the grassland, the more it will be used and the higher the nest success. The goal of the Refuge's grassland management program is to provide a few large grassland units and eliminate the smaller fragmented grasslands that are providing very little habitat to targeted wildlife species.

Strategies:

- Optimize the configuration (size and shape) of Refuge grassland units by reducing the number of units to two and let all other revert to forest.
- Remove hedgerows within the two selected grassland areas to increase the size of grassland patches.
- Continue to use mowing, haying, prescribed fire and herbicide application as tools to maintain grassland conditions on the two remaining units. Schedule mowing every one to three years to occur between July 15 and October 15 depending on the desired vegetation structure. Mowing later in the season will provide added benefits to pollinators.
- Schedule prescribed fires between April 1 to June 15 to take advantage of adequate site conditions for burning and achieve the desired vegetation results.

- Conduct herbicide applications to provide maximum control of undesirable vegetation.
- Evaluate and determine the feasibility of using Refuge grasslands for Karner blue butterfly reintroduction.
- Evaluate and refine bird and vegetation monitoring program for grassland units.

Objective 3.2 Shrublands

Revert 964 acres of shrublands to native forests, except for approximately 26 acres of natural self-sustaining mesic shrublands, to provide a more contiguous forest to benefit migratory breeding birds including wood thrush, cerulean warbler and black-billed cuckoo.

Rationale - Many of the shrublands on the Refuge have matured to a stage where they are moving from shrubland to forest habitat. The Refuge was once dominated by a mix of oak-hickory, northern hardwood, and hemlock-northern hardwood forests; the upland areas around Iroquois NWR are now dominated by agricultural land interspersed with wetlands and remnant forest stands. Thus, Iroquois NWR offers some of the best, remaining blocks of upland forest in this region. Currently, the mature forest habitats on the Refuge are not actively managed. Although in small patch sizes, the upland forests are relatively intact with a diversity of canopy tree species and some midstory and understory plant associates and light impact from invasive species. These forests support BCR 13 priority bird species including wood thrush and cerulean warbler (highest), and black-billed cuckoo (high). These three species are also birds of management concern for the USFWS in the northeast region and are noted as species of greatest conservation concern in the NYWAP. Therefore, allowing these shrublands to revert to forest, would provide a larger contiguous forest that would provide for higher priority wildlife species like the cerulean warbler. This would also promote a more natural and historical habitat structure on the Refuge.

Strategies:

- Allow shrubland areas to succeed naturally. Some areas will stay as shrubland and others may revert to forest.
- Control invasive species by chemical and mechanical treatments, including honeysuckle and autumn olive to reduce competition for young trees.
- Monitor avian composition annually for priority BCR species.

Objective 3.3 Upland Forests (Early, Mid and Late Successional)

Provide approximately 3,200 acres of early, mid and late (>150 years old) successional upland forest in blocks >75 acres dominated by sugar maple, black cherry and black oak to benefit migratory breeding birds including wood thrush, cerulean warbler and black-billed cuckoo.

Rationale - Although once dominated by a mix of oak-hickory, northern hardwood, and hemlock-northern hardwood forests, the upland areas adjacent to Iroquois NWR are now dominated by agricultural land interspersed with wetlands and remnant forest stands. Thus, Iroquois NWR offers some of the best, remaining blocks of upland forest in this region. Currently, the late successional forest habitats on the Refuge are not actively managed. The upland forests are relatively intact with a diversity of canopy tree species and some midstory and understory plant associates and light impact from invasive species. These forests support BCR 13 priority bird species including wood thrush and cerulean warbler (highest), and black-billed cuckoo (high). These three species are also birds of management concern for the USFWS in the Northeast Region and are noted as species of greatest conservation concern need in the NYWAP.

Over 46% of the Refuge is covered by forest, 66% of which is forested wetland. Species composition of the forest varies across the Refuge with mixed hardwood stands predominated by elm, maple, aspen, and upland species such as beech. Most conifers occur in plantations and include white pine, white spruce, Norway spruce, Scotch pine, red pine, Austrian pine and Douglas fir. Several natural hemlock stands are found in small pockets.

Large blocks of forested upland and forested wetland habitats are unique to the present day landscape of the Western Lake Plain. Landuse or landcover data for northwestern New York was developed by the U.S. Geological Survey (USGS) as part of the Geographic Information Retrieval Analysis System (GIRAS) during the 1970's. Of the entire area displayed (1,469,706 acres), 1.6% of the land cover (23,709 acres) is mapped as forested wetlands and 6% (8,417 acres) as upland forest. Sizes of these forested areas vary, but the largest block of forested wetlands (20% of the total forested wetland cover) is within the Iroquois NWR boundary.

During the 1960s and 1970s logging was conducted on the Refuge for both production of wood products and firewood. Habitat degradation due to cutting outside specified areas and lack of staff time to monitor these areas caused an end to cutting in 1978. Currently, there is little to no management within the forested areas. Many species such as woodcock, grouse, turkey, wood duck and hooded mergansers use the forested areas on the Refuge.

Strategies:

- Implement all strategies for Objective 3.3 in Alternative A.
- Restore selected grasslands to forest by either natural regeneration or planting.
- Conduct minimal management for example, only remove trees where they block access or could be a safety issue.

Objective 3.4 Plantations

Remove 202 acres of conifer plantations from the highest priority areas of the Refuge to encourage development of natural forest and shrubland communities that are more beneficial for Refuge priority resources of concern including wood thrush, cerulean warbler, and black-billed cuckoo.

Rationale - Conifers are a relatively small component of the forest types on the Refuge. The only naturally occurring, native conifer is the Eastern hemlock which is often found in association with sugar maple and American beech. All other conifers on the Refuge are planted stock. Conifer planting peaked during the 1960's and early 1970's. Species planted include white spruce, white pine, red pine, Austrian pine, Scotch pine, Douglas fir and Norway spruce.

Strategies:

- Implement all strategies for Objective 3.4 in Alternative B.

Goal 4. *Refuge visitors will understand and appreciate fish and wildlife conservation through high quality recreation, education and interpretive programs.*

Strategies that apply to all objectives under this goal:

- Continue to replace outdated and faded signs (e.g. boundary, hunt zones, closed areas, primary entrance, secondary entrance) using current standard Service signs.
- Maintain consistency when posting "no hunting" signs along the Refuge boundary.
- Hire one permanent full-time Park Ranger (GS-0025-5).

Background

The Improvement Act identifies six priority public uses for Refuges: hunting, fishing, wildlife observation, photography, environmental education, and interpretation. Interpretation and hunting have regionally been identified as the top two priority Areas of Emphasis at the Iroquois NWR. These two activities will be given highest priority to ensure wise use of staff and funding resources and enable the Refuge to provide fewer, but higher quality, visitor opportunities. Public use opportunities will be provided to the extent that they are compatible with the Refuge System mission and the purposes of Iroquois NWR. Goal 4 addresses wildlife observation, wildlife photography, environmental education and interpretation. Goal 5 addresses hunting and fishing recreation.

We develop our wildlife-dependent recreation programs in consultation with state fish and wildlife agencies and stakeholders. Refuge recreation programs must

- promote safety of participants, other visitors and facilities;
- promote compliance with applicable laws and regulations and responsible behavior;
- minimize or eliminate conflict with fish and wildlife population or habitat goals or objectives in an approved plan;
- minimize or eliminate conflicts with other compatible wildlife-dependent recreation;
- minimize conflicts with neighboring landowners;
- promote accessibility and availability to a broad spectrum of the public;
- promote resource stewardship and conservation;
- promote public understanding and increase public appreciation of America's natural resources and our role in managing and conserving these resources;
- provide reliable/reasonable opportunities to experience wildlife;
- use facilities that are accessible to people and blend into the natural setting; and
- use visitor satisfaction to help define and evaluate programs.

A Visitor Services Assessment and Review was completed in March 2009 (USFWS 2009a). This review was completed by visitor services managers in Region 5 to provide an objective view about Refuge resources and visitor services programs. Their recommendations included example themes and key messages the Refuge could integrate into interpretation, outreach, and education activities. The themes and key messages are listed below and will be used to help form our messages to the public.

Biodiversity
Biodiversity was as crucial to the survival of the Native Americans who historically inhabited this area as it is to the people, wildlife, and wildlands inhabiting it today.

Wildlife
The Refuge is a significant stop-over point for migrating waterfowl and other birds and has been key in the recovery of the bald eagle and the comeback of nesting black terns while also providing critical habitat for other wildlife (mammals, reptiles, amphibians, fish).

Habitat
Iroquois NWR and the adjacent state wildlife management areas provide the largest contiguous block of wildlife habitat between the Allegheny Plateau and Lake Ontario. The size and diversity of this natural area provides a variety of habitats to benefit wildlife and for enjoyment and appreciation by people. The management of such habitat diversity provides a wildlife oasis within a landscape fragmented by development and farming.

People
Iroquois NWR is not only a refuge for wildlife, but also a refuge for people – a place where people connect with nature, rest, restore, and build health – before continuing on the day's or life's, journey.

A program called "Connecting Children with Nature" is part of the Service's "Connecting People with Nature: Ensuring a Conservation Legacy Strategy". It was established to address the American public's declining interaction with nature and the threat this decline poses to the mission of the USFWS. Connecting Children with Nature addresses the fact that children today spend less time playing outdoors than any previous generation. Today, kids reportedly spend an average of 6.5 hours per day with television, computers and video games. This lack of connection with nature has been linked to a number of health problems, both physical and emotional (Children and Nature 2009). In order to accomplish the USFWS Directorate priority to connect people with nature, Northeast Region personnel have established the following goals:

- Educate ourselves and others about the benefits of connecting people, particularly children, with nature.
- Identify and share existing or new Service success stories.
- Facilitate new, and refine existing, opportunities.
- Network with other staff, partners, and other organizations to optimize opportunities.
- Identify, reduce and remove barriers to connect people with nature.
- Identify and implement tools for accountability.
- Seek new funding and leverage existing funding for projects.
- Demonstrate federal leadership in connecting people with nature.

The Service has also adopted the slogan "Let's Go Outside" to promote events, programs and activities for the Connecting People/Children with Nature initiative. Each service unit can modify the slogan to suit the event or activity they have planned. For example, "Let's Go Birding" or "Let's Go Fishing" or "Let's Go Outside to Restore Habitat for Wildlife." Many of the Refuge programs are designed to connect with kids to continue the conservation initiatives.

Objective 4.1 Interpretive Programs
Provide high quality, compatible interpretive programs as staffing and time permits with programs focusing on the Refuge System mission and Refuge purpose**.**

Rationale - Interpretation is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on Refuges. Because of our small staff and current facilities we limit interpretive programs to groups of 60 people or less with a minimum of 10 people in the target audience. Individuals, families or small groups have the option to attend scheduled weekend programs presented in partnership with the Buffalo Audubon Society. Interpretive messages are also presented through special events and non-personal interpretation including printed Refuge brochures, stationary interpretive panels in kiosks, wayside panels at Cayuga Overlook, and interpretive signs and materials at Kanyoo, Onondaga, and Swallow Hollow Nature Trails. Interpretation is one of the two Areas of Emphasis for the Refuge.

Refuge visitors include students from pre-K to college, area tourists, local conservation groups, wildlife photographers and observers, and hunters and fishermen. Annual visitation ranges from 35,000 to 45,000 people. To help address a shortage of Refuge staff, the Refuge partners with Buffalo Audubon Society to conduct interpretive programs on the Refuge mostly during the spring and fall. These programs include a "scope watch" on the eagle nest from Cayuga Overlook, birding tours, nature walks to identify plants, butterflies and trees, bat programs, "owl prowls," and canoe trips down Oak Orchard Creek. These programs are attended by 1,000 to 1,800 people each year. Participation in these programs has been increasing over the years and we expect that trend to continue.

Refuge staff conducts interpretive programs both on and off site. Onsite interpretive programs presented by Refuge staff and volunteers include formal programs and presentation and guided trail walks. In fiscal year 2009 the Refuge received eight requests from local schools, scouts, and church groups for guided visits which totaled 172 visitors. The Refuge conducts two major interpretive events: Spring into Nature and the Youth Fishing Derby. Spring into Nature is a one-day event hosted at the Refuge visitor contact station and is usually attended by over 1,000 people. This event provides interpretive programs, kid's activities and provides additional information on wildlife, habitats, conservation and stewardship. The Youth Fishing Derby is held at Ringneck Marsh and incorporates interpretive information into a fishing contest for kids under the age of 16 years. In addition to these two events, the Buffalo Audubon Society presents interpretive programs called Iroquois Observations. In fiscal year 2009, Iroquois Observations documented 829 visits for programs including eagle watches, birding field trips, guest speakers, woodcock walks, owl prowls, canoe treks, and themed nature walks.

Offsite programs include Conservation Field Days in three counties (Orleans, Niagara and Monroe) as well as local festivals and other events. At Conservation Field Days the Refuge provides one of many learning stations for over 200 students in each of the counties. Local festivals and other events include Plantaisia in Buffalo, Earth Day at Beaver Meadow Nature Center, the University of Buffalo Enviro Fair, EcoFest in Batavia, Ducks Unlimited's Green Wing events, and interpretive programs at local schools. These programs record nearly 800 contacts.

Under Alternative C we propose to continue existing interpretive programs and add new opportunities. Providing high-quality interpretation programs on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for our interpretation programs include the following:

- Promote visitor understanding of, and increase appreciation for, America's natural and cultural resources and conservation history by providing safe, informative, enjoyable, and accessible interpretive opportunities, products and facilities.

- Develop a sense of stewardship leading to actions and attitudes that reflect interest and respect for wildlife resources and the environment.
- Provide quality interpretive experiences that help people understand and appreciate Iroquois NWR and its role in the Refuge System.
- Provide opportunities for quality recreation and interpretive experiences consistent with criteria describing quality found in 605 FW 1.6(*Service Manual*).
- Assist Refuge staff, volunteers, and community in attaining knowledge, skills, and abilities in support of interpretation.
- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreational activities.

The Refuge maintains a series of nature trails open to the public year-round, including Kanyoo, Onondaga, and Swallow Hollow (See Map 2-19). Kanyoo and Swallow Hollow Nature trails are used extensively for school groups for field trips to experience nature and wildlife. Over the past couple of years these trails have been enhanced to ensure adequate access and to provide interpretative panels. We will continue to ensure that the trails are maintained and free from obstruction to allow easy access to the trails. Under this Alternative we are proposing a new trail that will begin at the refuge headquarters (Map 2-19).

Strategies:

- Implement all strategies listed for Objective 4.1 in Alternative B.
- Develop an educational power point that plays continuous loop in the visitor contact station informing the public on topics such as the history of the Refuge, types of habitat present, upcoming events and activities, and volunteer opportunities.
- Develop virtual trail tours, including a video of the trail, wildlife observations, visuals of interpretive signs present on the trail and an educational commentary.
- Develop a new display in the visitor contact station promoting “backyard habitat” and the importance of native species.

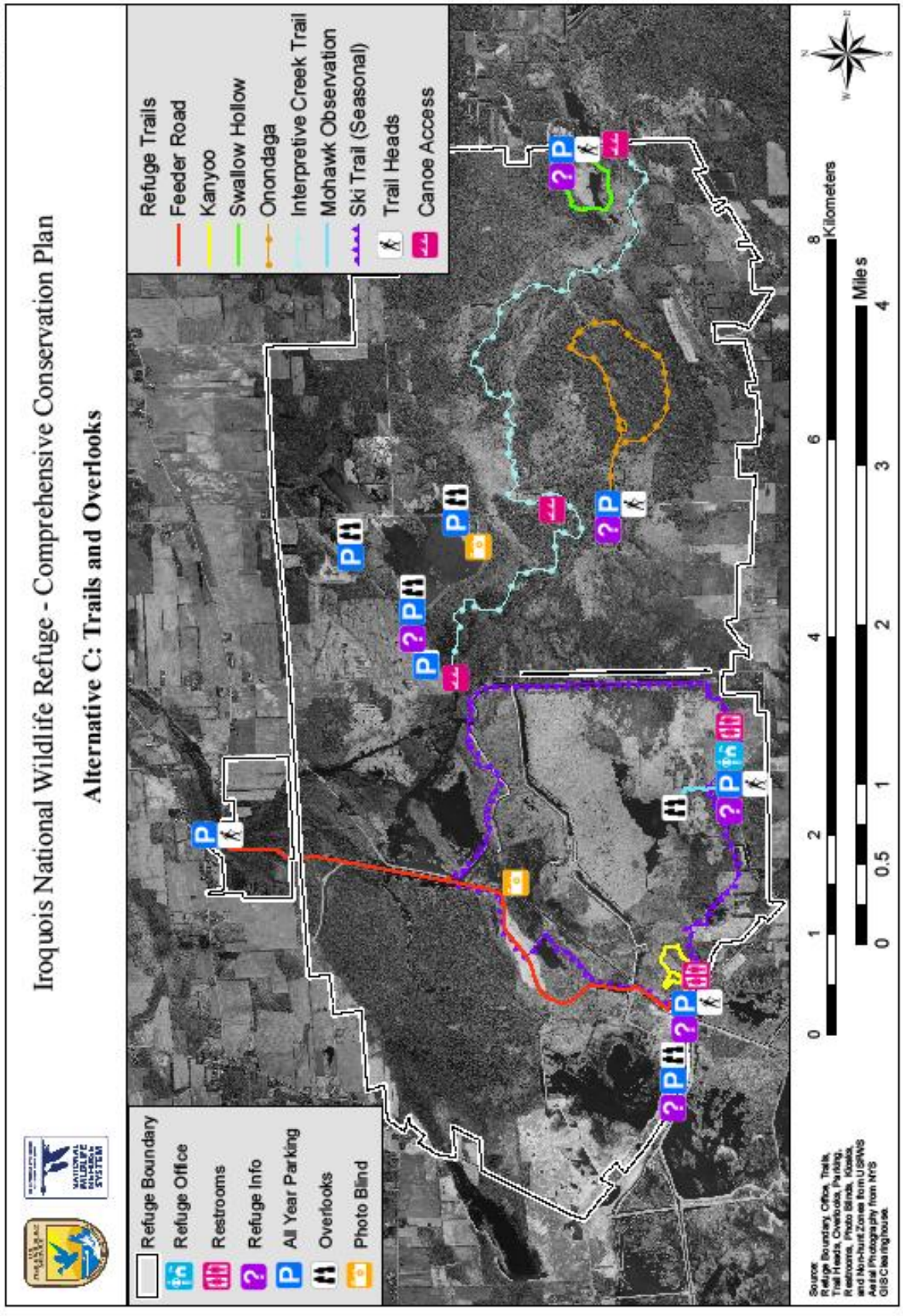
Objective 4.2 Outreach

Provide at least 10 opportunities annually for the local communities and visitors to learn about Iroquois NWR and the role of the Refuge System in protecting and managing our natural resources.

Rationale - While the Refuge has been established for more than 50 years we continue to come in contact with people who are not aware of the Refuge. It is important to have an effective outreach plan to develop stewardship for the Refuge in the community. The Refuge is located between two major cities, Buffalo and Rochester, with a number of small towns and hamlets in between. The Refuge also attracts international visitors. We do not fully know the demographics and needs of our visitors. With more information we can aim our outreach efforts to target audiences or direct new outreach activities to underserved audiences.

Strategies:

- Implement all strategies listed for Objective 4.2 in Alternative B.
- Provide monthly news releases.


Map 2-19
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative C: Trails and Overlooks
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Interpretive Creek Trail
Mohawk Observation
Ski Trail (Seasonal)
Trail Heads
Canoe Access
Refuge Boundary
Refuge Office
Restrooms
Refuge Info
All Year Parking
Overlooks
Photo Blind
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Source:
Refuge Boundary, Office, Trails, Trail Heads, Overlooks, Parking, Restrooms, Photo Blinds, Kiosks, and Non-Hunt Zones from USFWS
Aerial Photography from NYS GIS Clearinghouse.

- Develop a comprehensive outreach strategy based on demographic survey results.
- Allow visitors to register for upcoming activities and events online.
- Utilize new technology such as Twitter and Facebook.

Objective 4.3 Environmental Education

Within the next five years, reach 5,000 school-age (K-12) students annually with environmental education programs that coincide with NYS standards of learning. These programs should be conducted by staff, volunteers, partners and members of Friends of Iroquois NWR on or off Refuge property and integrate Refuge outreach and interpretive objectives and messages.

Rationale

Environmental Education is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. Due to our small staff and available funding we look to partnerships to provide quality environmental education programs. If the Refuge were able to hire additional visitor services staff environmental education programs and volunteer training could be expanded.

Local schools are incorporating wildlife and wetland topics into their curriculums to meet science-based standards of learning and help students understand scientific concepts, principles and theories pertaining to their physical setting and living environment. The Refuge can provide educational materials as well as an outdoor laboratory to augment the teachers existing curriculum and tie into NYS learning standards.

Providing high-quality environmental education on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for environmental education include:

- Teach awareness, understanding, and appreciation of our natural and cultural resources and conservation history;
- Allow program participants to demonstrate learning through Refuge-specific stewardship tasks and projects that they can carry over into their everyday lives;
- Establish partnerships to support environmental education both on-and off-site;
- Support local, State, and National education standards through environmental education on Refuges;
- Assist Refuge staff, volunteers, and other partners in obtaining the knowledge, skills, and abilities to support environmental education;
- Provide appropriate materials, equipment, facilities, and study locations to support environmental education
- Give refuges a way to serve as role models in the community for environmental stewardship; and
- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreation activities.

We currently partner with Canisius College to provide educational programs on the Refuge. The Canisius Ambassadors for Conservation (CAC) is a program that has been operating at the Refuge since 2005 teaching intermediate-grade student about the mission of the Service and the natural resources of Iroquois NWR emphasizing wetlands and migratory birds. Between 700 and 2,000 students participate in this program each year. The programs are developed to ensure that specific elements are delivered and retained by the students.

Strategies:

- Implement all strategies listed for Objective 4.3 in Alternative B.
- Develop a Volunteer Master Naturalist Program.
- Develop education programs targeting teens and young adults focusing on practical applications such as how to make environmentally conscious decisions.
- Develop a program designed for those interested in education as a career and give participants an opportunity to be involved in planning and implementing youth environmental education programs.

Objective 4.4 Wildlife Observations and Photography.
Provide access to unique and unusual habitats on the Refuge for wildlife observation and photography compatible with wildlife habitat management needs. Encourage wildlife photographers to use the Refuge by providing at least two well-placed photography blind.

Rationale - Wildlife observation and photography are two of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. The Refuge provides opportunities to view and photograph wildlife in natural settings at nature trails and overlooks (Map 2-19). The Refuge has historically been a popular birding site and has been recognized as an IBA by the National Audubon Society. The Refuge is a stopover point for migratory waterfowl and attracts hundreds of thousands of birds during migration. The Refuge's diverse habitat also attracts songbirds, shorebirds, raptors, marsh birds, reptiles, amphibians and over forty species of mammals.

The 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation indicates that over 3.8 million people participated in wildlife-watching activities in the State of New York during 2006 and spent more than $1.5 billion on activities and equipment related to wildlife watching (USFWS 2006b).

Providing a high-quality wildlife observation and photography on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for these two programs include:

- Provide safe, enjoyable, and accessible wildlife viewing opportunities and facilities.
- Promote visitor understanding of, and increase visitor appreciation for, America's natural resources;
- Provide opportunities for quality recreational and educational experiences consistent with criteria describing quality found in 605 FW 1.6; and
- Minimize conflict with visitors participating in other compatible wildlife-dependent recreation activities.

The Refuge facilitates opportunities for wildlife observations and photography at nature trails including Kanyoo, Onondaga and Swallow Hollow, and at Cayuga, Ringneck, Mallard, and Schoolhouse Overlooks. Some visitors have indicated a desire for Onondaga Trail to become a loop like Kanyoo and Swallow Hollow (Map 2-19). It appears that Onondaga trail originally provided a loop toward the end of the trail but for some reason it was not maintained. Visitors have also indicated that they would like to see more interpretation on the nature trails. Wildlife observation is the most common visitor activity at Iroquois NWR.

Several non-wildlife dependent activities facilitate wildlife observations and are considered acceptable methods for visitors to experience wildlife. These include the following:

Cross-country Skiing/Snowshoeing - Although not a priority public use, skiing and snowshoeing are often used by Refuge visitors to enjoy the solitude of the Refuge's natural areas and to view winter wildlife. Many skiers and snowshoers stop at the visitor contact station to obtain Refuge and wildlife viewing information. The light amount of use that is received by the Refuge for these activities will not interfere with the Refuge purpose since very few species of birds are present during the winter season. Cross-country skiing/snow shoeing is permitted on Onondaga and Kanyoo Nature Trails and the Mohawk Ski Trail. The Mohawk Ski Trail closes on March 1 to limit disturbance during spring migration, nesting and brood rearing seasons.

Hiking and Walking - Hiking and walking are permitted on the Refuge's designated trail system which includes Kanyoo, Onondaga and Swallow Hollow Trails and the Feeder Road, and along public roads adjacent to the Refuge. Hiking and walking allow visitors to enjoy the solitude of the Refuge and view and photograph wildlife. Under Alternative C we propose to restrict public access for hiking and walking to designated trails year-round.

Jogging and Bicycling - Jogging and bicycling will be permitted but not encouraged on the Refuge. Jogging and bicycling are not priority public uses but they can facilitate priority public uses on the Refuge. Although jogging and bicycling are classified as non-wildlife activity, most participants use the Refuge for the "wildlands" experience it provides. Jogging and bicycling generally occur between March and September. Some bicyclist stop at the visitor contact station to obtain Refuge or wildlife viewing information. Most visitors bike on Feeder Road which is open for a variety of public use activities and is the main service road used by Refuge staff for management functions. Bicycling is also permitted on other public roads that go around and through the Refuge. Bikes are not permitted on nature trails due to damage they cause to the trail surface.

The Refuge is used by amateur photographers, family members taking photos and tourists documenting their travels. Providing high quality opportunities for the public to engage in nature photography promotes visitor appreciation and support for Refuge programs. Approximately 400 visitors participate in photography-related activities each year. Under Alternative B, we propose to replace the two existing photo blinds with new blinds in different locations to provide a greater opportunity for the public to view and photograph wildlife (Map 2-19). One photo blind will be placed on the south side of Ringneck Marsh near Mallard Overlook and the second will be a combination photo/hunting blind that will be located in our waterfowl hunting area and used for both activities.

Strategies:

- Implement all strategies listed for Objective 4.4 in Alternative B.
- Develop Onondaga Trail to include a loop back to the parking area.
- Create an interpretive trail on Oak Orchard Creek for canoe/kayak users.
- Keep the creek clear of all obstructions.
- Conduct wildlife observation rated workshops on topics such as Wildlife Photography and Bird, Mammal, Reptile, Amphibian and/or Plant Identification.

Objective 4.5 Other Recreation

Discontinue berry picking, a non-wildlife dependent recreational activity.

Rational - Berry picking is an example of a visitor activity on the Refuge that is not a priority public use and may also result in disturbance to wildlife. In accordance with 605 FW1, General Guidance and 603 FW 1, Appropriate Refuge Uses, we will only permit non-priority uses when we determine that they are legally mandated, provide a benefit to the Service, occur due to special circumstances or facilitate one of the priority wildlife-dependent recreational uses.

In Alternative B we propose closing the Refuge to berry picking for several reasons. Under this alternative the refuge is being closed down to visitors just wandering through refuge habitats from July 15 through the end of Fabruary. Also, the majority of the berry species on the refuge ripen in early summer when birds are still in the nesting and brood rearing season (March 1 – July 15). There may be a few species that carry their fruits into the late summer.

Strategies:

- Close refuge to berry picking upon approval of CCP.

Goal 5. *Hunters and anglers will enjoy and support programs designed to provide high quality hunting and fishing experiences.*

Background

The Improvement Act identifies six priority public uses for refuges: hunting, fishing, wildlife observations, photography, environmental education and interpretation. Hunting and interpretation have regionally been identified as the top two priority Areas of Emphasis at the Refuge. These two activities will be given highest priority to ensure wise use of staff and funding resources and enable the Refuge to provide fewer, but higher quality, visitor opportunities. Iroquois NWR is popular among all hunting groups, but most notably deer and waterfowl hunters. The Refuge is becoming increasingly popular for these hunting activities and we are experiencing greater law enforcement challenges such as illegal deer stands, access into closed areas, littering, conflicts among user groups, and failure to abide by permit regulations.

We develop our wildlife-dependent recreation programs, including hunting, in consultation with state fish and wildlife agencies and stakeholders. Refuge recreation programs must

- promote safety of participants, other visitors and facilities;
- promote compliance with applicable laws and regulations and responsible behavior;
- minimize or eliminate conflict with fish and wildlife population or habitat goals or objectives in an approved plan;
- minimize or eliminate conflicts with other compatible wildlife-dependent recreation;
- minimize conflicts with neighboring landowners;
- promote accessibility and availability to a broad spectrum of the public;
- promote resource stewardship and conservation;
- promote public understanding and increase public appreciation of America's natural resources and our role in managing and conserving these resources;
- provide reliable/reasonable opportunities to experience wildlife;
- use facilities that are accessible to people and blend into the natural setting; and
- use visitor satisfaction to help define and evaluate programs.

Objective 5.1 Hunting
Allow access for hunting of small game, deer, turkey, waterfowl and other migratory birds in accordance with New York State regulations and consistent with sound biological principles to provide participants with reasonable harvest opportunities, uncrowded conditions and minimal conflicts with other users.

Rationale - Hunting is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on refuges. Hunting is a popular and traditional activity in the area and a management tool to keep wildlife populations at healthy numbers to maintain healthy habitats. When managed appropriately, hunting can instill a unique understanding and appreciation of wildlife, their behavior, and their habitat needs.

According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation approximately 566,000 residents and non-residents participated in hunting in New York in 2006. That group spent more than $715 million on activities and equipment related to hunting (USFWS 2006b).

Providing a high-quality hunt on the Refuge promotes visitor appreciation and support for Refuge programs. We define a quality hunting experience as one that achieves the following:

- Manage wildlife populations consistent with the Refuge System, specific management plans approved after 1997, to the extent practicable, state fish and wildlife conservation plans.
- Promote visitor understanding of, and increase visitor appreciation for, America's natural resources.
- Provide opportunities for quality recreation and interpretive experiences consistent with criteria describing quality found in 605 FW 1.6 (*Service Manual*).
- Encourage participation in hunting to help preserve it as a tradition deeply rooted in America's natural heritage and conservation history.
- Minimize conflicts with visitors participating in other compatible wildlife-dependent recreational activities.

Deer hunting is the most common form of hunting pressure on the Refuge. More than 400 hunters use the Refuge on opening day of the regular deer season and Thanksgiving, and 100-200 people hunt the Refuge on other days during the season. This level of hunting pressure creates potentially unsafe, overcrowded hunting conditions. In Alternative C, we propose changes reflected in the strategies listed below to improve the quality and safety of the Refuge hunt program.

Iroquois NWR does not have a large population of wild turkeys nor the habitat to support them. The Refuge is also concerned about the conflict of allowing hunting during the spring when most of the Refuge is closed to all other uses to protect nesting and brood rearing wildlife species. However, many species of birds are arriving to the refuge in May and starting to setup nesting territories or already in the process of nesting including wood duck and wood thrush, raptors like bald eagles.In particular, nesting birds like the cerulean warbler nests on the Refuge at the same time as the spring turkey hunt and in many of the same areas currently open to hunting. Iroquois NWR is one of four sites in New York with exceptional numbers of cerulean warblers recorded during the Cerulean Warbler Atlas Project conducted from 1997 to 2000. This warbler is among the highest priority landbirds for conservation in the U.S. based on a small total population size and a significant decline (-4.2% per year since 1966) in the Breeding Bird Survey (BBS) trend throughout its range (Rosenberg et al. 2000). The cerulean warbler occurs in riparian, forested wetlands and Iroquois NWR has the third highest concentrations in New York. Areas of known nests for particularly species sensitive to human disturbance like the bald eagle are closed

off to hunting, however, this is not practical for all nesting birds. Closing the spring season would eliminate any potential conflict with disturbance to nesting birds, and hunting opportunities lost would be off-set by opening up a fall turkey when there are other activities happening on the refuge.

The lands and waters of Iroquois NWR were purchased through the sale of Duck Stamps under the Migratory Bird Hunting and Conservations Stamp Act as an "inviolate sanctuary for migratory birds and other wildlife uses". In 1958 an amendment to the Migratory Bird Hunting and Conservation Stamp Act increased the total area of a Refuge that could be opened for hunting migratory game birds from 25 percent up to 40 percent. Because the Refuge was acquired as an inviolate sanctuary, only 40 percent of the Refuge area may be opened at one time for hunting waterfowl and other migratory birds (woodcock, snipe and rail). After reevaluating the areas which are open to waterfowl and other migratory bird hunting we found that we exceed the 40% limit when the New York State seasons for hunting waterfowl and other migratory birds overlap (Map 2-20). Waterfowl hunting is the second most popular hunt on the Refuge with an average of 400 hunt visits per year over the past five years. Hunting of other migratory birds reports an average of 17 hunt visits per year over the past five years. Based on our evaluation of the current hunting program we propose several strategies (see below) that will change waterfowl and other migratory bird hunting and bring the Refuge into compliance.

Strategies – All Hunting:

- Implement all strategies for all hunting listed under Objective 5.1 in Alternative B.

Strategies – Deer Hunting:

- Implement all strategies for all hunting listed under Objective 5.1 in Alternative B.
- Develop temporary ground stands for hunters with disabilities at accessible sites.

Strategies – Turkey Hunting:

- Open a fall turkey hunt in conjuction with closing the spring turkey season.
- Continue to conduct the youth turkey hunt on the first Sunday of the state season.
- Continue to require and provide a youth only orientation and hunt in cooperation with the local chapter of the National Wild Turkey Federation prior to hunt weekend.

Strategies – Waterfowl Hunting:

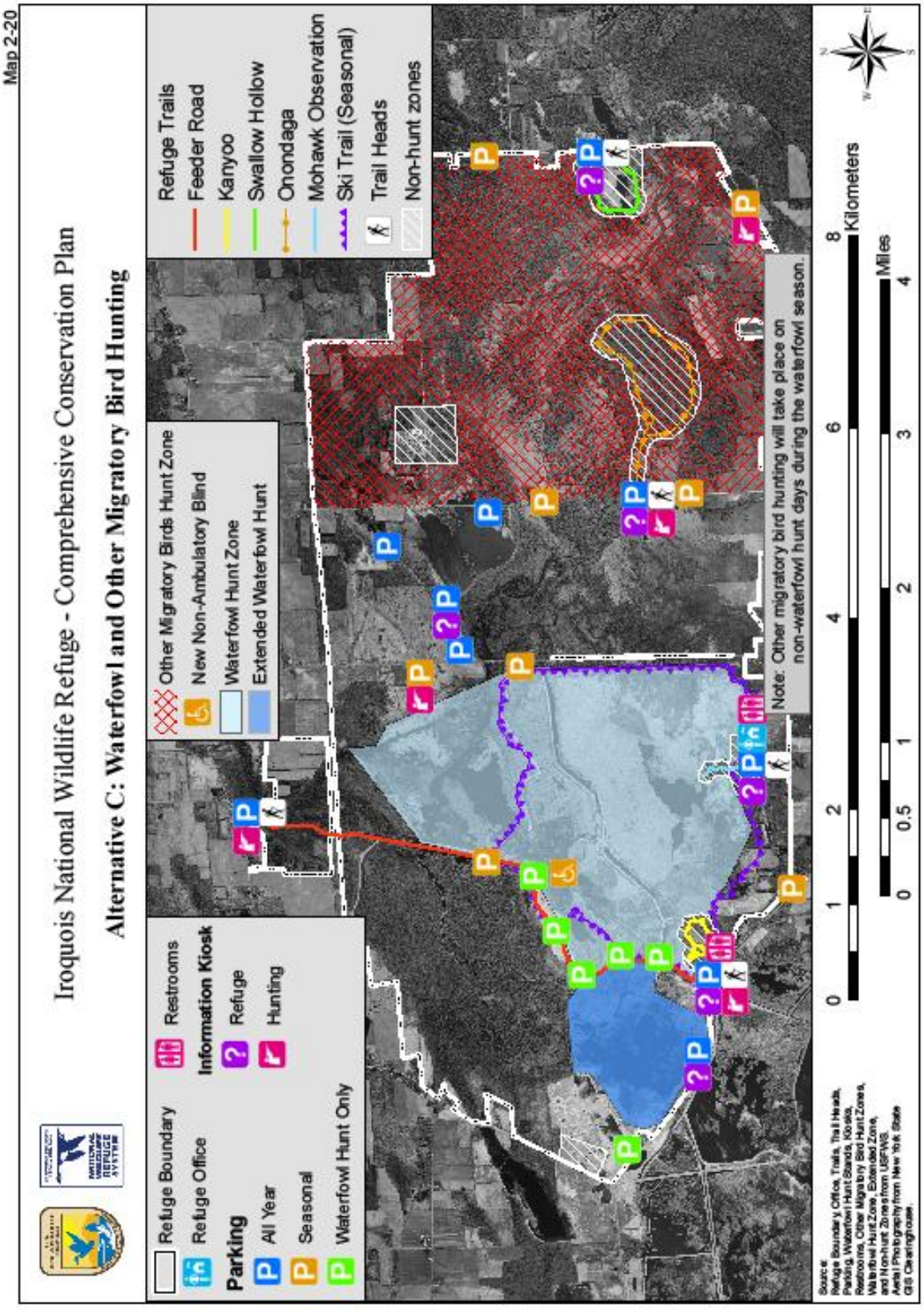
- Move or remove waterfowl hunt stands in Oneida Pool affected by removal of boards and reverting to natural hydrologic conditions as described in Goal 1 above.
- Continue to hunt in the same marshes that are currently open to hunting.
- Continue to allow waterfowl hunting on Tuesdays, Thursdays and Saturdays until noon.
- Open waterfowl hunting areas up to 30 parties with no restriction on hunter locations within the designated units open to hunting.
- Conduct a pre-season lottery draw for all hunting days.
- Extend waterfowl hunting season no later than December 1 in Cayuga Pool only.
- Create a permanent blind for non-ambulatory hunters on the north side of Mohawk Pool by enhancing the dike (Map 2-20).
- Continue to host the Young Waterfowler's Program with a youth only hunt day.
- Reschedule youth waterfowl hunt program to align with the New York State Youth Hunting days.

Strategies - Other Migratory Birds:

- Allow hunting of woodcock, snipe and rail on the off days of waterfowl hunting (Sunday, Monday, Wednesday, and Friday) to maintain 40% acreage requirement.
- Continue to hunt under general permits with no associated fees.

Strategies – Small/Upland Game:

- Continue to hunt under general permits with no associated fees.


Map 2-20
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative C: Waterfowl and Other Migratory Bird Hunting
Refuge Boundary
Refuge Office
Restrooms
Information Kiosk
Parking
All Year
Seasonal
Waterfowl Hunt Only
Refuge
Hunting
Other Migratory Birds Hunt Zone
New Non-Ambulatory Blind
Waterfowl Hunt Zone
Extended Waterfowl Hunt
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Mohawk Observation
Ski Trail (Seasonal)
Trail Heads
Non-hunt zones
Note: Other migratory bird hunting will take place on non-waterfowl hunt days during the waterfowl season.
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
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W
E
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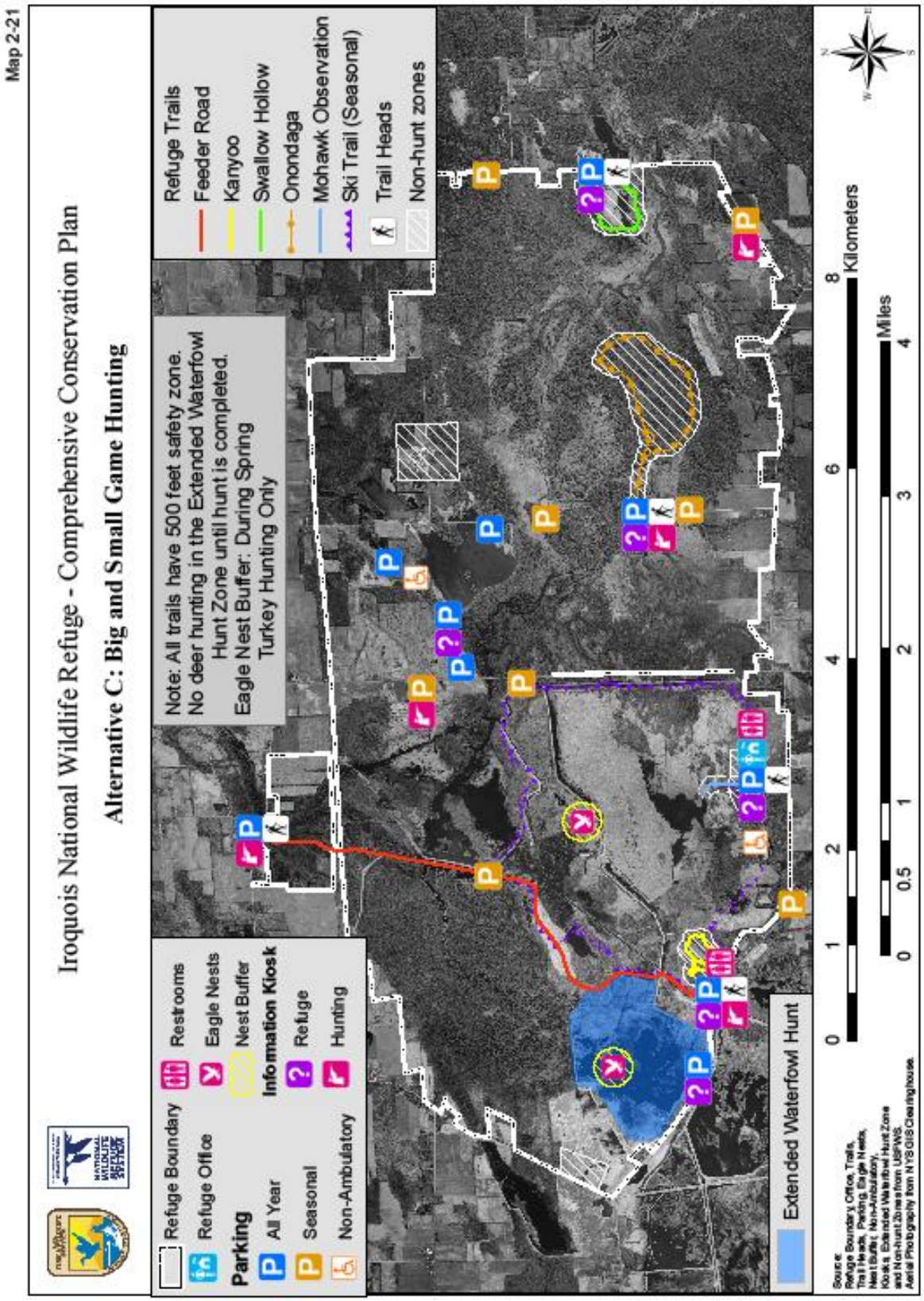

Map 2-21
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative C: Big and Small Game Hunting
Refuge Boundary
Refuge Office
Parking
All Year
Seasonal
Non-Ambulatory
Restrooms
Eagle Nests
Nest Buffer
Information Kiosk
Refuge
Hunting
Extended Waterfowl Hunt
Note: All trails have 500 feet safety zone.
No deer hunting in the Extended Waterfowl Hunt Zone until hunt is completed.
Eagle Nest Buffer: During Spring Turkey Hunting Only
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Mohawk Observation
Ski Trail (Seasonal)
Trail Heads
Non-hunt zones
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Source:
Refuge Boundary, Office, Trails, Trail Heads, Parking, Eagle Nests, Nest Buffer, Non-Ambulatory, Kiosk, Extended Waterfowl Hunt Zone and Non-hunt Zones from USFWS.
Aerial Photography from NYSGISClearinghouse.

Objective 5.2 Fishing
Provide opportunities for fishing on the Refuge in a manner that minimizes conflicts between fishing and biological resources, particularly nesting birds and provide participants with reasonable harvest opportunities, uncrowded conditions and minimal conflict with other users.

Rationale – Fishing is one of the six priority public uses required by the 1997 Refuge Improvement Act to receive enhanced consideration on Refuges. Fishing, which includes frogging, is a popular and traditional activity in the area. Fishing will be permitted in accordance with federal and state regulations. The Refuge received 1,073 visits in 2008 for recreational fishing.

According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation approximately 741,000 residents and non-residents participated in fishing in New York during 2006. Approximately 247,000 more anglers fished in the Great Lakes. Anglers spent more than $925 million on activities and equipment related to fishing during 2006 (USFWS 2006b).

Providing high-quality fishing opportunities on the Refuge promotes visitor appreciation and support for Refuge programs. The guiding principles for our fishing program include the following:

- Maximize safety for anglers and other visitors.
- Cause no adverse impact on populations of resident or migratory species, native species, threatened and endangered species, or habitat.
- Encourage the highest standards of ethical behavior in regard to catching, attempting to catch, and releasing fish.
- Provides opportunities to a broad spectrum of the public that visits, or potentially would visit, the Refuge.
- Provide reasonable accommodations for individuals with disabilities to participate in Refuge fishing activities.
- Reflect positively on the Refuge System.
- Provide uncrowded conditions.
- Create minimal conflict with other priority, wildlife-dependent recreational uses or Refuge operations.
- Provide reasonable challenges and harvest opportunities.
- Increase visitor understanding and appreciation for the fishery resource.

Iroquois NWR does not specifically manage the fishery resource. However, a significant sport fishery exists in Ringneck Marsh and Oak Orchard Creek (Map 2-22).

Strategies:

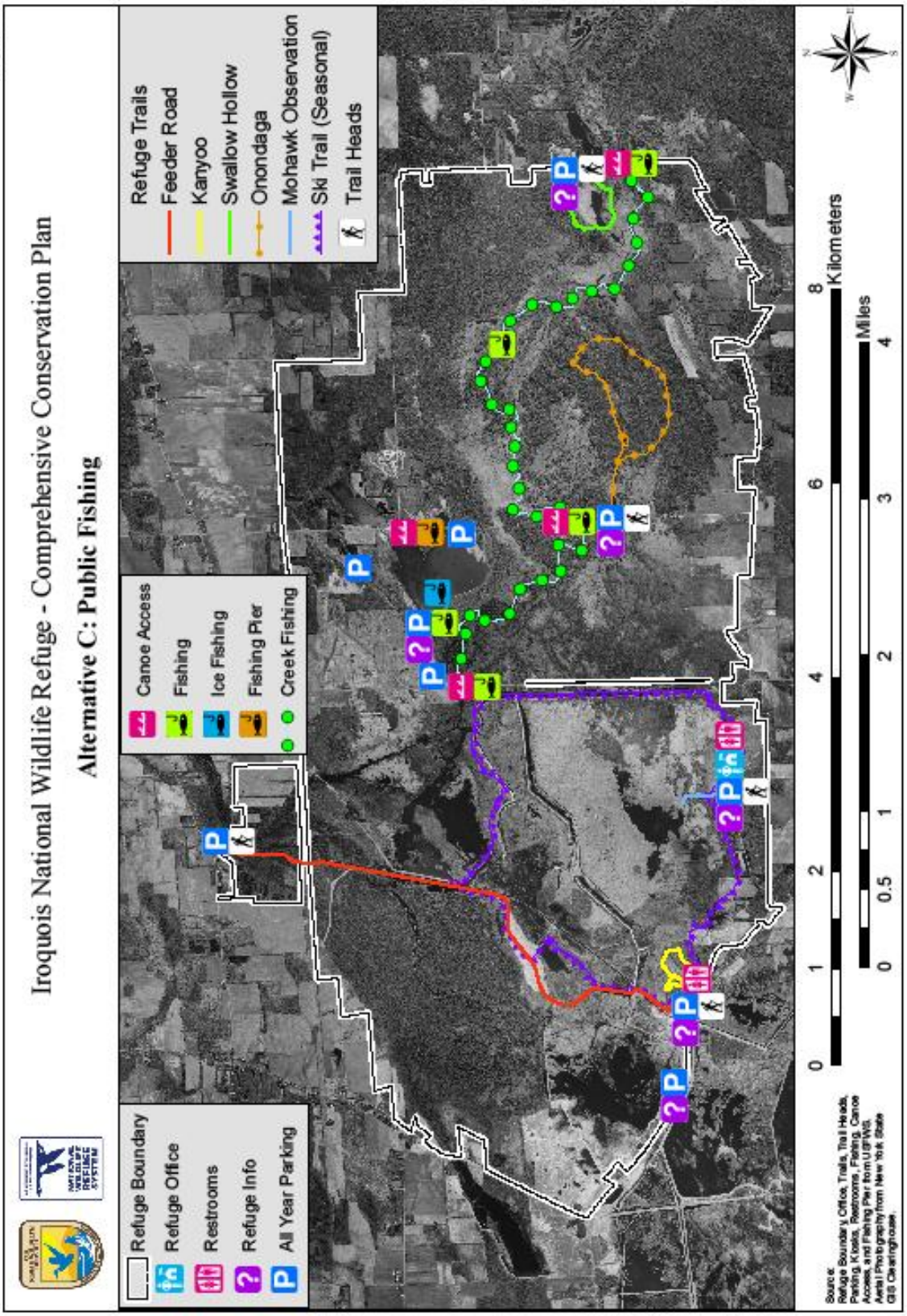
- Continue to allow access for fishing in accordance with New York State regulations in designated areas providing participants with reasonable harvest opportunities, uncrowded conditions and minimal conflicts with other users.
- Continue to have fishing areas in Ringneck Marsh and Oak Orchard Creek open year-round.
- Continue to allow fishing from sunrise to sunset.

- Continue to permit frogging using a spear, club, hand or hook under state fishing regulations.
- Continue to host the youth fishing derby on the first Saturday in June as part of National Fishing and Boating Week.
- Allow non-motorized boating access on Ringneck Marsh after the nesting season (after July 15).
- Develop a fishing rack card that will provide a map of the fishing areas, Refuge fishing regulations and fish species found on the Refuge.

Evan Grant/USFWS

Wood Frog

Map 2-22


Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Alternative C: Public Fishing
Refuge Boundary
Refuge Office
Restrooms
Refuge Info
All Year Parking
Canoe Access
Fishing
Ice Fishing
Fishing Pier
Creek Fishing
Refuge Trails
Feeder Road
Kanyoo
Swallow Hollow
Onondaga
Mohawk Observation
Ski Trail (Seasonal)
Trail Heads
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Source:
Refuge Boundary, Office, Trails, Trail Heads, Parking, Kiosks, Restrooms, Fishing, Canoe Access, and Fishing Pier from USFWS.
Aerial Photography from New York State GIS Clearinghouse.

Goal 6. *Enhance partnerships with local communities and various organizations to garner support and promote Refuge programs and resources.*

Objective 6.1 Landscape-Scale Conservation

Enhance the conservation and management of fish and wildlife resources in western New York through partnerships with public and private conservation groups, private landowners, state and local entities including Oak Orchard Watershed Protection Alliance, NYSDEC and other USFWS offices.

Rationale - The Refuge has benefited from existing partnerships in a variety of ways. These include: sharing of technical expertise to support wildlife and public resources; collaborative land conservation planning to ensure that important wildlife habitat is conserved throughout western New York; and cooperative outreach and enforcement of Refuge regulations. We conduct biological and environmental research and monitoring through partnerships with colleges, local schools, Ducks Unlimited (DU), other NGO's, and NYSDEC. The lack of Refuge staffing and funding is the limiting factor in developing and maintaining partners and partner programs.

The Refuge and the NYSDEC have been in partnership for management of the Iroquois Wetland Complex which includes Iroquois NWR, Oak Orchard State Wildlife Management Area (WMA) and Tonawanda State WMA since the Refuge was established. The Refuge and the NYSDEC work together to manage the wetlands and other habitats and cooperate on shared projects and activities. In addition, NYSDEC Environmental Conservation Officers provide law enforcement coverage on the Refuge and NYSDEC trains and provides instructors for the waterfowl identification classes held at Iroquois NWR.

Iroquois NWR will work closely with other agency, NGO and private partners to initiate a private lands habitat restoration program in the Oak Orchard Creek Watershed. Water flowing into Oak Orchard Creek upstream of the Refuge has a direct effect on Refuge water quality. Additionally, wildlife habitat on private lands near the Refuge can complement the habitats provided on the Refuge and improve the quality of the watershed as a whole. Much of the property adjacent to the Refuge and State Wildlife Management Areas has been developed for agriculture or residential and commercial uses. Any restoration activities on these private lands will increase the natural buffer around the Refuge and directly improve the water and habitat quality of the Refuge.

We intend to work within existing USFWS or Natural Resource Conservation Service (NRCS) private lands programs to help facilitate private land project on land near the Refuge. Currently, most government sponsored private land habitat improvement programs have many more applicants than can be accommodated by existing resources. The additional assistance the Refuge can provide by facilitating these programs on our neighbor's lands will help the private landowners, the agency overseeing the program and the Refuge itself.

Additionally, the Refuge currently oversees 23 conservation easements on lands throughout western New York. These easements were transferred to the Refuge from the U.S. Department of Agriculture (USDA) through the Farm and Home Administration (FmHA) loans. Generally, these easements protect relatively small wetlands located on agricultural lands. Under Alternative C the Refuge will visit and catalogue the biological resources on these easements and determine any restoration and enhancement opportunities that may exist on these lands as well as determining compliance with easement requirements. While visiting, Refuge staff will also record any potential wetland restoration or habitat/water quality improvement opportunities that exist on the adjacent lands not currently covered under the easement and contact landowners to determine their interest in private land programs.

Strategies:

- Implement all strategies listed for Objective 6.1 in Alternative B.

Objective 6.2 Support for Refuge Programs

Enhance Refuge programs and increase awareness and stewardship for the Refuge through support from partners that contribute to the Service mission, the Refuge purpose, and Refuge habitat, wildlife and recreation programs.

Rationale Due to our limited staff and funding, many Refuge programs would not be possible without partners. Partners help with public use, special events, outreach, and research.

Friends of Iroquois NWR is a not-for-profit organization dedicated to increasing public awareness of Iroquois NWR and to helping the community understand the Refuge's mission and goals.

The Friends of Iroquois NWR has several priorities to achieve their mission:

- Conserve, protect and enhance fish and wildlife and their habitats for the continuing benefit of the American people.
- Support the stewardship of the National Wildlife Refuge System.
- Improve awareness, appreciation, conservation and responsible utilization of the Refuge.
- Provide assistance to Refuge programs by entering into agreements with the USFWS.
- Produce and make available to Refuge visitors, by sales or free distribution, suitable
    - interpretive and educational materials to increase the visitors' understanding of the Refuge, wildlife, and the environment, and
    - special materials, memorabilia and events that will enhance visitor enjoyment.
- Acquire materials, supplies, equipment and labor which may be retained by the Corporation, or donated to the service or Refuge to support operational, educational or maintenance projects.

Friends of Iroquois NWR have secured funding from the Margaret L. Wendt Foundation, the National Fish and Wildlife Foundation ***Centennial Legacy Fund***, the Wild Birds Unlimited ***Pathways to Nature Program***, the USFWS, the Iroquois Job Corp, and Friends of Iroquois NWR members. Friends of Iroquois NWR are able to raise funds to be allocated for specific, much-needed projects on the Refuge. Some projects and activities are: the Youth Fishing Derby and the Spring Into Nature Celebration, purchase of camera equipment for live views of the eagle and kestrel nests, rehabilitation of Swallow Hollow Nature Trail, purchase of trail benches, support for outreach and educational programs such as the Canisius Ambassadors in Conservation program, and the purchase and installation of a water control structure.

The Refuge is fortunate to have a dedicated group of individuals who voluntarily assist the Refuge in various ways. Thirty volunteers contributed over 5,000 hours in 2007 and 86 volunteers provided over 7,000 hours of volunteer time to Refuge activities in 2008 (Table 3-22). These volunteers assisted with environmental education programs and outreach events, conducted wildlife and habitat surveys, provided visitor services, banded birds, managed habitats and species, and carried out general maintenance tasks. In addition to helping the refuge achieve its objectives and strategies, this group of volunteers serves as an important link with the community at large, promoting refuge messages and garnering support for the Refuge System.

Iroquois Job Corps Center has contributed significantly to projects and events on the Refuge. Carpentry students helped rebuild the 250-foot boardwalk on Kanyoo Nature Trail, participated in the rebuilding of Swallow Hollow Nature Trail, including 2,000 feet of boardwalk, and put a new roof and siding on Building 17 (a storage building located at Refuge Headquarters). These activities saved the Refuge more than $75,000. Students from Iroquois Job Corps Center have also assisted with the Refuge Spring into Nature Celebration helping visitors build bird houses, paint bird silhouettes and conduct face painting.

The Refuge works with many non-profit organizations to help facilitate Refuge programs to meet the demand of the public, to utilize their expertise, or to complete projects that would otherwise be delayed. Examples include with the Young Waterfowler's Orientation, the NYS Waterfowl Identification Course, the waterfowl hunt program and summer internships.

Strategies:

- Implement all strategies listed for Objective 6.2 in Alternative B.

Objective 6.3 Research

Conduct research activities using non-Service personnel from colleges, universities, federal, state, and local agencies, non-governmental organizations, and qualified members of the public to enhance our understanding of species requirements, habitat changes and effectiveness of management techniques.

Rationale - Some research activities on the Refuge are currently conducted by non-Service personnel including colleges, universities, federal, state, and local agencies, non-governmental organizations, and qualified members of the public. Such research furthers our understanding of the natural environment and improves the management of the Refuge's natural resources. The information research generates applies to management on and near the Refuge. Past research projects have studied species including neotropical migrants, marsh birds, and waterfowl. Habitat management techniques like mowing and prescribed fire have been examined to determine their effects on flora and fauna. Other projects have been broader in scale such as the surface-water/ground-water interaction study being conducted by USGS to understand how water flows through the entire Refuge.

The Service encourages and supports research and management studies on Refuge lands that will improve our understanding of and strengthen decisions on managing natural resources. The Refuge Manager encourages and seeks research that clearly relates to approved Refuge objectives, improves habitat management, and promotes adaptive management. Priority research addresses information on better managing the Nation's biological resources that generally are important to agencies of the Department of Interior, the National Wildlife Refuge System, and State Fish and Wildlife Agencies, which address important management issues, or demonstrate techniques for managing species or habitats.

We also consider research for other purposes that may not relate directly to Refuge-specific objectives, but contribute to the broader enhancement, protection, use, preservation or management of native populations of fish, wildlife and plants, and their natural diversity in the region or the Atlantic Flyway. All proposals must comply with Service policy on compatibility.

Strategies:

- Implement all strategies listed for Objective 6.3 in Alternative B.

Table 2-4. Summary of Strategies by Alternative

Refuge Resource or Program	Alternative A Current Management	Alternative B Service-proposed alternative	Alternative C
	Strategies that apply to all goals in Alternative A: Continue to recruit, hire and train, students under the Student Career Experience Program and Student Temporary Employment Program to assist with all Refuge goals, programs, and operations. Continue to recruit and train interns and volunteers to assist with all Refuge goals, programs, and operations and provide housing where possible. Continue to support Friends of Iroquois NWR to assist in Refuge programs and operations. Continue to annually evaluate approximately 15% of the Refuge's boundary and replace boundary signs and/or posts as needed	**Strategies that apply to all goals in Alternative B:** Continue to recruit, hire and train, students under the Student Career Experience Program and Student Temporary Employment Program to assist with all Refuge goals, programs, and operations. Continue to recruit and train interns and volunteers to assist with all Refuge goals, programs, and operations and provide housing where possible. Continue to encourage a broad-based Friends of Iroquois NWR group that supports Refuge goals, programs, and operations. Hire a permanent full-time Law Enforcement Officer (GS-0025-9) to provide visitor safety, protect resources, and ensure compliance with Refuge regulations. Hire a permanent full-time Maintenance Worker (WG-4749-8). Annually inspect approximately 20% of the Refuge boundary to ensure signs are visible, readable, have not been vandalized and are in good overall condition. Annually review that non-hunting areas are properly posted. Reach out to local communities and schools to build awareness, understanding, and support for Refuge biological and land protection programs and activities and demonstrate the role of Iroquois Refuge in	**Strategies that apply to all goals in Alternative C:** Continue to recruit, hire and train, students under the Student Career Experience Program and Student Temporary Employment Program to assist with all Refuge goals, programs, and operations. Continue to recruit and train interns and volunteers to assist with all Refuge goals, programs, and operations and provide housing where possible. Continue to encourage a broad-based Friends of Iroquois NWR group that supports Refuge goals, programs, and operations. Hire a permanent full-time Law Enforcement Officer (GS-0025-9) to provide visitor safety, protect resources, and ensure compliance with Refuge regulations. Hire a permanent full-time Maintenance Worker (WG-4749-8) Annually inspect approximately 20% of the Refuge boundary to ensure signs are visible, readable, have not been vandalized and are in good overall condition. Annually review that non-hunting areas are properly posted. Reach out to local communities and schools to build awareness, understanding, and support for Refuge biological and land protection programs and activities and demonstrate the role of Iroquois Refuge in

		the Refuge System.	the Refuge System.
	Strategies that apply to all objectives under Goals 1, 2, 3:	**Strategies that apply to all objectives under Goals 1, 2, 3:** Continue to develop a comprehensive GIS database for the Refuge and the surrounding landscape to map and analyze habitat types and conditions, rare species populations, other ecological features, land use issues, and other relevant information for long-term planning and monitoring of resources. Continue to monitor and control non-native invasive species using a combination of mechanical, biological, and chemical techniques to restore native plant communities and healthy ecosystems; refine the protocol for prioritizing mapping, monitoring and control of invasive species to have the greatest impact on the highest priority habitat objectives. Within five years evaluate all data from baseline surveys of birds, amphibians, reptiles, mammals, plants, mussels and fish, and other species to identify additional baseline surveys needed to confirm presence/absence in respective habitat types and to address management questions. Continue current inventorying and monitoring protocols, which are listed under the strategy sections for each habitat objective. Within two years of the CCP's completion, develop more inventory and monitoring protocols as necessary based on recognized needs in the HMP and include in the IMP.	**Strategies that apply to all objectives under Goals 1, 2, 3:** Reduce staff time spent on active management of Refuge resources and allow a natural cycle to prevail to the greatest extent possible. Continue to develop a comprehensive GIS database for Iroquois NWR and the surrounding landscape to map and track habitat types and conditions, rare species populations, other ecological features, land use issues, and other relevant information for long-term planning and monitoring of resources. Continue to monitor and control non-native invasive species using a combination of mechanical, biological, and chemical techniques to restore native plant communities and healthy ecosystems; Refine the protocol for prioritizing mapping, monitoring and control of invasive species to have the greatest impact on the highest priority habitat objectives. Within five years evaluate all the data from completed baseline surveys of birds, amphibians, reptiles, mammals, plants, mussels and fish, and other species to identify additional baseline surveys necessary to determine presence/absence in respective habitat types and to address management questions. Over a 15 year period, systematically remove artificial structures as appropriate. Wood duck nesting data should be evaluated to determine if certain boxes are not used at all should be removed sooner

		Over a 15 year period, systematically remove the majority of artificial structures as appropriate. Wood duck nesting data should be evaluated to determine which boxes are not used and which are used by undesirable species. These boxes should be removed sooner and the remainder phased out. Monitoring of wood duck boxes should be conducted by volunteers. Hire one permanent full-time Biological Technician (GS-7). Hire one permanent part-time Biological Technician (GS-5. 0.5 FTE).	and the remainder phased out. Monitoring of wood duck boxes should be conducted by volunteers. Hire one permanent full-time Biological Technician (GS-7). Hire one permanent part-time Biological Technician (GS-5. 0.5 FTE).
GOAL 1. High quality freshwater wetland migration stopover and breeding habitat for waterfowl, marsh birds, shorebirds, and bald eagles in the Refuge impoundments provided through water level control.			
Responds to Issues: Habitat management; drainage; invasive species; development; staffing and facilities; law enforcement			
	Strategies that apply to all objectives under this goal: Continue to conduct management of furbearers in marshes at the completion of the waterfowl hunt season to help sustain desired ratio of vegetation and open water in each impoundment (Map 2-2). Continue to allow management of furbearers throughout the entire Refuge, with restrictions on muskrat trapping on impoundments that have a large percentage of cattail coverage. Continue to issue up to 50 permits for marsh furbearer management across the entire Refuge. Continue to charge $50.00 for the marsh furbearer management permit.	**Strategies that apply to all objectives under this goal:** Remove and prevent mute swans from becoming established on or regular inhabitants of the refuge. Continue to allow management of marsh furbearers throughout Refuge, with restrictions on muskrat trapping in marshes that have large percentage of cattail coverage (Map 2-9). Continue to conduct furbearer management in marshes at the completion of the Refuge's waterfowl hunt season, by allowing up to 25 permits issued annually. Continue to charge $50.00 for the marsh furbearer management permit. Limit trappers to 25 traps each to reduce trapper competition while still maintaining furbearer populations at desired levels. Conduct annual counts of muskrat houses to	**Strategies that apply to all objectives under this goal:** Remove and prevent mute swans from becoming established on or regular inhabitants of the refuge. Allow management of marsh furbearers except in no trapping zones around the Refuge headquarters, houses, trails and Job Corps (Map 2-17). Allow up to three trappers per unit for trapping units 1, 2, 3, and 4. All other trappers will distribute themselves through trapping unit 5. Conduct yearly snapping turtle surveys.

		ensure sustainable populations are retained for Refuge needs and base removal of animals on annual numbers. After annual evaluation, determine which marsh(s) to open and create zones according to impoundment boundaries. Complete bathymetry mapping of Refuge impoundments to better understand what the elevation changes are to ensure that the Refuge is achieving appropriate water depths to meet its objectives.	
Objective 1.1 Emergent Marsh – Migrating Waterfowl	Continue to implement the 3-6 year drawdown cycle through water level control. Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed). Continue to collect bathymetry data on impoundments. Continue to monitor the response of annual moist soil vegetation after each drawdown at random points in areas that were previously open water; about 10-20 points for small impoundments. Continue to conduct early spring drawdowns and subsequent water level manipulations to promote the growth of annual wetland plants and minimize germination of perennial emergent vegetation in impoundments where robust perennial emergent vegetation makes up <40% (based on road-side surveys) of the total wetland acres. Percentage of emergent vegetation should be determined in the late fall/early winter with considerations the following spring. Continue to re-flood drawn down	In impoundments where robust perennial emergent vegetation makes up <40% of the total wetland acres, conduct early spring drawdowns and subsequent water level manipulations to promote the growth of annual wetland plants and minimize germination of perennial emergent vegetation. Percentage of emergent vegetation should be determined in the late fall/early winter with consideration given to expected impoundment conditions the following spring. Re-flood drawn down impoundments to coincide with waterfowl migration chronology. If necessary, induce physical/chemical disturbance to set back succession and promote growth of annual moist soil vegetation. Continue to implement the 3-6 year drawdown cycle through water level controls. Complete Mohawk/Oneida Marsh Restoration project with construction of Oneida dike. Incorporate all suggestions below into the Inventory and Monitoring Plan and	Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Remove all boards in Structure L (Oneida Pool) to allow water levels to fluctuate "naturally" with a less restrictive flow. Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed). Establish monitoring protocol to evaluate changes in wetland vegetation composition. Monitor the response of annual moist soil vegetation to this reduced-management alternative. Create and implement a protocol to monitor waterfowl trends during spring and fall migration. Continue to monitor the response of purple loosestrife to herbivory by *Galerucella* beetles.

	impoundments to coincide with waterfowl migration chronology. Continue to induce physical/chemical disturbance to set back succession and promote growth of annual moist soil vegetation, if necessary. Continue to monitor the response of annual moist soil vegetation after each drawdown. Continue to monitor waterfowl trends during spring and fall migration. Continue to monitor the response of purple loosestrife to herbivory by the *Galerucella* beetles.	Strategic Habitat Conservation Model. Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed). Continue to monitor the response of annual moist soil vegetation after each drawdown. Create and implement a protocol to monitor waterfowl trends during spring and fall migration. Work with conservation partners to monitor waterfowl use of Refuge impoundment habitats and enter the data into www.ebird.org. Monitor the response of purple loosestrife to herbivory by *Galerucella* beetles.	
Objective 1.2 Emergent Marsh – Spring Migrating Geese	Continue to provide a 50:50 mix of water and vegetation. Continue to limit visitor access near roosting areas to minimize disturbance.	Manipulate/maintain impoundment water levels >18" to control the germination or expansion of perennial emergent vegetation. Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed). Establish a monitoring protocol to evaluate changes in wetland vegetation composition. Limit visitor access near roosting areas to minimize disturbance by implementing the closure of the refuge to unrestricted access. Continue to provide spring roosting habitat with an emphasis on the Atlantic and Southern James Bay Canada goose populations.	Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Set level in some impoundments high enough to ensure open water areas in all but the driest years. Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed). Establish a monitoring protocol to evaluate changes in wetland vegetation composition.
Objective 1.3 Emergent Marsh – Breeding Marsh birds	Continue to maintain flooded conditions with and average water depth of 18-20" where the coverage of perennial emergent vegetation is >60 percent of the unit	Continue all strategies under Alternative A Objective 1.3 If necessary, induce physical/chemical disturbance to create additional openings	Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and

	Continue to implement the 3-6 year drawdown cycle through water level control. Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed). Continue to survey and inventory muskrat houses. Continue to collect bathymetry data on impoundments. Continue to conduct marsh bird surveys in cooperation with NYSDEC.	when water manipulation and muskrat activity are not providing these openings.	do not change. Set level in some impoundments to ensure some hemi-marsh habitat is available under normal precipitation conditions. Monitor black terns and least bitterns every three years to provide an index of what the breeding population is doing.
Objective 1.4 Emergent Marsh – Breeding Marsh birds	Continue to maintain flooded conditions with an average water depth of 18-20" where the coverage of perennial emergent vegetation is between 80% and 100%. Continue to implement the 3-6 year drawdown cycle through water level control. Continue to record and maintain logs of the proposed and actual water levels for each impoundment (e.g., 2005 proposed, 2005 actual, 2006 proposed). Continue to survey and inventory muskrat houses. Continue to collect bathymetry data on impoundments. Continue to conduct marsh bird surveys in cooperation with NYSDEC.	Implement strategies listed in Alternative A Objective 1.4.	Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Set level in some impoundments to ensure some heavily vegetated habitat is available under normal precipitation conditions. Conduct call-back and nest surveys according to regional protocol for pied-billed grebe (Region 5 species of concern) and American Bittern.
Objective 1.5 Emergent Marsh – Waterfowl Brood Rearing	Continue to maintain flooded conditions with a minimum 18-20 inches water depth where the coverage of perennial emergent vegetation is >80% Continue to , locate brood rearing habitat in	Where the coverage of perennial emergent vegetation is >80%, maintain flooded conditions with a minimum 18-20" water depth. When possible, locate brood rearing habitat	Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Set level in some impoundments (particularly those close to

	close proximity to waterfowl nesting cover (grasslands). Continue to induce physical/chemical disturbance as needed to reduce vegetation cover. Continue to coordinate volunteers to maintain approximately 400 wood duck nesting structures.	adjacent to waterfowl nesting cover (grasslands). If necessary, induce physical/chemical disturbance to reduce vegetation cover. Evaluate wood duck nest structures and remove those that are not productive.	grasslands) to ensure some hemi-marsh habitat is available under normal precipitation conditions. Reduce predators by increasing emphasis on upland furbearer management and initiating a snapping turtle management program. Over the next five years, remove all artificial nesting structures.
Objective 1.6 Open Water	Continue to implement USFWS 2007 National Bald Eagle Guidelines. Continue to restrict public access to eagle nesting areas during the breeding season. Continue to coordinate with the NYSDEC on the protection, monitoring and management of the Iroquois Wetland Complex nesting eagles. Continue drawdowns on Refuge impoundments for other objectives in Goal 1 to help concentrate foraging areas around eagle nesting sites. Continue not to conduct drawdowns on Ringneck Marsh in years when drawdowns are conducted in impoundments containing eagle nests	Continue to implement USFWS 2007 National Bald Eagle Guidelines. Continue to restrict public access to eagle nesting areas during the breeding season by implementing the closure of the refuge to unrestricted access. Continue to coordinate with the NYSDEC on the protection, monitoring and management of the Iroquois Wetland Complex nesting eagles. Conduct spring/summer drawdowns to concentrate forage fish and make them more available to feeding bald eagles. Do not conduct complete drawdowns on Ringneck Marsh in years when drawdowns are conducted in impoundments containing eagle nests.	Continue to implement USFWS 2007 National Bald Eagle Guidelines. Continue to close eagle nesting areas off to public intrusion during the breeding season. Continue to coordinate with the NYSDEC on the protection, monitoring and management of the Iroquois Wetland Complex nesting eagles. Maintain water levels in all impoundments at their optimum levels to ensure adequate open water areas in all years.
Objective 1.7 Shallow Water Mudflats	Continue to conduct early drawdowns, mechanical manipulation (when needed to reduce vegetation cover), and subsequent flooding of impoundments at least four weeks prior to peak shorebird migration to allow aquatic invertebrates to develop. Continue to maintain high water levels through early summer and slowly lower levels during late summer to expose mudflats. Continue to manage the 41-acre Cayuga	Conduct early drawdowns, mechanical manipulation (when needed to reduce vegetation cover), and subsequent flooding of impoundments at least four weeks prior to peak shorebird migration to allow aquatic invertebrates to develop. Maintain high water levels, near full pool levels, through early summer and slowly lower levels during late summer to expose mudflats. Continue to manage the 41-acre Cayuga	Evaluate all impoundments and determine an optimal water level. Place the required number of boards in the water control structure to maintain this optimal level and do not change. Set levels in impoundments different from one another to ensure some mudflat areas in all but the wettest years. Conduct herbicide spraying of wetland vegetation to meet open water requirements.

	sub-impoundment and the 10-acre Schoolhouse sub-impoundment for fall migrating shorebirds using water level controls to create mudflats with shallow water areas less than three inches deep.	sub-impoundment and the 10-acre Schoolhouse sub-impoundment for fall migrating shorebirds using water level controls to create mudflats with shallow water areas less than three inches deep. Work with conservation partners to monitor shorebird use of Refuge mudflat habitats and enter the data into www.ebird.org.	
Objective 1.8 Seneca Pool forested wetland	Continue to allow water levels in Seneca Pool to fluctuate with the level of Oak Orchard Creek. Continue to monitor Seneca Pool's water control structure to ensure that debris does not obstruct the flow of water into or out of the impoundment. Continue to monitor avian species of conservation concern through landbird surveys.	Allow water levels in Seneca Pool to fluctuate with the level of Oak Orchard Creek. Monitor Seneca Pool's water control structure to ensure that debris does not obstruct the flow of water into or out of the impoundment. Continue to monitor avian species of conservation concern through landbird surveys. Create a diversity of tree age classes to provide a sustainable forested wetland community by regulating water levels. Create an annual inventory and monitoring plan to guide management and increase nesting success of migratory waterfowl and other wildlife. Complete vegetative inventory of Seneca Pool. Within 5 years, remove the northeast dike to restore natural hydrology to the greatest extent possible.	Allow water levels in Seneca Pool to fluctuate with the level of Oak Orchard Creek. Install several culverts under Feeder Road to increase connectivity between Seneca Pool and Oak Orchard Creek. Continue to monitor avian species of conservation concern through landbird surveys. Complete vegetative inventory of Seneca Pool. Within 5 years, remove the northeast dike to restore hydrology to the greatest extent possible.
GOAL 2. Oak Orchard Creek is natural free flowing and environmentally healthy, with a diverse assemblage of native plants and animals in the associated wetlands.			
Responds to Issues: Habitat management; drainage; invasive species; development; staffing and facilities; law enforcement			
	Strategies that apply to all objectives under this goal: Continue management of furbearers in marshes at the completion of the waterfowl	**Strategies that apply to all objectives under this goal:** Allow management of marsh furbearers throughout Refuge, with restrictions on	**Strategies that apply to all objectives under this goal:** Allow management of marsh furbearers except in no trapping zones around the

	season to help sustain desired ratio of vegetation and open water in each impoundment. Continue to allow management of furbearers throughout the entire Refuge, with restrictions on muskrat trapping in marshes that have a large percentage of cattail coverage (Map 2-2). Continue to issue up to 50 permits for marsh furbearer management across the entire Refuge. Continue to charge $50.00 for the marsh furbearer management permit.	muskrat trapping in marshes that have large percentage of cattail coverage (Map 2-9). Conduct furbearer management in marshes at the completion of the Refuge's waterfowl hunt season, by allowing up to 25 permits issued annually. Continue to charge $50.00 for the marsh furbearer management permit. Limit trappers to 25 traps each to promote recruitment and retention of new trappers by reducing trapper competition while still maintaining furbearer populations at desired levels.	Refuge headquarters, houses, trails and Job Corps (Map 2-17). Allow up to three trappers per unit for trapping units 1, 2, 3, and 4. All other trappers will distribute themselves through trapping unit 5.
Objective 2.1 Oak Orchard Creek and Associated Emergent Wetlands and Bottomland Floodplain Forest	Continue to monitor for invasive species within the floodplain and remove invasive species using mechanical methods wherever possible. Continue to identify and map vernal pools within the floodplain forest. Continue to monitor colonial nesting bird rookery along Route 63.	Monitor the condition of the Oak Orchard Creek Marsh NNL every five years to record the representative native plant species and condition (e.g., presence of invasive species). Continue to monitor colonial nesting bird rookery along Route 63. Work with partners to improve upstream land use practices to enhance water quality within Oak Orchard Creek as it enters the Refuge. Work with local road agents to prevent runoff (salt, sand, and pollutants) into Oak Orchard Creek. Develop an index of biological integrity for the Oak Orchard Creek to be used by the Refuge to monitor restoration and maintenance of this ecosystem. Conduct water quality, invertebrate and fish surveys to gather baseline data and then every five years to detect trends over time. Within the un-impounded floodplain forest	Implement all strategies for Objective 2.1 in Alternative B. Restore channelized portions of Oak Orchard Creek to restore natural hydrology. Restore Knowlesville and Long Marshes which drain into Oak Orchard Creek to pre-settlement conditions when possible. This means removing water control structures and dikes and replanting to forests.

		in the Oak Orchard Watershed, rely on natural tree cavities for nest sites for wood duck, hooded merganser, and other cavity nesters; remove any artificial nest structures in this area. Identify the locations of invasive species within the floodplain Remove invasive species using mechanical methods wherever possible. Identify and map the vernal pools within the floodplain forest. Monitor and inventory vernal pools across the entire Refuge for species of conservation concern.	
Objective 2.2 Natural Forested Wetlands	Continue as time and funds permit, identify and map forested wetlands for rare plant species and natural communities to document their occurrence. Continue to conduct annual surveys of exotic invasive plants and control as necessary. Continue to maintain and conserve known vernal pools to sustain populations of species of conservation concern including obligate amphibians across the entire Refuge.	Identify and map forested wetlands for rare plant species and natural communities to document their occurrence. Conduct an inventory of fauna. Develop and conduct a refuge wide forest inventory and establish permanent vegetation monitoring plots. Evaluate implications for management based on the habitat requirements of species of conservation concern. Conduct annual surveys of exotic invasive plants and control as necessary. Consult with the NY Natural Heritage Program on suitable management strategies to maintain natural forested wetland communities. Maintain and conserve vernal pools to sustain populations of species of conservation concern including obligate amphibians.	Identify and map forested wetlands for rare plant species and natural communities to document their occurrence. Conduct an inventory of fauna. Conduct annual surveys of exotic invasive plants and control as necessary. Consult with the NY Natural Heritage Program on suitable management strategies to maintain natural forested wetland communities. Maintain and conserve vernal pools to sustain populations of species of conservation concern including obligate amphibians across the entire Refuge.
Goal 3: Provide a diverse mix of grassland, shrubland and forested habitats arranged to reduce fragmentation and edge			

effects and enhance habitat quality for priority species of conservation concern.			
Responds to Issues: Habitat management; drainage; invasive species; development; staffing and facilities; law enforcement			
	Strategies that apply to all objectives under this goal: Continue to conduct an upland furbearer management program that will help keep mammalian predator numbers in check decreasing the potential for predation on nesting migratory birds and reducing the spread of some density dependent diseases such as distemper, parvo, and rabies (Map 2-2). Continue to issue up to 25 permits for upland furbearer management across the entire Refuge except in on trapping zones (Refuge office, residences and Job Corps) and on Refuge trails and dikes. Continue to not charge for an upland furbearer management permit.	**Strategies that apply to all objectives under this goal:** Continue to conduct an upland furbearer management program that will help keep mammalian predator numbers in check decreasing the potential for predation on nesting migratory birds and reducing the spread of some density dependent diseases such as distemper, parvo, and rabies (Map 2-9). Continue to issue up to 50 permits for upland furbearer management across the entire Refuge except in on no trapping zones (Refuge office, residences, trails, dikes and Job Corps). Continue to not charge for an upland furbearer management permit.	**Strategies that apply to all objectives under this goal:** Allow management of upland furbearer species according to New York State trapping regulations.
Objective 3.1 Grasslands	Continue to use mowing, haying, prescribed fire and herbicide application as tools to maintain grassland conditions. Schedule mowing every one to three years to occur between July 15 and October 15 depending on the desired vegetation structure. Mowing later in the season will provide added benefits to pollinators. Continue to schedule prescribed fires between April 1 to June 15 to take advantage of adequate site conditions for burning and achieve the desired vegetation results. Continue to conduct herbicide applications to provide maximum control of undesirable vegetation. Continue to evaluate and determine the feasibility of using Refuge grasslands for	Continue to use mowing, haying, prescribed fire and herbicide application as tools to maintain grassland conditions. Schedule mowing every one to three years to occur between July 15 and October 15 depending on the desired vegetation structure. Mowing later in the season will provide added benefits to pollinators. Schedule prescribed fires between April 1 to June 15 to take advantage of adequate site conditions for burning to achieve the desired vegetation results. Conduct herbicide applications to provide maximum control of undesirable vegetation. Evaluate and determine the feasibility of using Refuge grasslands for Karner blue butterfly reintroduction. Evaluate and refine bird and vegetation	Optimize the configuration (size and shape) of Refuge grassland units by reducing the number of units to two and let all other revert to forest. Remove hedgerows within the two selected grassland areas to increase the size of grassland patches. Continue to use mowing, haying, prescribed fire and herbicide application as tools to maintain grassland conditions on the two remaining units. Schedule mowing every one to three years to occur between July 15 and October 15 depending on the desired vegetation structure. Mowing later in the season will provide added benefits to pollinators. Schedule prescribed fires between April 1 to June 15 to take advantage of adequate

	Karner blue butterfly reintroduction. Continue to conduct three grassland bird surveys before July 15 each year. Continue to remove fence-lines and hedgerows in grassland along Route 63 and Roberts Road as staff time permits.	monitoring program for grassland units. Remove hedgerows within grassland areas to increase the size of grassland patches. Optimize the configuration (size and shape) of designated grassland units.	site conditions for burning and achieve the desired vegetation results. Conduct herbicide applications to provide maximum control of undesirable vegetation. Evaluate and determine the feasibility of using Refuge grasslands for Karner blue butterfly reintroduction. Evaluate and refine bird and vegetation monitoring program for grassland units.
Objective 3.2 Shrublands	Continue to maintain approximately 10-20 acres of shrublands each year by hydroaxing in the winter on frozen ground or in mid-summer on dry ground. Continue to treat shrubland units that have become dominated by trees as necessary to retard succession into young forest. Continue to conduct shrub management in winter on frozen ground or in mid-summer on dry ground. Continue to monitor avian composition annually for priority BCR species.	Increase shrubland acres managed annually to 20-30 acres via hydroaxing in the winter on frozen ground or in mid-summer on dry ground. Treat shrubland units that have become dominated by non-native invasive species. Treat shrubland units that have become dominated by trees as necessary to retard succession into young forest. Conduct shrub management in winter on frozen ground or in mid-summer on dry ground. Develop a shrubland management treatment rotation schedule. Evaluate results of ongoing study on wildlife use of different shrubland types including native dogwood, non-native honeysuckle, and seedling green ash. Work with partners to develop cost-efficient methods for managing and maintaining shrublands dominated by native shrub species with few or no invasive species. Monitor avian composition annually for priority BCR species.	Allow shrubland areas to succeed naturally. Some areas will stay as shrubland and others may revert to forest. Control invasive species by chemical and mechanical treatments, including honeysuckle and autumn olive to reduce competition for young trees. Monitor avian composition annually for priority BCR species.
Objective 3.3	Continue to monitor avian species of	Implement all strategies listed for Objective	Implement all strategies for Objective 3.3

Forest (early, mid, late and wetland)	conservation concern through landbird surveys and woodcock surveys. Continue to conduct vernal pool surveys and amphibian surveys. Continue to conduct annual surveys of exotic invasive plants and control as necessary. Continue to limit any new trails into undisturbed upland forest to avoid providing pathways for invasive species. Continue to rely on natural tree fall gaps within the mature forest to create a multi-layered forest structure with a variety of dead and fallen woody debris.	3.4 in Alternative A. Develop and conduct a refuge wide forest inventory and establish permanent vegetation monitoring plots. Develop forest management techniques for forested uplands for species of conservation concern. Implement a commercial forest management program to assist in maintaining early successional forest habitat in accessible areas using existing protocols for hiring contractors. Maintain a no-cut buffer of at least 100 feet along each side of perennial streams, rivers and extensive forested wetlands. Develop a protocol for monitoring and control of invasive plant species including garlic mustard and honeysuckle along woodland trails. Evaluate the juxtaposition of early successional openings and upland forests to determine if restoration is needed and feasible to promote reforestation of artificial forest openings, areas surrounding forest peninsulas, gaps between isolated forest tracks, and riparian corridors to create more forest interior for area-sensitive species. Give restoration and management priority to those areas currently adjacent to large tracts of mature forest, thus increasing the overall size of the forest patch. Restore selected grasslands to forest by either natural regeneration or planting.	in Alternative A. Conduct minimal management for example, only remove trees where they block access or could be a safety issue.
Objective 3.4 Plantations	Continue to remove conifers as they interfere with other management actions or Refuge needs.	Conduct annual surveys of exotic invasive plants and control as necessary. Evaluate current bird survey transects in	Implement all strategies for Objective 3.4 in Alternative B.

	Continue annual surveys of exotic invasive plants, and control as necessary. Continue to rely on natural tree fall gaps within conifer plantations to create a multi-layered forest structure with a variety of dead and downed woody debris. Continue to evaluate current bird survey transects in conifer plantations and establish new surveys as needed to monitor species of conservation concern as plantations convert to a more natural state.	conifer plantations and establish new surveys as needed to monitor for species of conservation concern as plantations convert to a more natural state. Prioritize wood lots for plantation removal. Implement a commercial forest management program to remove conifer plantations in accessible areas using existing protocols for hiring contractors. Determine if reforestation is needed or if natural seeding is sufficient in areas where conifer plantations have been removed. Incorporate survey results, habitat treatments, treatment responses, and future prescriptions into GIS database.	
Goal 4: Refuge visitors will understand and appreciate fish and wildlife conservation through high quality recreation, education and interpretive programs.			
Responds to Issues: Increased visitor access for recreation; hunting conflict; staffing and facilities; law enforcement			
	Strategies that apply to all objectives under this goal: Continue to replace outdated and faded signs (e.g. boundary, hunt zones, closed areas) using current standard Service signs. Continue to restrict public access to seasonally sensitive wildlife areas as needed. Continue to restrict access to the Refuge from March 1 through July 14 except in designated public areas (trails, overlooks, photo blinds and fishing locations).	**Strategies that apply to all objectives under this goal:** Continue to replace outdated and faded signs (e.g. boundary, hunt zones, closed areas, primary entrance, secondary entrance) using current standard Service signs. Maintain consistency when posting "no hunting" signs along the Refuge boundary. Hire one permanent full-time Park Ranger (GS-0025-5).	**Strategies that apply to all objectives under this goal:** Continue to replace outdated and faded signs (e.g. boundary, hunt zones, closed areas, primary entrance, secondary entrance) using current standard Service signs. Maintain consistency when posting "no hunting" signs along the Refuge boundary. Hire one permanent full-time Park Ranger (GS-0025-5).
Objective 4.1 Interpretation	Continue to host two special events during the year: Spring into Nature on the last Saturday in April and the Annual Youth Fishing Derby on the first Saturday in June to coincide with National Fishing and Boating Week.	Implement all strategies listed for Objective 4.1 in Alternative A. Develop three to five power point programs that focus on different themes associated with Refuge goals and objectives such as habitat wildlife and visitor services.	Implement all strategies listed for Objective 4.1 in Alternative B. Develop an educational power point that plays continuous loop in the visitor contact station informing the public on topics such as the history of the Refuge,

	Continue to offer programs to assist Boy Scouts and Girl Scouts to obtain badges on request for a minimum of 10 children in the target audience. Continue to have the visitor contact station open Monday through Friday, except holidays, from 7:30 am to 4:00 pm with extended hours on weekends in the spring and fall from 9:00 am to 5:00 pm. Continue to offer slide programs and/or guided trail walks as requested and presented by staff or volunteers with a minimum of 10 people in the target audience and no more than 60. Continue to partner with Buffalo Audubon Society to provide weekend nature programs in the spring and fall. Continue to distribute interpretive brochures including the Kanyoo Trail Guide. Continue to maintain interpretive displays in the visitor contact station, and interpretive panels in kiosks at Cayuga Overlook, Onondaga, Kanyoo, and Swallow Hollow Nature Trails, and at the visitor contact station. .	Develop thematic programs for guided trail walks using the method described in the Certified Interpretive Guide Course to develop outlines which have theme, target audience, goals, mission-based behavioral objectives, introduction, sub-themes and conclusion. Conduct two to four outdoor-related workshops such as Orienteering and Map Reading, Women in the Outdoors, and New Hunters to Iroquois NWR. Rewrite the Kanyoo Nature Trail guide and install six interpretive panels on the blue loop of Kanyoo Trail. Standardize the six Refuge kiosks and the messages they provide regarding Refuge goals, objectives and management. In locations where there are more than one kiosk for interpretation and hunting, determine if they can be combined into one kiosk. Conduct research on the demographics of Refuge visitors and their activities. Renovate interpretive displays in the visitor contact station to integrate CCP goals and objectives. Revise Refuge publications to current USFWS design standards and to reflect the updated rules and regulations. Investigate new technologies that can be incorporated into interpretive programs such as podcasts, virtual technologies and www.ebird.com. Update cultural resource interpretive displays to incorporate the history of the eastern elk and displays the antlers recently	types of habitat present, upcoming events and activities, and volunteer opportunities. Develop virtual trail tours, including a video of the trail, wildlife observations, visuals of interpretive signs present on the trail and an educational commentary. Develop a new display in the visitor contact station promoting “backyard habitat” and the importance of native species.

		discovered on the Refuge. Utilize *National Association of Interpreters Standards and Practices for Interpretive Methods, Interpretive Organizations, and Planning.*	
Objective 4.2 Outreach	Continue current outreach activities including news releases prior to major events and maintaining a Refuge website. Continue participating in Conservation Field Days in Orleans, Niagara and Monroe Counties and in festivals or special events offsite. Continue to work with the Chambers of Commerce to reach visitors through the tourism industry.	Implement all strategies listed for Objective 4.2 in Alternative A. Continue to develop and distribute news releases to local papers, television, radio, schools, local tourism about the Refuge and wildlife activity. Develop targeted outreach based on research findings conducted under Objective 4.1 and connect outreach goals to Refuge messages and key resource needs. Develop an introductory video about the Refuge. Update the Refuge website to provide interactive management and natural resources games and ensure consistency with new website standards. Develop outreach program with Iroquois Job Corps Center (interpretation, environmental education, and partnerships). Develop a comprehensive outreach strategy. Within five years of completion of the CCP, conduct an evaluation of the effectiveness of current outreach techniques and identify at least two specific audiences for outreach goals that have thus been unexplored. Explore opportunities to work with the Buffalo and Rochester zoos to partner on outreach programs. Obtain training in tourism and eco-tourism and explore opportunities to connect with Niagara Falls tourism organizations.	Implement all strategies listed for Objective 4.2 in Alternative B. Provide monthly news releases. Develop a comprehensive outreach strategy based on demographic survey results. Allow visitors to register for upcoming activities and events online. Utilize new technology such as Twitter and Facebook.

		Update the Refuge website to provide more information on the Refuge's biological resources, recreational opportunities, regulations and policies, and the mission of the Service and the Refuge.	
Objective 4.3 Environmental Education	Continue the Canisius Ambassadors for Conservation (CAC) education program ensuring that the program ties into the New York State Standard of Learning requirements. Continue to work with teachers to develop their own environmental education programs.	Implement all strategies listed for Objective 4.3 in Alternative A. Work with Friends of Iroquois NWR (FINWR) and Canisius College to find secure funding for the CAC program. Continue to provide annual busing assistance to the CAC program. Develop three to five key environmental education curricula/messages for CAC teachers to evaluate their pre- and post-visit knowledge of Refuge resources and management actions. Develop a program that provides environmental education options for the NY State School for the Blind focusing on non-visual teaching methods. In conjunction with the CAC, conduct a conservation camp or after school camp such as the Junior Refuge Manager Program. Look for opportunities to incorporate the Shorebird Sister Schools Program, Jr. Duck Stamp education materials, and Project Webfoot into environmental education activities.	Implement all strategies listed for Objective 4.3 in Alternative B. Develop a Volunteer Master Naturalist Program. Develop education programs targeting teens and young adults focusing on practical applications such as how to make environmentally conscious decisions. Develop a program designed for those interested in education as a career and give participants an opportunity to be involved in planning and implementing youth environmental education programs.
Objective 4.4 Wildlife Observation and Photography	Continue to maintain Kanyoo, Onondaga, and Swallow Hollow Nature Trails and Feeder Road to provide opportunities for wildlife observation and photography. Continue to maintain Cayuga, Mallard, Ringneck and Schoolhouse Overlooks. Continue to promote Oak Orchard Creek as	Continue to maintain Kanyoo, Onondaga, and Swallow Hollow Nature Trails and Feeder Road to provide opportunities for wildlife observation and photography. Continue to maintain Cayuga, Mallard, Ringneck and Schoolhouse Overlooks. Continue to promote Oak Orchard Creek as	Implement all strategies listed for Objective 4.4 in Alternative B. Develop Onondaga Trail to include a loop back to the parking area. Create an interpretive trail on Oak Orchard Creek for canoe/kayak users.

	a canoe/kayak route to provide additional unique opportunities for wildlife viewing and photography. Continue to loan binoculars which can be checked out at the visitor contact station. Continue to operate the live kestrel cam to provide a unique opportunity to view an active kestrel nest. The live feed can be viewed via a monitor in the visitor contact station and on the web. Continue to permit cross-country skiing on the Mohawk Ski Trail from December 1 until the last day in February. Continue to allow biking on Feeder Road. Continue to allow jogging on nature trails and Feeder Road. Continue to restrict hiking and walking to Kanyoo, Onondaga and Swallow Hollow Nature Trails only during the spring migrations, nesting and brood rearing season, March 1 to July 14. Continue to allow hiking and walking the Refuge uplands (off designated nature trails) from July 15 to the end of Februrary. Continue to update Refuge publications and brochures regarding wildlife observation and photography opportunities every three years (e.g., fact sheets, wildlife lists, general brochure). Continue to repair and maintain two photo blinds in their current locations	a canoe/kayak route to provide additional unique opportunities for wildlife viewing and photography. Continue to loan binoculars which can be checked out at the visitor contact station. Continue to operate the live kestrel cam to provide a unique opportunity to view an active kestrel nest. The live feed can be viewed via a monitor in the visitor contact station and on the web. Continue to permit cross-country skiing on the Mohawk Ski Trail from December 1 until the last day in February. Continue to allow biking on Feeder Road. Continue to allow jogging on nature trails and Feeder Road. Continue to update Refuge publications and brochures regarding wildlife observation and photography opportunities every three years (e.g., fact sheets, wildlife lists, general brochure). Open existing trail used for waterfowl hunting access behind headquarters and create an overlook platform. Provide one designated photo blind and one combination photo/hunt blind. Provide one canoe launch for accessing Oak Orchard Creek. Develop a Refuge rack card for distribution at key tourism and highway information sites. Partner with Friends of Iroquois NWR and others to offer an annual or a regular wildlife photography contest. Encourage and promote the use of	Keep the creek clear of all obstructions. Conduct wildlife observation rated workshops on topics such as Wildlife Photography and Bird, Mammal, Reptile, Amphibian and/or Plant Identification.

		www.ebird.org by publicizing it and adding an internet linked kiosk on station so that birders can consult previous sightings and add their own sightings. Incorporate the Mohawk Ski Trail into other Refuge maps and create a fact sheet about the trail. On Feeder Road, where biking is allowed, ensure trail is properly posted showing bike access. Reestablish an eagle camera when technology and an appropriate nesting tree are available.	
Objective 4.5 Other Recreation	Continue to allow picking of berries and fruits from July 15 to December 15. Continue to allow berries to be picked for recreational use only, no commercial operations. Continue to allow the use of baskets smaller than ½ bushel at any one time.	Close refuge to berry picking upon approval of CCP.	Close refuge to berry picking upon approval of CCP.
Goal 5: Hunters and anglers will enjoy and support programs designed to provide high quality hunting and fishing experiences.			
Responds to Issues: Increased visitor access for recreation; hunting conflicts; staffing and facilities; law enforcement			
Objective 5.1 Hunting	**Strategies – Deer Hunting:** Continue to provide deer hunting via archery, regular firearms and muzzleloader. Continue to close Onondaga Nature Trail to all uses except hunting during the regular (shotgun) deer season. Continue to provide two locations for deer hunters with disabilities. **Strategies – Turkey Hunting:** Continue to allow spring turkey hunting and issue up to 50 permits via a pre-season	**Strategies – All Hunting:** Create a general permit for the Refuge hunting program. Under a general permit, hunters may chose to apply for hunts that require a lottery system and submit the required fee/fees. All lottery hunts will require an application fee. **Strategies – Deer Hunting:** Continue current management of the archery and muzzleloader season and	**Strategies – All Hunting:** Implement all strategies for all hunting listed under Objective 5.1 in Alternative B. **Strategies – Deer Hunting:** Implement all strategies for all hunting listed under Objective 5.1 in Alternative B. Develop temporary ground stands for hunters with disabilities at accessible sites.

	lottery draw. Continue to collect a $5 application fee for the spring turkey hunt. Continue to provide a youth only orientation and hunt in cooperation with the local chapter of the National Wild Turkey Federation on the first Sunday of May. **Strategies – Waterfowl Hunting:** Continue to host waterfowl identification courses in cooperation with the NYSDEC and the Finger Lakes and Western New York Waterfowl Association. Continue to issue permits for opening day and/or the first two Saturdays of waterfowl season through a pre-season lottery draw. Continue to permit waterfowl hunting from designated stands in Cayuga, Oneida and Mohawk Pools, and Sutton's Marsh. Continue to allow waterfowl hunting on Tuesdays, Thursdays and Saturdays until noon. From New York State opening day until the Thursday preceding opening day of deer firearm season. Continue to allow up to three hunters per permit and charge $5.00 for permits on Tuesdays and Thursdays and $10.00 on Saturdays. Continue to provide a 50% discount on permit fees for Golden Age and America the Beautiful – Interagency Senior Pass Holders. Continue to provide one hunt stand for hunters with disabilities. Continue to host the Young Waterfowler's Program with a youth only hunt day on the	evaluate each year. Conduct a lottery hunt for high use days to provide uncrowded conditions and ensure quality hunting. An increase in hunters may require a quota hunt where the number of hunters would be limited to a specified number as necessary. Create a separate lottery system for non-ambulatory hunters as demand for these areas increase. Post Onondaga Trail as a "no hunting zone" to restrict hunting and hunter access. This will make it consistent with the other nature trails on the Refuge and allow use by other visitors during the regular (gun) deer hunting season (Map 2-14). Develop parameters and guidelines to allow scouting. **Strategies – Turkey Hunting:** Issue turkey permits through a preseason lottery draw. The lottery draw would allow hunters to be considered for three separate sessions they wish to hunt; Session 1 - May 1 to May 10; Session 2 - May 11 to May 20; or Session 3 - May 21 to May 31. Increase hunting permits up to 85, divided into the 3 different hunt sessions as follows: Session 1 – 50 permits; Session 2 – 25 permits; Session 3 – 10 permits. Reschedule youth turkey hunt program to align with the New York State Youth Hunting Weekend. Continue to require and provide a youth only orientation and hunt in cooperation with the local chapter of the National Wild Turkey Federation prior to hunt weekend.	**Strategies – Turkey Hunting:** Open a fall turkey hunt in conjuction with closing the spring turkey season. Continue to conduct the youth turkey hunt on the first Sunday of the state season. Continue to require and provide a youth only orientation and hunt in cooperation with the local chapter of the National Wild Turkey Federation prior to hunt weekend. **Strategies – Waterfowl Hunting:** Establish the same permit fee for weekdays and Saturdays. Move or remove waterfowl hunt stands in Oneida Pool affected by removal of boards and reverting to natural hydrologic conditions as described in Goal 1 above. Continue to hunt in the same marshes that are currently open to hunting. Continue to allow waterfowl hunting on Tuesdays, Thursdays and Saturdays until noon. Open waterfowl hunting areas up to 30 parties with no restriction on hunter locations within the designated units open to hunting. Extend waterfowl hunting season no later than December 1 in Cayuga Pool only. Create a permanent blind for non-ambulatory hunters on the north side of Mohawk Pool by enhancing the dike (Map 2-20). Continue to host the Young Waterfowler's Program with a youth only hunt day. Reschedule youth waterfowl hunt program to align with the New York State Youth

	first Sunday in the season. **Strategies - Other Migratory Bird Hunting:** Continue to allow rail, snipe, and woodcock hunting on the Refuge east of Sour Springs Road with no associated fees. **Strategies – Small/Upland Game:** Continue to upland game hunting with no associated fees.	**Strategies – Waterfowl Hunting:** Establish the same permit fee for weekdays and Saturdays. Continue to hunt in the same marshes that are currently open to hunting. Continue to provide hunt stands and add an opportunity to hunt in "free roam" areas. Use habitat conditions to determine the exact locations of stands and free roam areas. Allow canoeing for both free roam areas as well as stand areas as appropriate. Continue to allow waterfowl hunting on Tuesdays, Thursdays and Saturdays until noon. Extend waterfowl hunting season no later than December 1 in Cayuga Pool only. Develop parameters and guidelines to allow scouting. Continue to host the Young Waterfowler's Program with a youth only hunt day. Reschedule youth waterfowl hunt program to align with the New York State Youth Hunting days. Hold a pre-season lottery drawing for expected high use waterfowl hunt days prior to the hunt season. Allow stand-by hunters for no shows as long as the hunter has a Refuge permit and other required documents. Continue to require and host waterfowl identification courses in cooperation with the NYSDEC and the Finger Lakes and Western New York Waterfowl Association. Create a permanent, accessible hunt blind.	Hunting days. **Strategies - Other Migratory Birds:** Allow hunting of woodcock, snipe and rail on the off days of waterfowl hunting (Sunday, Monday, Wednesday, and Friday) to maintain 40% acreage requirement. Continue to hunt under general permits with no associated fees. **Strategies – Small/Upland Game:** Continue to hunt under general permits with no associated fees.

		Continue to provide a 50% discount on permit fees for Golden Age and America the Beautiful – Interagency Senior Pass Holders. **Strategies - Other Migratory Bird Hunting:** Continue to hunt under general permits with no associated fees. Allow hunting of woodcock, snipe and rail prior to the opening of waterfowl season. Discontinue during waterfowl season to maintain the 40% acreage requirement discussed above. **Strategies – Small/Upland Game:** Continue to hunt under general permits with no associated fees.	
Objective 5.2 Fishing	Continue to allow access for fishing in accordance with New York State regulations in designated areas providing participants with reasonable harvest opportunities, uncrowded conditions and minimal conflicts with other users. Continue to have fishing areas in Ringneck Marsh and Oak Orchard Creek open year-round. Continue to allow fishing from sunrise to sunset. Continue to permit frogging using a spear, club, hand or hook under state fishing regulations.	Continue frogging for bullfrogs only on the Refuge. Continue to allow fishing at Ringneck Marsh and Oak Orchard Creek open year-round. Continue to host the youth fishing derby on the first Saturday in June as part of National Fishing and Boating Week. Partner with the USFWS Fisheries Office to conduct a fisheries inventory on the Refuge. Evaluate the quality of fishing opportunities at Ringneck Marsh. Develop an accessible fishing pier at Ringneck Marsh or in Oak Orchard Creek along Sour Springs Road. Prohibit the use of lead sinkers and other lead tackle to prevent their ingestion by wildlife and possible lead poisoning. Develop an outreach program to minimize	Continue to allow access for fishing in accordance with New York State regulations in designated areas providing participants with reasonable harvest opportunities, uncrowded conditions and minimal conflicts with other users. Continue to have fishing areas in Ringneck Marsh and Oak Orchard Creek open year-round. Continue to allow fishing from sunrise to sunset. Continue to permit frogging using a spear, club, hand or hook under state fishing regulations. Allow non-motorized boating access on Ringneck Marsh after the nesting season (after July 15). Develop a fishing rack card that will provide a map of the fishing areas, Refuge fishing regulations and fish species found

		conflicts among user groups, help control aquatic invasive plants and lead in the environment, reduce the introduction of nonnative fish species, and minimize the disturbance to wildlife and habitat.	on the Refuge.
Goal 6: Enhance partnerships with local communities and various organizations to garner support and promote refuge programs and resources.			
Responds to Issues: Development; partnerships; staffing and facilities			
Objective 6.1 Landscape Scale Conservation	Continue to partner with the Oak Orchard Watershed Protection Alliance. Continue to partner with the USFWS Partners for Fish and Wildlife Program to provide technical assistance for habitat restoration projects in western New York. Continue to cooperate with the USFWS New York Field Office in Cortland, NY to manage trust resources on and off Refuge lands. Continue to work with the USFWS Lower Great Lakes Fisheries Resources Office on habitat restoration projects, fisheries inventory and outreach. Continue to partner with NYSDEC.	Implement all strategies listed for Objective 6.1 in Alternative A. Enhance partnership with the Oak Orchard Watershed Alliance which was established in August of 2004 to guide the development of the State of the Basin Report for the Oak Orchard Watershed. The State of the Basin Report is the first step in the development of a comprehensive watershed management plan. The Orleans and Genesee County Soil and Water Conservation Districts sponsor this watershed planning effort. Collocate with the Lower Great Lakes Fish and Wildlife Conservation Office currently located in Amherst, New York into a new Refuge visitor contact station and administration building (See discussion at beginning of chapter).	Implement all strategies listed for Objective 6.1 in Alternative B.
Objective 6.2 Support for refuge programs	Continue to work with Friends of Iroquois NWR to promote Refuge programs and act as a local grassroots organization. Continue the Refuge Volunteer Program to assist with completion of Refuge projects. Continue to partner with the Iroquois Job Corps Center. Continue to partner with other non-profit organizations like Buffalo Audubon Society, Western New York and Finger	Increase support for activities of Friends of Iroquois NWR to promote Refuge programs and act as a local grassroots organization through interpretation and educations programs. Enhance Refuge volunteer program to assist with the completion of Refuge projects. Enhance partnership with the Iroquois Job Corps Center by engaging in at least one cooperative project per year with the center.	Implement all strategies listed for Objective 6.2 in Alternative B.

	Lakes Waterfowl Association, Lake Plains Waterfowl Association, Canisius College, and University of Buffalo.	Continue to partner with other non-profit organizations like Buffalo Audubon Society, Western New York and Finger Lakes Waterfowl Association, Lake Plains Waterfowl Association, Canisius College, and University of Buffalo. Develop an RV pad with hookups on the Refuge to accommodate seasonal volunteers.	
6.3 Research	Continue to encourage local college research projects on the Refuge to further obtain information regarding the success of management strategies. Continue to work with state and other federal agencies on research projects conducted on the Refuge.	Implement all strategies listed for Objective 6.3 in Alternative A. Develop a database of research needs that is updated each year to allow the Refuge to respond quickly to funding opportunities.	Implement all strategies listed for Objective 6.3 in Alternative B.

Chapter 3

USFWS

Iroquois National Wildlife Refuge

Affected Environment

- Physical Environment
- Biological Environment
- Socioeconomic Environment
- Historical Picture
- Refuge Administration
- Contributions to Local Economy
- Refuge Public Uses

Chapter 3
Affected Environment

Physical Environment

Iroquois National Wildlife Refuge (Iroquois NWR, the Refuge) was established in 1958 and encompasses 10,828 acres of open water, emergent marsh, forested wetland, upland forest, grassland, and shrubland. The Refuge lies within the rural towns of Alabama (Genesee County) and Shelby (Orleans County) of western New York.

The physical environment, expressed through climate, geology, topography and soils, explains much about the patterns and distribution of biological diversity. These patterns describe natural divisions, called biophysical regions or ecoregions. Organizing the physical environment into ecoregions helps us understand, conserve, and manage wildlife and biodiversity. Ecoregions are relatively large geographic areas of land and water defined by common climate, geology and vegetation patterns. The Nature Conservancy (TNC) classified New York into seven ecoregions. Iroquois NWR is in the Great Lakes Ecoregion (Map 3-1), a region formed during the last glacial advance 14,000 years ago and characterized by gently rolling, low level landscapes and flat lake plains (NYSDEC 2005).

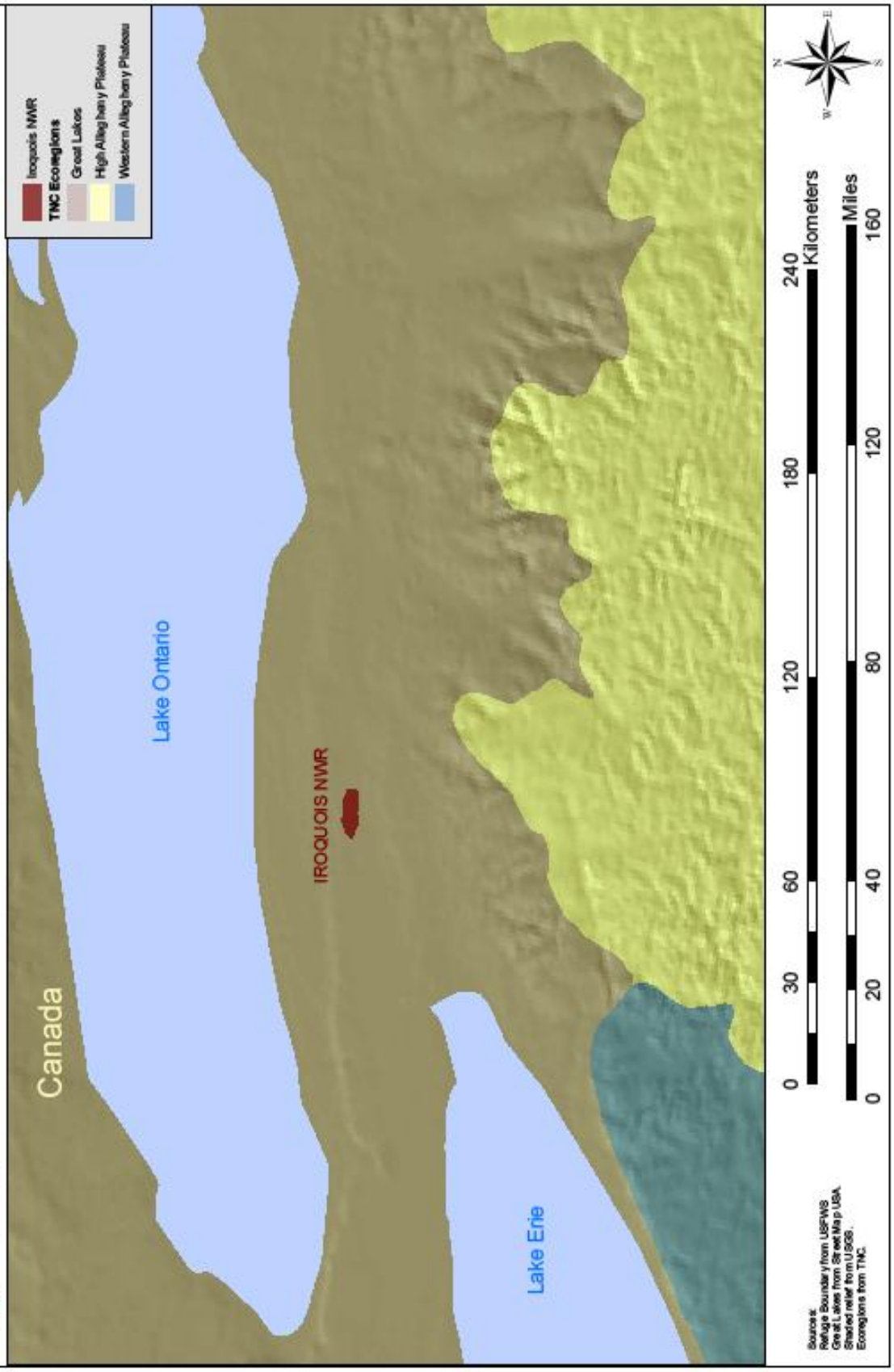
USFWS

Blue Jay

Map 3-1

Iroquois National Wildlife Refuge - Comprehensive Conservation Plan

The Nature Conservancy Ecoregions



The Refuge lies within the 173,975-acre Oak Orchard Watershed which is within the Southwest Lake Ontario Basin (SWLO Basin), a subwatershed of the Great Lakes Watershed (Map 1-2 and 1-7).

The Iroquois NWR, Oak Orchard Wildlife Management Area (WMA), and Tonawanda WMA together form the 19,000-acre Tonawanda-Iroquois-Oak Orchard Wetland Complex (Map 1-3). The Complex is primarily wetland habitat consisting of emergent marsh, forested wetland, wet meadow, and shrub wetland, interspersed with areas of grassland and upland hardwood forest. The Complex is an Audubon designated Important Bird Area (IBA) and a New York State designated Bird Conservation Area (BCA), providing nesting and migration habitat for a large number of birds including waterfowl, marsh birds, grassland birds, bald eagle, cerulean warbler, and prothonotary warbler (NYDEC 2005).

Bird Conservation Region

Iroquois NWR lies within BCR 13, the Lower Great Lakes/St. Lawrence Plain (Map 1-5). BCR 13 encompasses the vast, low-lying lake plain region surrounding Lake Erie and Lake Ontario, the St. Lawrence River Valley, low-lying regions between the Adirondack Mountains and the Laurentian Highlands, and upper regions of the Hudson River Valley. In addition to providing important lakeshore habitats and associated wetlands, this region was originally dominated by a mixture of oak-hickory, northern hardwood, and mixed-coniferous forests. Nearly 95% of the original habitat types have been lost and the landscape is now dominated by agriculture with interspersed wetlands and remnant forest stands. The BCR plays a critical role in providing important staging and migrating habitat for birds during the spring and fall migration (Hartley 2007).

Regional Conservation Lands and Land Use Patterns

Iroquois NWR lies within Partners in Flight (PIF) Physiographic Area 15 (Map 1-6). Unlike most other physiographic areas in the northeast U.S., roughly 74% of the land area in Area 15 is in agricultural production (Dettmers and Rosenberg 2003). According to the U.S. Environmental Protection Agency (USEPA) land classification, the land cover in the SWLO basin is 64% agricultural, 26% deciduous forest, 12% mixed forest, 4% developed, and 3% other (NYDEC 2005) (Table 3-1 and Map 3-2). Agricultural crops in the vicinity of Iroquois NWR are dominated by soybeans, corn, and wheat; onions are grown in the low lying muck soils. As described above, Iroquois NWR joins with Oak Orchard and Tonawanda WMAs to create the Tonawanda-Iroquois-Oak Orchard Complex encompassing 19,000 acres of State and Federal conserved lands. The Tonawanda Indian Reservation covering approximately 7,000 acres lies adjacent to Tonawanda WMA and southwest of the Iroquois NWR (Map 1-3).

Table 3-1 Land Cover within the Southwest Lake Ontario Basin of New York

Land Use Classification	%Cover
Row Crops	39.02
Deciduous Forest	26.31
Pasture/Hay	16.08
Mixed Forest	12.38
Low Intensity Residential	1.96
Parks, Lawns, Golf Courses	1.03
Water	0.83
High Intensity Commercial/Industrial	0.64
Evergreen Forest	0.60
Wooded Wetlands	0.49
High Intensity Residential	0.39
Emergent Wetlands	0.14
Barren; Quarries, Strip Mines, Gravel Pits	0.12

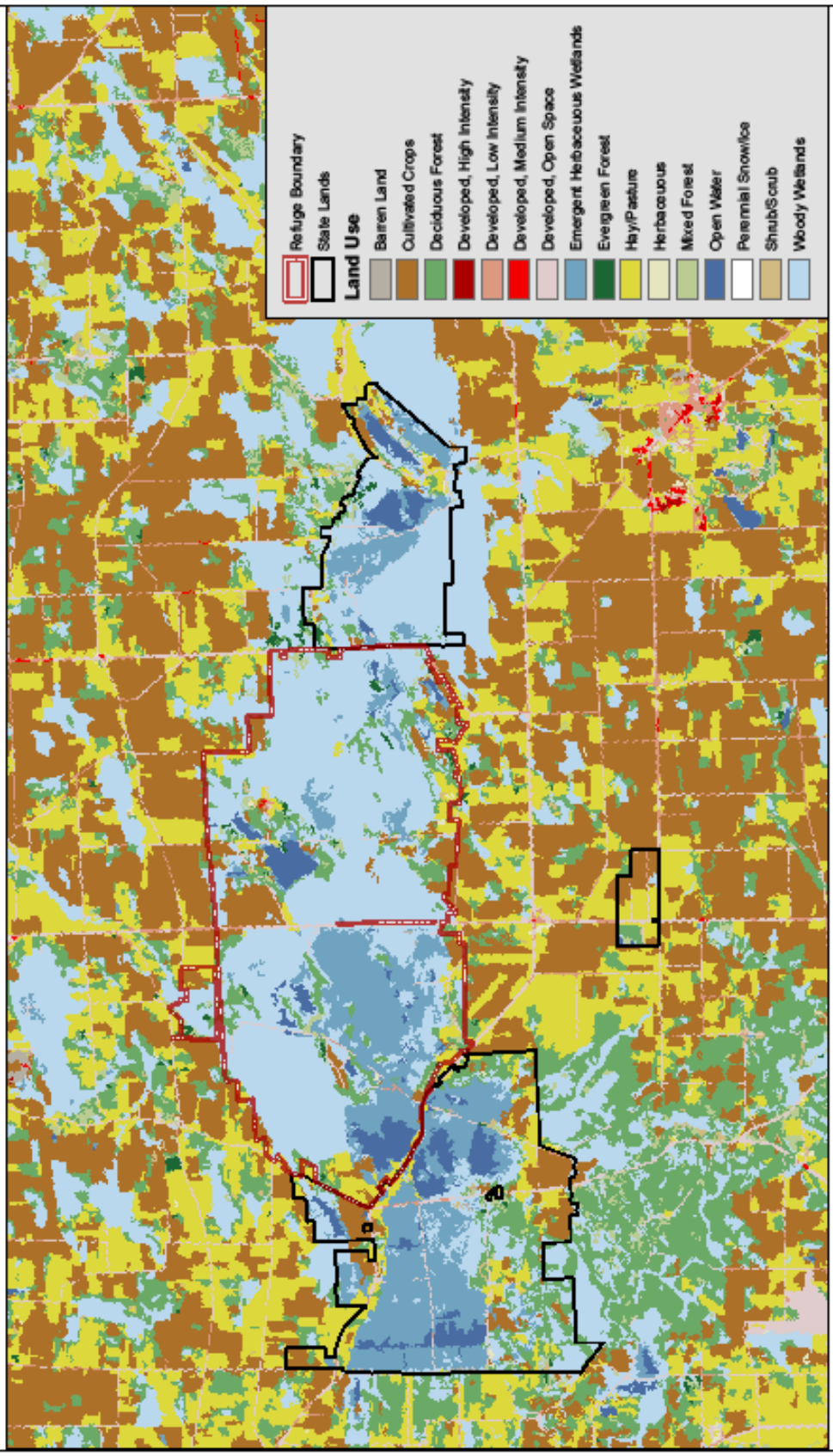
USFWS

Bird habitat on the refuge

Map 3-2

Iroquois National Wildlife Refuge - Comprehensive Conservation Plan

Regional Land Use



Climate

The weather in the Great Lakes Watershed is influenced by the location and size of each lake, air masses from other regions, and the location within a large continental landmass. Each lake acts as a heat sink, absorbing heat when the air is warm and releasing it when the air is cold. This results in more moderate temperatures at nearshore areas than other locations at similar latitudes. The influence of external air masses varies seasonally. In the summer, the region is influenced mainly by warm humid air from the Gulf of Mexico, whereas in winter the weather is influenced more by Arctic and Pacific air masses (USEPA and Government of Canada 1995).

The weather around Iroquois NWR is relatively cool and wet. High temperatures range from an average of 28.6°C (83.4°F) in August to -1.2°C (29.9°F) in February. Average annual precipitation is 94.0 cm (37.0 in). Snowfall is moderately high with an annual average of 168.4 cm (66.3 in). Much of this snow is provided by moisture absorbed into the atmosphere as cool westerly winds travel across the warmer water of Lake Erie. Winds are moderate to high due to the flat, open character of this part of New York (USFWS 2002).

Climate Change

Climate change is defined as a change in the state of the climate characterized by changes in the mean and/or the variability of its properties persisting for an extended period, typically decades or longer (IPCC 2007a). The change in climate has been attributed to the increase in carbon dioxide (CO2) and other greenhouse gases in the Earth's atmosphere, due in large part to human activities such as fossil fuel burning, agriculture and land use change. In January 2001, the U.S. Department of the Interior issued Secretarial Order No. 3226 requiring federal agencies under its direction that have land management responsibilities to consider potential climate change impacts in long range planning endeavors. In September 2009, Secretarial Order No. 3289 updated the earlier order with organizational changes to enable fulfillment of planning requirements.

There is consensus among the scientific community that global climate change will lead to significant impacts across the U.S. These impacts include sea-level rise adding stress to coastal communities and ecosystems (Wigley 2004). The effect of climate change on wildlife and habitats is expected to be variable and species specific, with a predicted general trend of ranges shifting northward. Uncertainty about the future effects of climate change requires Refuge managers to use adaptive management (e.g., adjusting regulations, shifts in active habitat management, or changing management objectives) to maintain healthy ecosystems in light of unpredictability (Inkley et al. 2004). Refuge managers can plan and respond to changing climate conditions. A few recommendations include managing for diverse and extreme weather conditions (e.g., drought and flood); maintaining healthy, connected, genetically diverse wildlife populations; and protecting coastal wetlands to accommodate sea level rise (see Inkley et al. 2004 for more recommendations). Well maintained coastal wetlands help to keep inland wetlands healthy.

In western New York climate change is predicted to have a large impact on all facets of life. From agricultural and rural communities to industry and the economy, climate change will shape the way that people live and ecosystems change far into the future. Annual average temperatures, heavy rainstorms and winter and spring precipitation are all predicted to increase. Temperatures may increase by 5 to 12 °F in winter and by 5 to 20 °F in the summer, but will affect the nighttime temperatures more than the daytime temperatures. Although the amount of precipitation may not change, the time of year in which the precipitation will occur will change

with an increase in the winter and a decrease in the summer. This will occur in part as the duration of the Great Lake's ice cover will decrease. All of these predicted changes will contribute to major climate changes in western New York by the end of the century (Kling, et al. 2003).

Hydrology

Watershed Level Hydrology

The Refuge lies entirely within the 173,975-acre Oak Orchard Watershed. The region encompassing Iroquois NWR is characterized by gently rolling land with 0 to 6% slopes. Refuge elevations range from 185 to 198 m (610 to 650 ft) above sea level. Oak Orchard Creek is the largest river in Orleans County, and is one of ten major tributaries in the Great Lakes Ecoregion of New York. Oak Orchard Creek enters the Refuge from the east, meanders northwest, and exits to the north, eventually emptying into Lake Ontario (USFWS 2002, Map 1-2). The Creek begins north of Batavia in Genesee County at an elevation of 850 feet. It flows northeast through Elba, then turns and runs west through Oakfield and Alabama. The Creek then runs north through the towns of Shelby, Ridgeway and Carlton in Orleans County before entering Lake Ontario at Point Breeze at an elevation of 245 feet (Zollweg et al. 2005). Oak Orchard Creek also serves as the main outlet channel for waters that drain from the Elba mucklands, historically a highly productive agricultural region.

A Dolomite limestone outcrop in Shelby Center forms a natural restriction in the Creek approximately in the center of the watershed. Upstream of this restriction Oak Orchard Creek drops only 30 feet in 25 miles forming the shallow flooded basin known that is now the Tondawanda-Iroquois- Oak Orchard Wetland Comples. Lewiston Road runs along a height of land that separates Oak Orchard Swamp from the Tonawanda Swamp (Carroll 2001).

Oak Orchard Creek is within the SWLO Basin which covers 2.2 million acres in western and central New York (Map 1-7). The Basin stretches across the state from north to south and includes three major sub-watersheds: West Lake Ontario, Lower Genesee, and Upper Genesee. The Basin has a highly diverse landscape covering several ecological zones and includes a wide variety of vegetative cover, wildlife habitat and land use. Although grasslands were historically found in the Basin, there are no lands in the Basin currently classified by the USEPA as natural grasslands. The northern portion of the Basin is primarily an agricultural region with scattered forest stands, diverse and extensive wetlands, and is generally flat. The largest river in the basin is the Genesee River, which originates in Pennsylvania and drains into Lake Ontario near Rochester, New York. Mt. Morris Dam was built in 1952 by the U.S. Army Corp of Engineers to provide flood control; this splits the Genesee into two major sub-watersheds (Upper and Lower Genesee). The Erie Canal passes through the northern part of the basin, in turn affecting water quality and quantity (NYDEC 2005).

SWLO is part of the 290,000 square-mile Great Lakes Watershed (Map 1-7), the largest freshwater ecosystem in the world. Iroquois NWR is in the southeastern corner. The watershed includes all tributary streams and inland lakes that are hydrologically connected to the five Great Lakes: Superior, Michigan, Huron, Erie and Ontario. Together these lakes hold 20% of the world's supply of surface freshwater and 95% of the U.S. supply. The climate and hydrology of the Great Lakes create unique environmental conditions that support a diversity of species and communities. The glacial and cultural histories have also had significant influence on the presence and distribution of biodiversity in this region (TNC 2000).

Local Level Hydrology

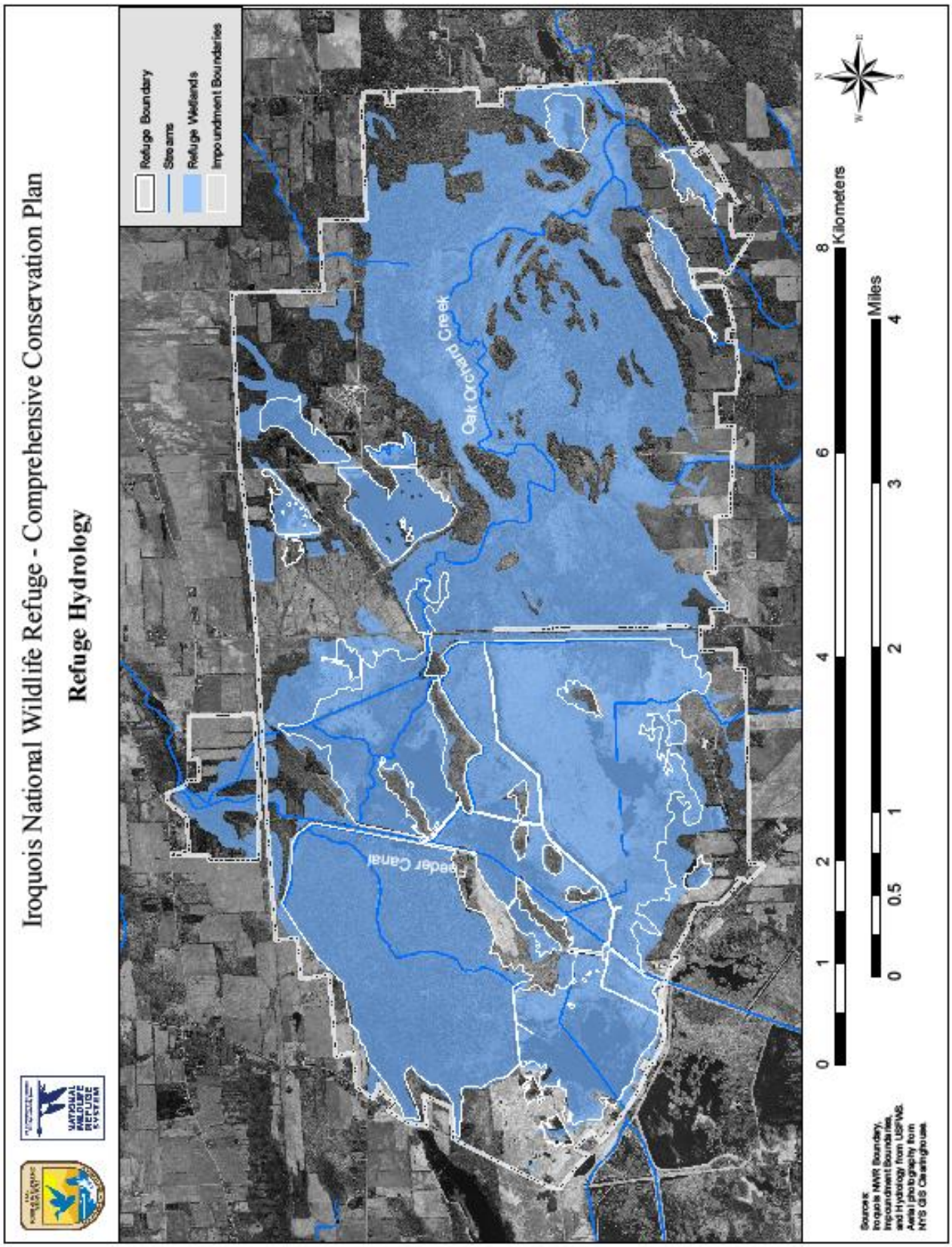
At a local scale, the Refuge is supported by an important hydrological system comprised of natural and man-made waterways in which materials and energy are transferred. Some of these waterways, such as the Oak Orchard Creek, constitute an important ecological component to the Refuge by connecting biologically diverse food webs that provide important habitat features for wildlife (Map 3-3).

Prior to European settlement, the Refuge area contained several thousand acres of emergent marsh and forested wetland that were flooded continuously or periodically throughout the year. After agricultural development, the Refuge area contained approximately 5,000 acres that normally were inundated in the spring, but mostly dry by fall, making all but the wettest areas suitable for farming. Impoundments were developed after the Refuge was established and this allowed some degree of water level management which resulted in nearly 4,000 acres of manageable wetlands. Manipulating water levels mimics natural wetland dynamics, rejuvenates wetland substrate, controls undesirable vegetation as well as flooding on neighboring lands, and maintains a continuous flow in Oak Orchard Creek (USFWS 2002).

USFWS

Iroquois National Wildlife Refuge

Map 3-3


Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Refuge Hydrology
Refuge Boundary
Streams
Refuge Wetlands
Impoundment Boundaries
Oak Orchard Creek
Feeder Canal
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Sources:
Iroquois NWR Boundary,
Impoundment Boundaries,
and Hydrology from USFWS.
Aerial photography from
NYS GIS Clearinghouse.

Geology

The Earth has experienced several glacial periods; the last, known as the Pleistocene Ice Age, began about two million years ago. Glaciers advanced and retreated over time as temperatures fluctuated. The most recent period to affect portions of New York was the Wisconsin Glaciation. A one-mile thick sheet of ice, known as the Laurentide Ice Sheet, covered the region until its retreat northward. This ice sheet was gone from northern New York by about 10,000 years ago (Smith 1985). As the glacier retreated it left behind piles or layers of sediments, rocks and other debris, known as glacial drift. These surficial deposits over bedrock include two types: glacial till and glacio-fluvial. Glacial till is a mixture of sand, silt, clay and rock ground up by the glacier and dropped as it retreated. It covers most of this region. Glacio-fluvial drift develops from the transport, sorting, and deposit of material by flowing glacial meltwater. Larger gravels and stones settle out at higher gradients, while finer silts, sands, and clays settle out as the waters slow at valley bottoms (Sperduto and Nichols 2004). After glacial ice retreated from the Oak Orchard Watershed, lake deposits, mucklands and stream alluvium filled-in some of the low-lying areas (Zollweg et al. 2005).

At the end of the last glacial period much of western New York was under glacial Lake Tonawanda. Genesee and Orleans Counties were completely covered by the last glacial advance. This Lake extended from the Niagara River east 50 miles to the current town of Holley and was in a shallow basin bounded to the north by the Niagara escarpment and to south by the Onondaga escarpment. These escarpments are limestone cliffs that rise a few hundred feet above the Huron Plain. Lake Tonawanda waters drained north spilling through several notches in the Niagara escarpment. These outlet streams formed waterfalls and over time, eroded deep gorges. The erosion continually lowered the level of the Lake so that eventually the only remaining outlet was the Niagara River that created Niagara Falls. Shallow pools and swamps were left behind in the poorly drained areas of the plain as the lake level receded, creating the wetland conditions visible on Iroquois NWR and surrounding WMAs (Carroll 2001).

South of Iroquois NWR, Route 77 (Lewiston Road) follows a ridge of glacial till that is likely the remains of a glacial moraine. A moraine is accumulations of glacial debris left behind when the glacier "halted" before continuing to recede. Sand hills in the area were originally formed as sandbars in Lake Tonawanda or by wind deposits on the beaches as the Lake receded (Carroll 2001).

The majority of the soils on the Refuge came from one or more combinations of four lake sources including glacial till, silt deposits in glacial lakes, decaying vegetation, and erosion (USFWS 2000c). The Natural Resources Conservation Service (NRCS; formerly the Soil Conservation Service) prepared a Soil and Water Conservation Plan for Iroquois NWR in 1964 that classified 74 soil types in nine general associations. The NRCS also prepared soil surveys of Genesee and Orleans Counties in 1969 and 1977, respectively. By 1977 the soil classification system and some soil names had changed, so the description of soils on Iroquois NWR relies mostly on the Orleans County soil survey. Only broad soil types are shown (Table 3-2 and Map 3-4).

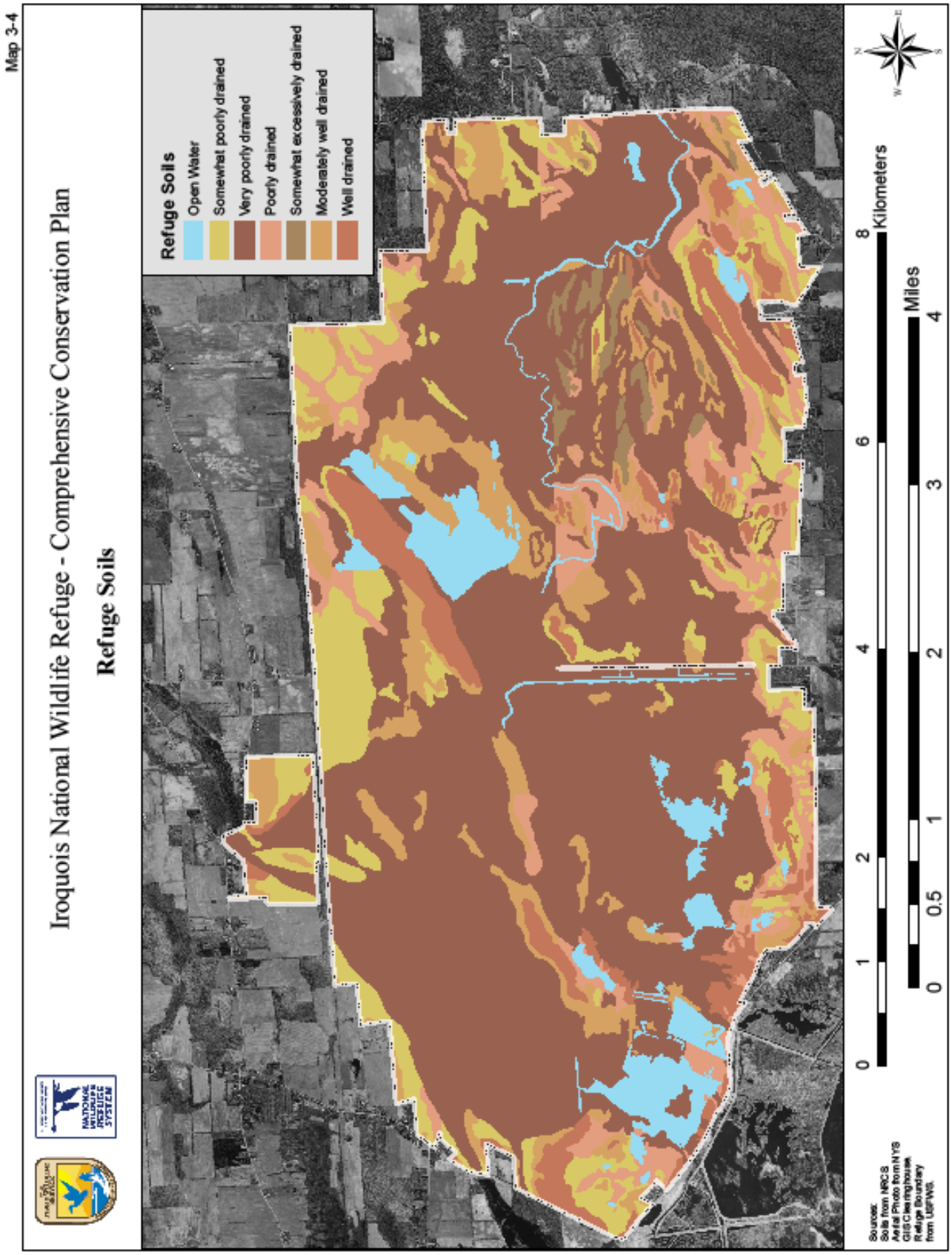
Table 3-2 Soils Mapped for Iroquois NWR

Soil Association	Origin	Habitats
Excessively Well Drained	Glacial till plains	Upland forests, shrublands and grasslands
Well Drained	Sandy deltaic and glaciolacustrine sediments	Upland forests, shrublands and grasslands
Moderately Well Drained	Glacial till plains, mainly on drumlins and recessional moraines	Upland forests, shrublands and grasslands
Somewhat Poorly Drained	Silty or clayey glaciolacustrine sediments and glacial lake modified till plains	Forested wetlands and wet grasslands
Poorly Drained	Silty or clayey lacustrine sediments and sandy deltaic and glaciolacustrine sediments	Forested wetlands
Very Poorly Drained	Organic deposits	Marsh, forested wetlands and bogs

From the United States Department of Agriculture (USDA) Soil Conservation Service 1969 (Genesee County) and 1977 (Orleans County) Soil Surveys.

USFWS

Trail within the forested area on refuge.


Map 3-4
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Refuge Soils
Refuge Soils
Open Water
Somewhat poorly drained
Very poorly drained
Poorly drained
Somewhat excessively drained
Moderately well drained
Well drained
0
1
2
4
6
8
Kilometers
0
0.5
1
2
3
4
Miles
Sources:
Soils from NRCS
Aerial Photo from NYS
GIS Clearinghouse.
Refuge Boundary
from USFWS.

Air Quality

There are several primary sources of pollution that come from Genesee County that could have an impact on the Refuge. Sources for air, land, and water pollution come from the U.S. Gypsum Company Plant in Oakfield, the Batavia Power Plant, and Lapp Insulator. Pollution includes excess of carbon monoxide, nitrogen oxide, sulfur dioxide, volatile organic compound emissions, and diesel soot from highway traffic and off-road heavy equipment being used for construction and agriculture. Other contamination sites on the National Priority list are the Batavia Landfill, Lehigh Valley Railroad and Byron Barrel & Drum (Epodunk 2008a, *http://www.epodunk.com/cgibin/genInfo.php?locIndex=22474*).

There are several primary sources of pollution that come from Orleans County that could have an impact on the Refuge. Sources for air, land, and water pollution come from New York State Albion and Orleans Correctional Facilities, Bayex Inc., F&H Metal Finishing Company, and the Western New York Energy Ethanol Plant. Pollution includes excess of carbon monoxide, nitrogen oxide, sulfur dioxide, volatile organic compound emissions, as well as diesel soot from highway traffic and off-road heavy equipment being used for construction and agriculture. Other contamination sites on the National Priority list are Diaz Chemical Corporation and FMC Corporation (Dublin Road Landfill) (Epodunk 2008b, *http://www.epodunk.com/cgi-bin/genInfo.php?locIndex=22492*).

Table 3-3 provides NYS and federal standards for air quality.

Table 3-3 Ambient Air Quality Standards New York State and Federal Standards

Pollutant	Avg. Period	Federal Air Quality Standards				New York State Standards [1]	
		Primary Standard		Secondary Standard			
		Level [3]	Statistic [2]	Level	Statistic	Level	Statistic
Carbon Monoxide	8-hour	9 ppm	Maximum	None		9 ppm	Maximum
	1-hour	35 ppm	Maximum			35 ppm	Maximum
Lead [4]	Quarterly Average	1.5 µg/m³	Maximum	Same as Primary		None	
Nitrogen Dioxide	Annual	0.053 ppm	Arithmetic Mean	Same as Primary		0.05 ppm	Arithmetic Mean
Total Suspended Particulates (TSP) [5]	12 consecutive months	None		None		75 µg/m³	Geometric Mean
	24-hours	260 µg/m³	Maximum	150 µg/m³	Maximum	250 µg/m³	Maximum
Particulate Matter (PM_{10}) [6]	24-hour	150 µg/m³	Maximum	Same as Primary		None	
Particulate Matter ($PM_{2.5}$)	Annual	15 µg/m³	Arithmetic Mean	Same as Primary		None	
	24-hour	35 µg/m³ [7]	3 year avg	Same as Primary			
Ozone [8]	8-hour (2008	0.075	3 year avg	Same as Primary		None	

	std)	ppm					
	8-hour (1997 std)	0.08 ppm	3 year avg	Same as Primary		0.08 ppm	Maximum
	1-hour	0.12 ppm	Not Applicable in NYS	Same as Primary		0.12 ppm	Maximum
Sulfur Dioxide	Annual	0.03 ppm	Arithmetic Mean	None		0.03 ppm	Arithmetic Mean
	24-hour	0.14 ppm	Maximum			0.14 ppm	Maximum
	3-hour	None		0.5 ppm	Maximum	0.50 ppm	Maximum
Hydrocarbons (non-methane)	3-hour (6-9 am)	None		None		0.24 ppm	Maximum

Footnotes (source: NYSDEC 2008a, *http://www.dec.ny.gov/chemical/8542.html*)

1. New York State also has standards for beryllium, fluorides, hydrogen sulfide, and settleable particulates (dustfall). Ambient monitoring for these pollutants is not currently conducted.

2. All maximum values are concentrations not to be exceeded more than once per calendar year. (Federal 1 hour Ozone Standard not to be exceeded more than three days in three calendar years).

3. Gaseous concentrations for federal standards are corrected to a reference temperature of 25°C and to a reference pressure of 760 millimeters of mercury.

4. Federal standard for lead not yet officially adopted by NYS, but is currently being applied to determine compliance status.

5. New York State also has 30, 60, and 90-day standards as well as geometric mean standards of 45, 55, and 65 µg/m³ in Part 257 of NYCRR. While these TSP standards have been superseded by the above PM_{10} standards, TSP measurements may still serve as surrogates to PM_{10} measurements in the determination of compliance status.

6. Federal standard for PM_{10} not yet officially adopted by NYS, but is currently being applied to determine compliance status.

7. Federal standard was changed from 65 to 35 µg/m³ on December 17, 2006. Compliance with the federal standard is determined by using the average of 98th percentile 24 hour value during the past three years, which cannot exceed 35 µg/m³.

8. Former NYS Standard for ozone of 0.08 PPM was not officially revised via regulatory process to coincide with the federal standard of 0.12 PPM which is currently being applied by NYS to determine compliance status. Compliance with the federal 8 hour standards is determined by using the average of the 4th highest daily value during the past three years - which cannot exceed 0.084 PPM or 0.075 PPM, effective May 27, 2008.

Water Quality

Under the 1972 Clean Water Act, waters designated as 303(d) do not meet water quality standards that states, territories, and authorized tribes have set for them. Oak Orchard Creek has been listed as a 303(d) impaired water body. Sampling in Oak Orchard Creek since 1997 has shown that valuable soil and excess nutrients are eroding and transported through the watershed and deposited in the nearshore regions of Lake Ontario. Water samples have been analyzed for total phosphorus (TP), soluble reactive phosphorus (SRP), nitrate + nitrite (NO_3 + NO_2), total Kjedahl nitrogen (TKN), total suspended solids (TSS), and sodium from deicing (Na). During

2008, the annual discharge of soil and nutrients from Oak Orchard Creek averaged 827,608 m^3/day and was within 10% of the levels documented in 1997/98 and 1998/99. Peak discharge occurred in the spring and secondarily in July. This level of discharge into Lake Ontario creates a plume of sediments and nutrients that can extend up to 10 km out into the lake from the mouth of Oak Orchard Creek. To manage nutrient and soil losses from the watershed, a total maximum daily loading (TMDL) may be required for Oak Orchard Creek in the future to meet the water quality standards of the Clean Water Act (Makarewicz and Lewis 2009).

A significant contribution to water quality issues in both Genesee and Orleans County is animal waste from farm animals. Variables associated with animal waste include the total number of animals, the volume and weight of waste being generated, nutrient levels (nitrogen and phosphorus) in the waste, and the amount of nitrogen that escapes into the atmosphere. Inorganic nitrogen predominately occurs as either ammonia (NH_3) or nitrate (NO_3) and is usually the limiting nutrient in marine ecosystems. A limiting nutrient is one which "limits" or controls the growth of primary producers (i.e., algae and other plants). Under conditions of nitrogen limitation, increases in nitrogen from any source can result in rapid and excessive increases in algal growth. When these algae die the bacteria responsible for decomposition consume dissolved oxygen in the water column. A massive "bloom" of algae can cause a severe drop in the level of dissolved oxygen, the result being that not enough oxygen is left for fish, crabs and other animals to breathe. The nitrogen in animal waste goes through many conversions and much of it can be volatilized or lost to the air, as ammonia (NH_3). Ammonia volatilization occurs while the waste is still in the barn and the fans used for ventilation pump the nitrogen-laden air to the external atmosphere. Further volatilization occurs from the lagoon, or other holding surfaces, once the waste is transported. Finally, the process of spraying onto a field also causes loss of ammonia to the atmosphere. Animal waste also contains a significant amount of phosphorus, a nutrient which often limits algal growth in freshwater systems and has the same effects as increased levels of nitrogen.

Noise

Ambient noise levels on and around the Refuge are generally similar to other rural locations in western New York. The presence of high and low-speed roadways scattered throughout the Refuge results in some traffic noise being within hearing distance of many Refuge areas. Off-Refuge noise such as farm machinery also adds to noise levels on the Refuge. Noise generated from Refuge operations, such as heavy equipment used for habitat management, adds to noise levels but is usually of short duration (one to a few days) and for a short time on those days (one to eight hours). Noise levels at any time in any area are influenced by the type of noise being generated, wind speed and direction and the type of habitat and topography separating the listener from the source of the noise. There are still some areas on the Refuge (e.g., along Oak Orchard Creek east of Sour Springs Road) that are sufficiently buffered from most noise sources to allow the visitor to remain relatively undisturbed.

Visual Resources

The Refuge and neighboring State lands represent the largest land area in northwestern New York that is nearly free of agricultural and urban development. For many western New Yorkers seeking an aesthetically pleasing landscape to visit, the Refuge offers their best opportunity within a days drive. The interspersion of forested wetlands and uplands, shrublands, grasslands and marshes provides a picturesque backdrop for outdoor recreation activities. The abundance and diversity of wildlife associated with these habitats significantly enhances the outdoor experience. When visited in the fall of the year, the pallet of natural color provided by a variety

of tree species makes this area one of the most aesthetically pleasing spots to visit in western New York.

Some Refuge activities may detract from the aesthetic in the short term. Maintenance of roads, water management infrastructure (e.g., culverts, dikes, water control structures) and recreational infrastructure (e.g., kiosks) often causes a short-term disturbance to some areas. These areas are generally along roadways and parking areas, which are already of a disturbed nature. Habitat management activities (e.g., mowing grasslands and shrublands) may reduce aesthetics for a slightly longer period, but are usually no longer noticeable after one growing season.

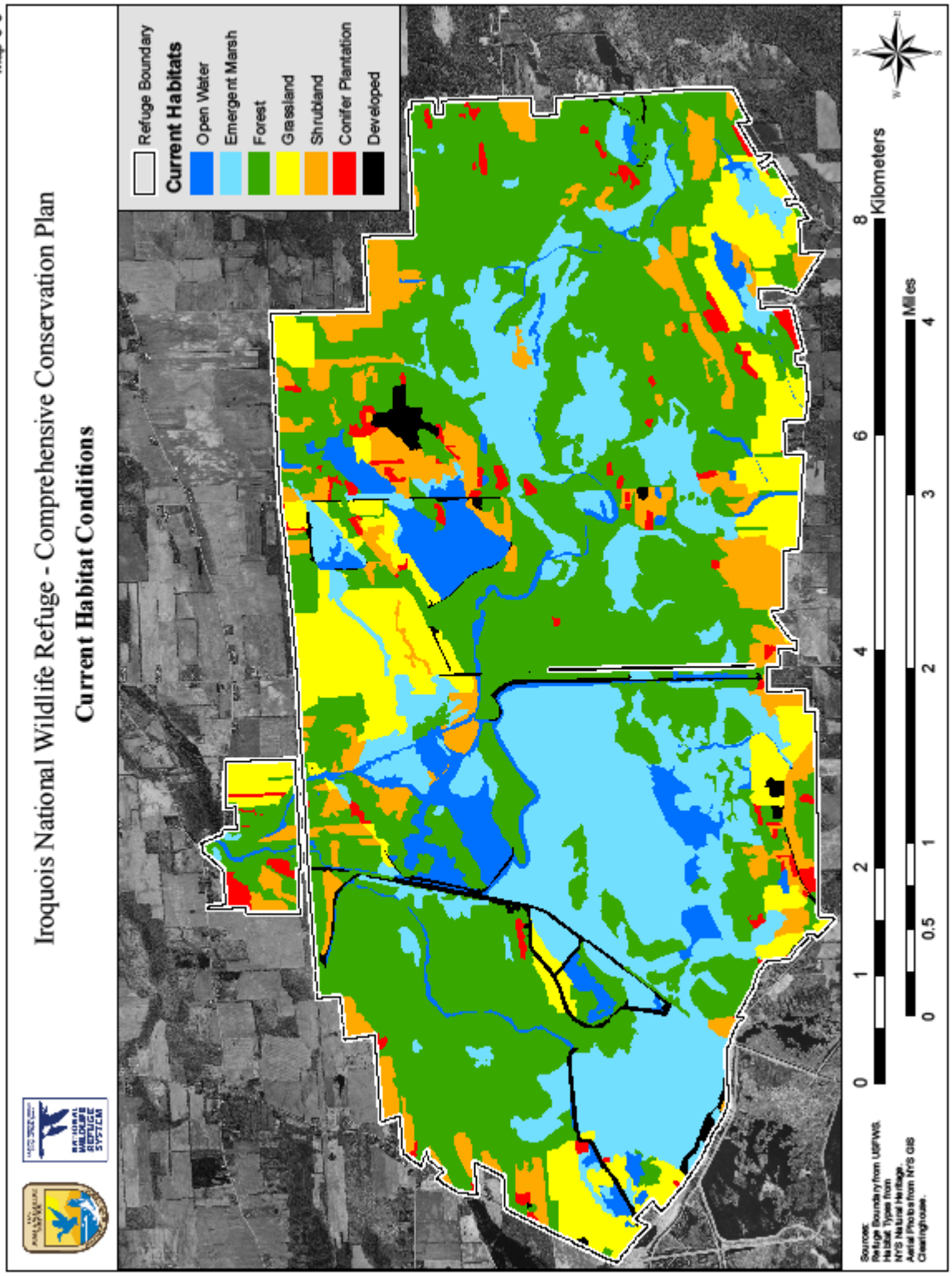
Biological Environment

Habitat Types

The relatively flat terrain of Iroquois NWR supports open water, emergent marsh, forested wetlands, upland forests, shrublands, and grasslands (Map 3-5 and Table 3-4). Wetlands are the dominant habitat type on the Refuge.

Table 3-4 Habitat Types on Iroquois NWR

Habitat Type	Acres
Emergent Marsh	2,582
Open Water	823
Forest (upland and wetland)	4,817
Shrubland	971
Grassland	1,186
Plantations	203
Developed Area	248
TOTAL	**10,828**


Map 3-5
Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Current Habitat Conditions
Refuge Boundary
Current Habitats
Open Water
Emergent Marsh
Forest
Grassland
Shrubland
Conifer Plantation
Developed
0 1 2 4 6 8 Kilometers
0 0.5 1 2 3 4 Miles
Sources:
Refuge Boundary from USFWS.
Habitat Types from
NYS Natural Heritage.
Aerial Photos from NYS GIS
Clearinghouse.

Wetlands

In the mid-1990s New York was estimated to have approximately 2.4 million acres of wetlands. The Lake Plains and the Adirondack regions of NY have the greatest percentage of the state's wetlands. Approximately 75% of wetlands in the Lake Plains region are forested. The remaining wetlands include 14% shrub, 8% emergent marsh and 3% open water (NYSDEC 2008b, *http://www.dec.state.ny.us/website/dfwmr/habitat/fwwprog3.htmlhttp://www.dec.state.ny.us/website/dfwmr/habitat/fwwprog3.html*).

Historically the area surrounding Iroquois NWR had more extensive wetlands than what currently exist. Wetland loss and degradation have occurred through draining, channelization, and other manipulations, primarily for agriculture.

Impounded Wetlands - The Refuge has 19 freshwater impoundments encompassing nearly 4,000 acres of wetland habitat (Table 3-5 and Map 2-3). The goal of the Refuge's water management program is to provide high quality wetlands that provide optimal stopover and breeding habitat for waterfowl, waterbirds and bald eagles. This program requires the manipulation of water levels to provide high-energy plant and invertebrate foods and structural habitat diversity for feeding, resting, and breeding waterfowl and other migratory birds (USFWS 2005b). Impoundments are drawn down approximately every five years on a rotation that ensures only a few pools are drained each year. This periodic draining of the marsh mimics a drought in a natural marsh and allows the re-growth of vegetation. Drawdowns also give Refuge staff a chance to make needed repairs to dikes and water control structures.

Table 3-5 Impoundments on Iroquois NWR

Impoundment	Year Impounded	Acres
Mohawk Pool South*	2006	939
Mohawk Pool North*	2006	190
Mohawk Pool West*	2006	235
Seneca Pool	1968	935
Oneida Pool	1977	770
Cayuga Pool	1969	365
Cayuga Sub-Impoundment	1986	45
Ringneck Marsh	1969	172
Center Marsh	1969	84
Long Marsh	1965	69
Swallow Hollow Marsh	prior to refuge establishment	54
Knowlesville Marsh	1966	46
Schoolhouse Marsh	1967	40
O'Brien Marsh	2003	18
Olsen South	1991-92	15
Olsen North	1991-92	10
Galaxy Marsh	1965	10
Schoolhouse Moist Soil Unit	1991	10
Sutton's Marsh	1965	23
TOTAL		**3,968**

*Mohawk Pool was originally created in 1974 and encompassed 1,370 acres. In 2006, it was split into three sub-impoundments to facilitate habitat management and water manipulation.

Natural Emergent Marsh - Most natural (unimpounded) emergent marsh habitat on the Refuge is located along Oak Orchard Creek, east of Sour Springs Road. There are no control structures regulating the water level of the Creek in this area; the only constriction is Sour Springs Road itself and transient beaver dams. During flood events and as a result of beaver activity the water in the Creek will back up beyond the existing emergent marsh and a small distance further into the floodplain.

Forested Wetland - Red and silver maple and green ash are the primary tree species in the 3,297acres of forested wetlands (bottomland hardwoods) on the Refuge. Second growth mature trees more than 75 years old dominate most of this habitat. About 1,000 of these acres are contained in Seneca Pool, an impoundment that was originally built and managed as a green tree impoundment. This pool is a red maple/green ash swamp that, when still managed as a green tree impoundment, was routinely flooded to provide deeper water habitat at different times of the year to coincide with the needs of certain wildlife species. Long periods of managed flooding stressed and killed mature trees and prevented germination and survival of seeds and seedlings. Due to this negative effect on the forested wetland habitat, the pool level is now allowed to fluctuate with the level of Oak Orchard Creek. Fluctuating with the creek level reduces the amount of water in this pool and limits the amount of water stress put on the trees, while still providing wetland habitat throughout spring migration. This pool provides a large contiguous tract of forested wetland habitat managed for species such as the wood duck and cerulean warbler.

Oak Orchard Creek Marsh National Natural Landmark - The Refuge contains the 523-acre Oak Orchard Creek Marsh National Natural Landmark (Map 1-4). The marsh encompasses a pristine stretch of the sluggish and meandering creek that varies in width from 20 to 150 feet. The surrounding terrain is low and flat and shows the effects of annual flooding. Broad-leaved cattail grows in marshy areas at the bends in the creek. Buttonbush and water willow are common shrubs along the creek edges, accompanied by a diversity of other plant species including red osier dogwood, white dogwood, swamp rose, purple nightshade, watercress, water hemlock, swamp milkweed, lizards tail, cardinal flower, broad-fruited bur reed, and forget-me-nots. A forested swamp dominated by silver maple with some green ash, swamp white oak and slippery elm with a dense understory of sensitive fern borders the creek channel (Vogelmann 1972). When this landmark was established in 1974 it also included the 15 acre Milford Posson Natural Area (see Upland Section below).

Uplands

Approximately 56% of the upland habitat on the Refuge is maintained in an early succession stage either as grassland or shrubland. These units are maintained through a variety of techniques including mowing, haying, burning, disking, planting, hydro-axing and chemical treatment. Burning of grassland fields typically occurs between April 1 and May 31. Fall burns are also possible, but are generally avoided as they do not adequately control undesirable vegetation Mowing and haying are conducted after mid July to allow for completion of nesting cycles while still putting stress on undesirable vegetation during the active growing season. Hydro-axing of shrub units occurs in summer or winter depending on habitat objectives, ground conditions and availability of machinery.

Grasslands - Refuge grasslands are a mix of managed warm and cool season fields and unmanaged forb-dominated fields. Switchgrass, smooth brome and goldenrod dominate the grasslands. Grasslands are currently managed using a combination of mowing, chemical spraying and prescribed burns to control unwanted vegetation and to maintain nesting habitat for grassland

nesting birds like sedge wren, Henslow's sparrow, grasshopper and vesper sparrow, mallard and blue-winged teal. Haying, conducted through a cooperative farming program, is also used as a grassland management tool (USFWS 2002). Approximately 450 acres of upland habitat have been planted to warm season grasses (primarily switchgrass, big bluestem and indiangrass) and succession is suppressed to maintain these units (USFWS 2000c).

Shrublands - The Refuge shrublands are very diverse from location to location with the most common species present being dogwoods (red panicled, red osier and silky). Other species include honeysuckle (Tartarian and Bella), buckthorn, Russian olive, multifora rose and viburnum. Many of the shrublands on the Refuge have matured to a stage where they are moving from shrubland to forestland habitat. Shrublands provide important habitat for many wildlife species and add diversity to the landscape. The Refuge is identifying those shrubland areas that would be best kept as shrubland management units and those areas that would be better left to revert to forests.

Forest - Northern hardwoods (beech, sugar maple, yellow birch and hemlock) and Allegheny hardwoods (black cherry, tulip poplar and white ash) comprise the 1,520 acres of upland forest. These types are rarely distinct from one another and tend to blend together with other species such as hickories, butternuts and red or white oak. Much of the forest on the Refuge is in second growth. Current forest management includes creation of early succession habitat and maintenance of mature forest through natural processes. Most management will favor the development of old growth stands to provide essential wildlife habitat for many species of wildlife.

Conifers are not a large component of the forest types on the Refuge. Found in association with other northern hardwoods, the Eastern hemlock and white pine are the only native conifers on the refuge. Other conifers found on the refuge where planted during the 60's and 70's. Species planted include white and Norway spruce and red, Austrian and Scotch pines. These conifers are found in small scattered stands ranging from <1 acre to as much as 20 acres in size and include roughly 200 acres total.

Research Natural Areas (RNA) - The Service cooperates with many other agencies and organizations to establish and preserve a diverse, representative network of plant and animal communities of different ecological types, managing each in a natural state for research purposes. Research Natural Areas (RNAs) are intended to represent the full array of North American ecosystems including biological communities, habitats and phenomena, and geological and hydrological formation and conditions. They are areas where natural processes are allowed to predominate with little or no human intervention (USFWS 2009b, *http://www.fws.gov/Refuges/whm/wilderness.html*).

Iroquois NWR has a single RNA: the Milford Posson. This RNA is a small 15 acre upland forest near the Oak Orchard Creek Marsh (Map 1-4). This site supports a good example of an old age stand of Northern hardwoods-hemlock growing on a narrow ridge that rises 6-8 feet above the surrounding wetland. Eastern hemlock, beech, yellow birch and sugar maple are the dominant trees. The larger hemlocks and beeches have trunk diameters greater than 30 inches and heights greater than 70 feet. These trees are 150 to 200 years old. Hop hornbeam, ironwood, red oak and red elm also grow in the overstory; witchhazel and maple-leaved viburnum are typical in the understory along with spicebush in the wetter areas. A diverse groundcover includes spinulose

wood fern, New York fern, Jack-in-the-pulpit, Canada mayflower, bellworts, foamflower, wild sarsaparilla, Indian cucumber root, partridgeberry and goldthread.

Fish and Wildlife

Iroquois NWR was established as a nesting, resting, and migration area for migratory birds and resident wildlife, particularly waterfowl. Management of refuge habitats is designed to provide the best possible habitat for migratory waterfowl and waterbirds, while also benefitting several other wetland wildlife species. Following is a brief discussion of the different groups of wildlife that occur on the Refuge. For a more detailed list of species that inhabit the refuge see Appendix D.

Birds

Iroquois NWR has a great variety of avian species that range from small, ruby-throated hummingbirds to our national symbol: the bald eagle. For centuries, birds have used the Refuge area for resting and feeding during their annual migrations between Central and South America and the northern U.S., Canadian and Arctic breeding grounds. Over 266 different species of birds have been observed on the Refuge since its inception, with 122 of these known to nest on the Refuge. The Refuge has long been considered an important migratory stopover area for mallard, blue-winged teal, ring-necked duck and wood duck. Other migrant species that utilize the Refuge during spring, summer, or fall include American bittern, least bittern, great blue heron, egrets, black-crowned night heron, swans, geese (Canada, snow, and white-fronted), red-tailed hawk, sora, sandhill crane, American woodcock, common snipe, brown thrasher, warblers, sparrows, eastern meadowlark and bobolink, just to name a few. Waterfowl are most abundant in the spring with counts of ducks and geese averaging more than 120,000. There are several resident bird species (species that do not migrate) on the Refuge including bald eagle, ring-necked pheasant, ruffed grouse, wild turkey, woodpeckers, and nuthatches.

Iroquois NWR provides important waterfowl nesting and brood rearing habitat; in some years over 6,000 ducklings and 1,500 goslings have been produced on the Refuge. This productivity has declined in recent years as the habitats have matured. The most common waterfowl nesting species are wood duck, resident Canada geese, mallard, and blue-winged teal (USFWS 2002).

Seven species of wading birds (bitterns, herons and egrets) use the Refuge. Great blue heron is the most common; a heron rookery on the Refuge supports nearly 400 nests. American and least bitterns also nest on the Refuge. Bitterns are relatively common on the Refuge but are inconspicuous (USFWS 2002). The least bittern is state-listed as threatened and both species are identified as "species of greatest conservation need" by the NYSDEC (NYSDEC 2005). The American and least bitterns were the focus of two research projects on the Refuge (Lor 2000, Bogner 2001). Lor (2000) found nesting densities of least bitterns to be one nest per 18 acres of emergent marsh, which was much higher than was previously recorded for the area. Both studies found hemi-marsh to be the preferred habitat for nest site selection (USFWS 2002). Other nesting species on Refuge wetlands that are also on the "greatest need" list include black tern and pied-billed grebe.

Iroquois NWR is one of four sites in New York with exceptional numbers of cerulean warblers recorded during the Cerulean Warbler Atlas Project conducted from 1997 to 2000. This warbler is among the highest priority landbirds for conservation in the U.S. based on a small total population size and a significant decline (-4.2% per year since 1966) in the Breeding Bird Survey

(BBS) trend throughout its range (Rosenberg et al. 2000). The cerulean warbler occurs in riparian, forested wetlands and Iroquois NWR has the third highest concentrations in New York.

Prior to the 1950s more than 70 pairs of bald eagles nested in New York State and by the 1960s only one active nest remained. This decline was caused by habitat loss and the bio-accumulation of organochlorine pesticides (DDT and dieldrin) in fish, the primary food source for eagles. The use of pesticides which contained DDT or dieldrin were banned in 1972, and shortly thereafter the number of successful eagle nests started to increased steadily. In the 1970s New York led the national recovery of the bald eagle by "hacking' young wild birds into new artificial nest sites. From 1976-1980, 23 young eagles were hacked at Montezuma NWR, 90 miles to the east of Iroquois NWR. After two released birds successfully nested in 1980, the hacking program expanded to three more sites including Oak Orchard WMA, adjacent to Iroquois NWR. A pair of bald eagles has nested on Iroquois NWR each year since 1986 and a second pair started nesting in 2001. The hacking program ended in 1985 as statewide eagle numbers continued to increase. In 1998, bald eagle numbers across the U.S. were high enough to allow them to be upgraded from the federal endangered species list to the federal threatened species list. On August 9, 2007 bald eagles were removed from the federal list of threatened and endangered species and no longer require protection under the Endangered Species Act. Bald eagles remain protected under the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA). The Eagle Act prohibits anyone from "taking" bald eagles. Among other actions, "take" includes disturbance of bald eagles (USFWS 2007b).

Mammals

The Refuge supports a diversity of mammal species that contribute to the ecological, economic and aesthetic value of western New York. The white-tailed deer is the largest mammal that resides on the Refuge and can be observed year round. Eastern cottontail rabbit, snowshoe hare, gray, red and flying squirrel, woodchuck, raccoon, skunk, red and gray fox, coyote, muskrat, mink, otter, opossum, weasel and beaver are mid-sized mammals that serve as both predators and prey in Refuge plant and animal communities. Small mammalian residents include meadow vole, white-footed and deer mouse, shrews and moles. These small animals are a primary food source for many larger animals. The Refuge provides habitat for little and big brown bat and red bat which serve as an important natural control of insects.

Reptiles and Amphibians

Reptiles and amphibians are important species in the ecological communities of Iroquois NWR. The Refuge has not conducted a systematic inventory of all reptiles and amphibians. However, studies focusing on different suites of species were conducted and anecdotal information regarding the presence of various species has been recorded. From these sources, 23 amphibian and reptile species were identified to occur on the Refuge and another six species were found adjacent to the Refuge and are likely to occur here as well. Snake species include northern brown snake, eastern garter snake, smooth green snake, northern water snake, northern redbelly, black rat, and eastern milk snake. Painted, softshell, and snapping turtles inhabit wetland environments. Frog and toad species include leopard frog, green frog, wood frog, grey tree frog, northern spring peeper, and American toad. Several salamander species are fairly common and can be found in dark moist environments, such as under decaying logs or thick leaf litter.

Invertebrates

Invertebrates are abundant on the Refuge and play an integral role in maintaining the ecological balance of several Refuge ecosystems. The Refuge has not yet conducted a systemic inventory of all invertebrate species.

Fish

Fishery resource assessments were conducted on selected areas of the Refuge in 1993 and again in 1997, documenting 16 species of fish (USFWS 2002). Fish species include northern pike, largemouth bass, yellow perch, black crappie, pumpkinseed and brown bullhead.

Invasive Species

Several invasive plant and animal species inhabit the Refuge. Plants include purple loosestrife, several honeysuckle species, multiflora rose, garlic mustard, common reed, buckthorn, black swallowwort, autumn olive, oriental bittersweet and Eurasian milfoil. The most invasive animal species on the Refuge is the common carp which destroys wetland vegetation and causes high turbidity in Refuge wetlands. European starling, house sparrow and rock pigeon all nest on the Refuge and compete with native species for nest sites. Other invasive wildlife species occurring on the Refuge include feral ducks, mute swan, feral and free-roaming cats, and Norway rat.

Threatened and Endangered Species

No federally listed endangered species are known to occur on the Refuge. For many years the bald eagle was the primary endangered species upon which the Refuge focused its efforts. Due to successful conservation efforts the bald eagle is now listed in the least concern category. Two active eagle nests currently occur on the Refuge and another active nest is on the nearby Oak Orchard State Wildlife Management Area.

The Karner blue butterfly was listed as federally endangered in 1992. Its historical range included savanna/barren ecosystems in 12 states from Minnesota to Maine and in the province of Ontario. The lupine flower is a critical component for Karner blue habitat. Lupines grow primarily on sandy soils within oak and pine savanna/barrens communities. In New York, the Karner blue butterfly was once common. The Tonawanda Potential Recovery Unit is one of two units that could form a geographic connection between eastern and western populations (USFWS 2003). Iroquois NWR and Tondawanda WMA are also being considered for Karner blue reintroduction if a minimum of 100 acres of suitable habitat can be developed. Planting of lupines on the Refuge and Oak Orchard began in 1995-96.

Other federally threatened or endangered species that once occurred in western New York and that could again occur on the Refuge given current or potential habitats include bog turtle, Hine's emerald dragonfly and eastern Massasauga rattlesnake (candidate species). Table 3-6 identifies species that are listed as endangered or threatened at the state level.

Table 3-6 State Listed Species Occurring on Iroquois NWR

Common Name	Scientific Name	Status
Golden Eagle	*Aquila chrysaetos*	S-E
Peregrine Falcon	*Falco peregrinus*	S-E
Black Tern	*Chlidonias niger*	S-E
Short-eared Owl	*Asio flammeus*	S-E
Loggerhead Shrike	*Lanius ludovicianus*	S-E

Common Name	Scientific Name	Status
Pied-billed Grebe	*Podilymbus podiceps*	S-T
Least Bittern	*Ixobrychus exilis*	S-T
Bald Eagle	*Haliaeetus leucocephalus*	S-T
Northern Harrier	*Circus cyaneus*	S-T
King Rail	*Rallus elegans*	S-T
Upland Sandpiper	*Bartramia longicauda*	S-T
Common Tern	*Sterna hirundo*	S-T
Sedge Wren	*Cistothorus platensis*	S-T
Henslow's Sparrow	*Ammodramus henslowii*	S-T

S-E State Endangered S-T State Threatened

Based on the information compiled and analyzed in the fish and wildlife section above we are able to identify and list resources of concern and the habitat that support these resources. Table 3-7 provides a summary of these resources of concern for Iroquois NWR.

Table 3-7 Iroquois Resources of Concern Based on Priority Habitats

High Priority Habitat Types	Resources of Concern	Other Benefiting Species
Freshwater Impoundments: emergent marsh and open water Streams and associated emergent marsh (un-impounded)	American and least bitterns, black tern, pied-billed grebe, Virginia rail, American black duck, blue-winged teal, mallard, Northern pintail, Atlantic-Southern James Bay Canada goose, least sandpiper, pectoral sandpiper, semipalmated sandpiper, Wilson's snipe and bald eagle	Sora, black-crowned night heron, king rail, common tern, osprey, canvasback, and greater yellowlegs
Forested Wetlands	Wood duck and cerulean warbler	Prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker, bats, river otter
Moderate Priority Habitat Types	**Resources of Concern**	**Other Benefiting Species**
Vernal pools	Wood frog, blue-spotted and Jefferson salamanders	Other obligate amphibian species
Grasslands	Bobolink, grasshopper sparrow and Henslow's sparrow	Eastern meadowlark, horned lark, sedge wren
Shrublands	Field sparrow, blue-winged warbler and golden-winged warbler	Brown thrasher, song sparrow, willow flycatcher, black-billed cuckoo, American woodcock
Upland Forest	Wood thrush, black-billed cuckoo, cerulean warbler and American woodcock	Rose-breasted grosbeak, scarlet tanager

Rare Plants and Significant Ecological Communities

The New York Natural Heritage Program (NYNHP) tracks rare species and significant ecological communities in the State. The program provided a list of the rare plants and significant ecological communities known to occur on or near the Refuge (Appendix D). Two rare plants

and three ecological communities have been documented on the Refuge in recent history: smooth bur-marigold (state threatened), Georgian bulrush (state endangered), deep emergent marsh, hemlock-northern hardwood forest, and beech-maple mesic forest.

Socioeconomic Environment

Population Demographics

While the population in New York has grown slightly, the region surrounding Iroquois NWR has actually declined from 2000 to 2006. Table 3-8 provides census information reflecting population trends in New York, Genesee and Orleans County and the towns of Alabama and Shelby (US Census 2008, *www.census.gov*).

Table 3-8 Population Demographics 2000 to 2006

	2000 Population	2006 Population
State of New York	18,976,457	19,306,183
Genesee County	60,370	58,830
Orleans County	44,171	43,213
Town of Alabama	1,881	1,831
Town of Shelby	5,420	5,300

Economics of Genesee County

The median household income in Genesee County in 2005 was $44,640. Genesee County's economy is based on agriculture, tourism, recreation, and industry. Many businesses cater to recreational interests and tourists including campgrounds, businesses that support fishing and other outdoor sporting and recreation activities, and motels. Federal and state lands that support outdoor recreation and other public uses include Darien Lakes State Park, Oak Orchard and Tonawanda WMA, John White WMA, Carleton Hill WMA and Iroquois NWR. Commercial industrial parks are slowly but steadily growing.

Agriculture is the primary land use. Genesee County covers 495 square miles; one square mile is water. High quality land is considered Genesee County's greatest asset. The diversity of soils and climate conditions attracted the early settlers who carved out homes and farms, developing Genesee into one of the richest agricultural regions in New York State. Genesee County has the highest percentage of classified farmland in the state and three of the top 100 vegetable farms in the country. Genesee County is fourth in agriculture sales within New York State. Crops include corn (22,215 acres), wheat (10,689 acres), soybeans (4,507 acres), vegetables (25,381 acres) and orchards (116 acres). The fertile muck soil in Elba has made Genesee one of the principal counties in the nation for growing beets and onions. Genesee County also ranks fifth in snap bean production. Dairy farming is the leading commodity in the county. Fifty percent of all cattle on farms are devoted to milk production. There are many farm stands and farmer's markets providing fresh vegetables, fruits and flowers. The average revenue generated each year from agricultural produce in Genesee County is $215,410 per farm; the average annual expense is $168,571 per farm (Epodunk 2008a, *http://www.epodunk.com/cgi-bin/genInfo.php?locIndex=22474*).

The Genesee County Agricultural and Farmland Protection Board developed a Protection Plan in concert with the County Departments of Planning and Real Property Tax Services, the Genesee County Soil and Water Conservation District, Cornell Cooperative Extension of Genesee County, the Agricultural Development Associates, the American Farmland Trust, and Peter J. Smith and

Company. The plan is intended to preserve the agricultural land resource, direct development away from farming areas, and to support the economic contributions of agriculture and related businesses. The project was initiated to maintain and protect agriculture as Genesee County's largest industry and predominant land use. The primary objective of the project was to develop a plan that would focus on agricultural land preservation techniques and, perhaps most importantly, on the long-term economic viability of the agricultural industry in Genesee County. The plan development process was based on the premise that farm profitability is the fundamental element of agricultural protection. The Genesee County Agricultural and Farmland Protection Plan was officially adopted by the Genesee County legislature on November 14, 2001 and approved by the NYS Department of Agriculture and Markets on April 8, 2002 (Genesee County 2008, *http://www.co.genesee.ny.us/dpt/planning/agfarmboard.html*).

Economics of Orleans County

The median household income for Orleans County in 2004 was $38,482. Like Genesee County, the economy of Orleans County is based on agriculture, tourism, recreation, and industry. Many businesses cater to recreational interests and tourists including campgrounds, fishing and other sporting goods and services, motels and bed and breakfast establishments. Federal and State lands that support outdoor recreation and other public use include Oak Orchard State Marine Park, Oak Orchard and Tonawanda WMA, Lakeside Beach State Park, and Iroquois NWR. Commercial industry is slowly but steadily growing.

Orleans County covers approximately 817 square miles; land covers 391 square miles and water covers 426 square miles. The high proportion of water is due to the extension of Orleans County north into Lake Ontario. Orleans County is on the southern shore of Lake Ontario and the Erie Canal passes from east to west through the center. Agriculture is the primary land use. In 2005, 87% of farms were in operation. Milk production is lower in Orleans County compared to Genesee County; only 34% of all cattle on farms are milk cattle. Crops include corn (23,175 acres), wheat (11,387 acres), soybeans (16,393 acres), vegetables (18,443 acres) and orchards (5,928 acres). Land is Orleans County's greatest asset. The area was once fitted to agriculture, and when the fever of land speculation had abated and the timber of the section had been removed enough to open wide areas, farming became the leading industry. Grains, particularly wheat, were the main crops and were very profitable until the Erie Canal opened import of wheat from other states. This required farmers to explore other crops and potatoes, coarse grains and livestock were explored as options to replace wheat. Then, in 1845, a concerted effort was made to capitalize on the climate and soil of Orleans County that makes it particularly adapted to growing fruit. Apple orchards became successful with increased experience in cultivation, grafting and improved varieties of apples. The apple crop is now one of the most important in the County. The average revenue generated each year from agricultural produce in Orleans County is $136,739 per farm; the average annual expense is $110,505 per farm (Epodunk 2008b, *http://www.epodunk.com/cgi-bin/genInfo.php?locIndex=22492*).

The Empire Zone Program was created to stimulate economic growth through a variety of tax incentives, helping to attract new businesses and enable existing businesses to expand and create more jobs. Since Orleans County was designated as an Empire Zone in 2002, there have been 11 zone-certified businesses established employing 1,762 people. These businesses have invested over $12.5 million. The Western New York Energy Ethanol Plant opened in 2008 in Orleans County. It created 58 new jobs and is projected to purchase approximately six million bushels of corn each year from local upstate farmers. In addition to ethanol, the facility will produce two byproducts that will be marketed for sale: carbon dioxide, which is used for beverage carbonation

and freeze drying, and distiller's dried grains, a high-protein livestock feed that is well-suited for New York's dairy industry (WNY Energy 2008, *http://www.wnyenergy.com/show/?id=97*).

Historical Picture

Native People

Native people have lived along the shores of the Great Lakes for over 10,000 years, fishing, raising crops, and using rivers for transportation (USEPA 1998). The Seneca Indians, one of the five tribes of the Haudenosaunee Confederation, meaning "people of the Longhouse", commonly called Iroquois, thrived on the region's bounty of fish and wildlife. The other Confederation tribes were the Mohawk, Oneida, Onondaga, and Cayuga. Until the early 1700s, the Iroquois lived and traveled from New England to the Mississippi River as far south as Tennessee. By the mid-1700s their main territory was centered on New York State. Centuries after Lake Tonawanda drained leaving behind swamps and pools, the Seneca began to drain the swamp and clear some of the forests for farming and garden plots near their villages (USFWS 2008b, *http://www.fws.gov/northeast/iroquois/*). The Iroquois Nation lost rights to most of their lands during the Revolutionary War. Today, there are two Seneca Reservations in New York and one reservation of the Seneca – Cayuga in Oklahoma (Holland Land Office 2009, *http://www2.pcom.net/cinjod/historian/index.html*).

European Settlement

Europeans did not settle northwestern New York extensively until after the American Revolution in the late 1700s. Rivers and lakes offered transportation routes and the mixed hardwood forest supported a logging industry. To the first European settlers in the early 19th century the remaining clusters of oak trees were reminiscent of an orchard so they named the area "Oak Orchard Swamp". Settlers expanded artificial drainage of the swamp to improve logging and farming operations. Much of the virgin swamp timber was logged. The rich black soils of the swamp enticed settlers to implement many drainage attempts as early as 1828. Plagued by high costs and a cycle of muck fires and floods, the outcome was marginal at best. By the 1930s, residents noticed a sharp decline in the once plentiful wildlife and made plans to protect the dwindling swamp from further development (USFWS 2002).

In 1958, Oak Orchard NWR was established within the historic Oak Orchard Swamp, locally referred to as "the Alabama Swamp". The Refuge was renamed Iroquois NWR in 1964 to avoid confusion with the neighboring Oak Orchard State WMA.

The Erie Canal

Iroquois NWR is located seven miles south of the Erie Canal and bears the mark of early canal development. The Erie Canal, first proposed in 1808, was completed in 1825 linking the Hudson River in the east to Lake Erie in the west. The Erie Canal was enlarged between 1836 and 1862 to 70 feet wide and seven feet deep to handle larger boats (up to 240 tons) and more traffic. In 1903, the Erie Canal was enlarged again with the construction of the "Barge Canal", consisting of the Erie Canal and three main branches -- the Champlain, the Oswego, and the Cayuga and Seneca Canals. (Sadowski 2008, *www.eriecanal.org*).

The Feeder Canal

The Feeder Canal was dug during the period from 1823 to 1825 to divert water from Tonawanda Creek to Oak Orchard Creek to supply more water to the Erie Canal. The Feeder Canal was abandoned around 1910 and was later plugged at Tonawanda Creek. Until that time, various

changes were made to the Feeder Canal including rebuilding of dams, widening, deepening, and installing higher gates. The Feeder Canal was lower in elevation than the surrounding wetlands and it acted as a drainage ditch dramatically lowering the water level in the "Alabama Swamps" (Carroll 2001). The Feeder Canal, now defunct, runs between two large pools on Iroquois NWR and is mostly flooded and incorporated into Mohawk Pool (Map 3-4).

The 1900s to Present

By the end of the 19th century, less than 20% of the original forest remained in the region and today the forest cover still remains low (< 25%) with agriculture dominating the landscape (Dettmers and Rosenberg 2003). Over time the agricultural lands have changed in composition and declined in diversity with a shift toward row crop monoculture and a consolidation of smaller farms into larger monocultures. This led to a loss of grassland, woodland, hedgerow and other edge habitats across the agricultural landscape (NYDEC 2005).

Approximately 50% of the SWLO Basin pre-colonial wetlands are thought to be gone (USEPA 1998). That loss may be as high as 60% to 90% in the intensely urban shoreline areas of Lake Ontario. Emergent marsh along the lakeshore declined significantly since the early 1900s. While the amount of open water and forested wetlands increased in the 1980s, the acreage of shrub swamp and emergent marsh declined during the same period. Perhaps as a result of declining emergent marsh habitat, marsh-nesting birds in the SWLO Basin appear to be declining. Of 34 fish species that occur in the SWLO Basin and use emergent marsh as a critical habitat, 12 are in decline, three are extirpated from the basin, and 13 are of unknown status (NYDEC 2005).

The major environmental stressors in the SWLO Basin are related to human land use including changes in agricultural practices and increases in residential, industrial and commercial development. While the human population in the basin has not increased significantly in the last 50 years, an increasing percentage of the basin is being developed creating "sprawl" and fragmenting once contiguous blocks of habitat. Improved treatment of municipal and industrial waste has resulted in improved water quality in aquatic habitats. However, non-point source pollution including toxic contaminants and sediment, invasive species, altered hydrology, and degradation of riparian areas continue to degrade aquatic systems (NYDEC 2005).

Since the 1800s, more than 140 exotic aquatic organisms of all types including plants, fish, algae, and mollusks have become established in the Great Lakes (NYDEC 2005). More than one-third of the organisms were introduced in the past 30 years, coinciding with the opening of the St. Lawrence Seaway. Exotic/invasive species and diseases in the SWLO Basin that pose a significant threat to fish and wildlife species of concern include:

- Exotic zooplankton: spiny waterflea and fish hook waterflea
- Rusty crayfish
- Common carp
- Ruffe
- Sea lamprey
- Alewife
- Round gobies
- Zebra mussels/quagga mussels
- Purple Loosestrife
- Common reed
- Eurasian Water Milfoil

- Curly-leaf pondweed
- Flowering rush
- Mute swan
- Type E botulism

Refuge Cultural and Historical Resources

Cultural resources are archaeological sites, sacred sites, historic structures, and museum property such as art, archaeological artifacts, and scientific collections. As previously discussed, the refuge was Seneca territory until the late 1700's and early 1800's when Europeans began settling here. The land was actively farmed for over 100 years before becoming a Refuge, but little disturbance has occurred to archaeological sites other than from plowing. There are no significant historic period structures on the Refuge. However, its rich history can be explored through the museum collection housed at Refuge Headquarters which contains more than 2,800 objects. Within the museum, nearly 2,000 objects are classified as archaeology; the remaining objects are categorized between art, history, documents, botany, zoology, paleontology and environmental samples.

In 1992 the USFWS contracted with SJS Archaeological Service, Inc. to conduct an overview survey of the entire Refuge to determine the archaeological sensitivity of various landforms. This effort included a geomorphologic study and limited archaeological sampling in a variety of locations. The Refuge currently contains 101 recorded archaeological sites: 24 pre-Contact Native American sites and 77 historic period ones. The overview survey identified 20 pre-Contact Native American sites and 21 historic period sites. The remaining pre-Contact and historic period sites were found through a combination of archival research and a number of smaller scale archaeological surveys performed for various habitat restoration projects. Pre-Contact sites recorded on the Refuge have generally not had enough research to determine their dates of occupation. The few that can be dated by the style of artifacts discovered or carbon testing of charcoal appear to date from the Late Archaic (3,500 to 5,000 years ago) to just prior to European contact, but earlier sites and 17^{th}-18^{th} century ones may exist. Pre-Contact stone artifacts are principally of local chert. Chert is a coarse type of siliceous rock (similar to flint or chalcedony) and the primary raw material used for the manufacture of tools including projectile points (spear and arrowheads), drills, knives and scrapers.

Historic period sites are generally 19^{th} century farmsteads, but one is more unusual: the Alabama Sour Springs Hotel or Spring House, made famous by the "Acid Water". Eight springs were discovered in the early 1800's. Three of these springs were acid, one was sulphur, one magnesia, one iron, and one gas (used to light gas burners). The principal spring was called Sour Springs. It was believed by doctors and professors that drinking the acid water was useful for chronic diseases, especially those of the digestive organs, weakness and debility. Bottles manufactured by Lockport Glassworks in Lockport, New York, were filled with acid water and transported all over the U.S. The hotel was constructed in 1848 by J. C. Colton and Thomas W. Olcott. It included 37 rooms for guests, a large ballroom on the third floor and verandas on three sides. In 1849, approximately 25,000 bottles of acid water were sold for 25 cents each. The hotel closed shortly after the start of the Civil War (1865) and converted into a farmstead home. In 1912 it was struck by lightning and burned to the ground. The Sour Springs site was mapped and excavated in 1974-75 by the Youth Conservation Corps. Nothing remains of the hotel today.

Two sets of rare Eastern elk antlers were unexpectedly recovered from the Refuge during the construction of wetland subimpoundments in 2004. One set of antlers was attached to a partial

skull which had split down the middle; the associated lower mandibles were also recovered. The second pair is smaller and lacks the mandibles. Survey maps from the mid-1800s as well as early refuge planning maps show the area in which the remains were found to have standing water. Locals confirmed that that particular area had never been drained or farmed. Thus, the remains were well preserved in the thick muck-soil layer. Analyses of radiocarbon, sediment and DNA samples indicate a 95% probability that the antlers are between 9,500 and 9,130 years old. No archaeological material was found with them. The Refuge is saving DNA and sediment samples for future analysis. The larger set of antlers was sent to the Buffalo Museum of Science for preservation to display at a future date.

Refuge Administration

Step-down Management Plans

Step-down management plans are an important component of Refuge management. These detailed plans serve as guiding documents for the daily operation of the Refuge. Step-down management plans differ from CCPs in that they provide more detail relative to Refuge management subjects (e.g., habitat management, public use, fire, safety) or groups of related subjects. In many cases, step-down management plans will serve as an implementation tool that describes specific strategies and schedules for meeting CCP goals and objectives. In some cases, step-down plans provided the general framework for developing the CCP. The referenced plans in Table 3-9 are currently utilized or will be developed in support of the goals and objectives set forth in this document.

Table 3-9 Step-Down Management Plan Schedule for Iroquois NWR

Step-Down Management Plan	Date Completed/Updated	Anticipated Date Completion/Update
Habitat Management Plan	----	2011
Forest Management Plan	4/04/1990	*
Grassland Management Plan	5/16/1990	*
Upland Habitat Plan	3/29/1990	*
Marsh and Water Management Plan	1/19/1984	*
Visitor Services Plan	----	2011
Public Use Plan	5/18/1992	+
Hunt Plan	10/15/1985	+
Fire Management Plan	2008	2013
Law Enforcement Plan (Crowd Control)	1971	2012
Wildlife Inventory and Monitoring Plan	5/11/1982	2011
Furbearer Management Plan	11/19/1983	2012
Fishery Resources Management Plan	5/04/1995	2014
Integrated Pest Management Plan		2013
Cultural Resources Management Plan		2013

* Now incorporated into the Habitat Management Plan
+ Now incorporated into the Visitor Services Plan

General Administration

Many administrative functions support the operation and maintenance of the Refuge. These include payroll, accounting, budgeting, procurement, acquisition, contracting and planning. With

the downsizing of both regional office and refuge staff, many duties have shifted from the regional office to the field, and Erie NWR is now administratively joined with Iroquois NWR.

Refuge infrastructure includes buildings, water control structures, dikes and roadways; these require regular maintenance and repair. There are also overlooks, trails, signs, parking areas and boundaries that are maintained. Maintenance of some of these facilities has fallen behind due to an inadequate level of staffing and funding.

Work Force and Budget

The ultimate success of the Refuge in carrying out its mission depends on staffing patterns (Table 3-10) and funding levels.

Table 3-10 Current Staffing at Iroquois NWR

Position	Status
Refuge Manager	1.0 FTE (Full Time Equivalent)
Wildlife Refuge Specialist	1.0 FTE
Wildlife Biologist	1.0 FTE
Visitor Services Manager	1.0 FTE
Automotive Mechanic	1.0 FTE
Administrative Support Assistant	1.0 FTE

Annual budget appropriations vary from year to year, depending on the Service's overall budget and how the Refuge's needs and requests rank regionally and nationally with other Refuges. Table 3-11 summarizes budget levels from 2004 to 2008.

Table 3-11 Refuge budgets from 2004 to 2008

Fiscal Year	Salaries/Operations	One-Time Project Funds	Fees	Fire	Total
2004	$628,775	$357,580	$284	$7,500	**$985,105**
2005	$523,849	$42,112	$1,760	$7,400	**$575,121**
2006	$597,425	$332,649	$1,578	$0	**$931,652**
2007	$673,879	$82,684	$839	$2,847	**$760,249**
2008	$618,660	$96,388	$1,026	13,069	**$729,134**

Facilities and Maintenance

Iroquois NWR facilities include the Refuge Headquarters and adjoining Visitor Contact Station, maintenance shop, hunter check station and three cold storage buildings that include the Williams Barn, Building #17, and a divided shed for storage of flammable liquids and grain. There are also three houses owned and maintained by the Refuge; one Refuge house is scheduled for demolition. There are above ground, uncovered fuel tanks as well. The maintenance staff is responsible for the upkeep of all these facilities.

The Refuge staff and volunteers maintain informational kiosks, gravel parking areas, trails, overlooks, hunting and fishing access points, the Feeder Canal Road and a paved parking area for the Visitor Contact Station. Refuge personnel, with help from volunteers, are responsible for four nature trails; Refuge signage including informational, interpretational, and regulatory signs; lawn maintenance at the headquarters and shop; and lawn and garbage maintenance at overlooks and

Refuge houses. Maintaining gravel parking lots and roads often requires significant time and effort, especially after spring floods.

The staff manages 19 water impoundments as shown in Table 3-5. These impoundments are enclosed by 18 different dike systems and 30 water control structures to manipulate and control water levels. Maintaining these impoundments, dikes and water control structures are handled by the maintenance staff and volunteers.

Contributions to Local Economy

The contribution of Iroquois NWR to the local economy is multifaceted. The Refuge contributes directly to the local economy through shared revenue payments. The federal government does not pay property tax on Refuge lands; instead it makes annual payments to respective municipalities based on a maximum of 0.75 percent of the fair market value of Refuge lands as determined by an appraisal every five years. The actual amount distributed each year varies based on Congressional appropriations, land acquisition and the annual sale of Refuge goods and products (hay) and Special Use Permits that contribute directly to the revenue sharing account.

The Refuge contributes to the local economy by providing valuable recreational opportunities for local residents and attracting tourists and travelers into the area. Public ownership requires little in the way of services from municipalities, yet provides valuable recreational opportunities for local residents. A 2006 national survey of hunting, fishing, and wildlife watching showed that 87.5 million people age 16 and older participated in outdoor recreational activities and spent over $122 billion per year. Within the state of New York (total population of 19,306,183) four million people spent over $3,570,000 on wildlife-related recreation (USDOI 2006). These statistics represent a significant contribution to New York's economy and highlight the strong connection New York residents and non-residents have to the land and wildlife.

The Refuge is popular for big and small game hunting, waterfowl and turkey hunting, fishing, and wildlife observation. Increasing numbers of birdwatchers, photographers, naturalists, hunters and anglers are drawn to the Refuge each year. Refuge visitors contribute to the local economy through the purchase of goods and services such as gas, food, hunting and fishing related gear, equipment repair services, clothing and lodging. The Refuge budget provides to the local economy through staff salaries and the purchase of goods, supplies and services from local businesses.

Trapping is a very small factor in the local economic picture and is pursued on a limited basis at the Refuge. Trapping is focused on those animals that are causing infrastructure or management problems related to wildlife management activities. Raccoons, muskrats, and beavers are some of the mammals trapped. Trappers are typically local and purchase food, gas, and other supplies to conduct their work. The pelts are usually sold to large fur houses and their profits directly benefit the trappers who in turn spend it in the local economy. Other economic uses on the Refuge include haying. In an effort to economically maintain an average of 160 acres per year of grassland as open herbaceous habitat for migratory birds and other animals, the Refuge has cooperative haying agreements with local farmers. The farmers pay the Refuge a fee to harvest hay from Refuge lands each year.

Refuge Public Use

Visitor Services

Providing recreational opportunities and educating and interpreting the unique natural features of the Refuge for visitors are important elements of the Service's mission and the goals and objectives of the Refuge. In the National Wildlife Refuge System Improvement Act of 1997, six wildlife-dependent recreational uses were designated as priority public uses on national wildlife refuges. These are hunting, fishing, wildlife observation, wildlife photography, environmental education and interpretation. These six uses, when compatible with the Refuge purpose, are the focus of the Refuge's public use activities. All six recreational uses are offered at Iroquois NWR. In 2006, Region 5 identified hunting and interpretation as two "Areas of Emphasis" to help direct staff time and budget dollars.

Iroquois NWR receives a moderate and increasing level of public use with an average of 43,000 visits per year (FY 2008). Visitors are welcomed year-round to the Visitor Contact Station located at Refuge Headquarters. The Visitor Contact Station provides brochures and fact sheets about the Refuge, birds, mammals, trails and overlooks, hunting and fishing. There are wildlife exhibits and a live feed from the American kestrel camera. Volunteers and staff are available to answer questions, record reports of unique sightings, and operate the Flyway Nature Store.

Hunting

Hunting is a popular form of wildlife recreation in New York State; over 500,000 state residents and more than 50,000 nonresidents purchase hunting licenses on an annual basis. According to the NYSDEC, about 85 percent of the state is private property, and where most hunting occurs. While most private property is posted against trespass, many landowners will give permission for access. New York also provides abundant opportunities to hunt on public lands such as WMA's, state forests and refuges. Whether on private or public land, hunting is closely regulated by the NYSDEC and hunters must complete a mandatory hunter education course to obtain a hunting license.

Hunting is permitted on portions of the Refuge in accordance with state and federal seasons and regulations. Special arrangements to accommodate persons with disabilities can be made by contacting the refuge manager. The Refuge provides opportunities for hunting big game, upland game, waterfowl and other migratory game birds. Informational fact sheets about hunting and trapping on Iroquois NWR are updated to reflect periodic changes to the program.

Hunting programs on the Refuge promote understanding and appreciation of natural and cultural resources and their management; hunters have been primary supporters of the Refuge since its creation in 1958. Hunting is also an integral part of a comprehensive wildlife management program. Hunting programs on the Refuge are administered in consultation and in cooperation with New York State and with state regulations. The USFWS has several objectives for refuge hunting programs:

- promote public understanding of, and increase public appreciation for, America's natural resources;
- manage wildlife populations at optimum levels; and
- provide opportunities for quality recreational and educational experiences.

The Service defines a quality hunting experience on a national wildlife refuge as one that

- maximizes safety for hunters, trappers, and other visitors;
- encourages the highest standards of ethical behavior in taking or attempting to take wildlife;
- is available to a broad spectrum of the hunting public;
- contributes positively to, or has no adverse affect on, population management of resident or migratory species;
- reflects positively on the individual refuge, the NWRS, and the Service;
- provides hunters un-crowded conditions by minimizing conflicts and competition among hunters;
- provides reasonable challenges and opportunities for taking targeted species under the described harvest objective established by the hunting and trapping program;
- minimizes the reliance on motorized vehicles and technology designed to increase the advantage of the hunter over wildlife;
- minimizes habitat impacts;
- creates minimal conflict with other priority wildlife-dependent recreational uses or refuge operations; and
- incorporates a message of stewardship and conservation in hunting opportunities.

Refuge visitors participate in hunting big and small game, waterfowl and other migratory birds in designated areas. Dogs can be used when hunting small game and migratory birds. While the Refuge currently does not hold any special hunts, opportunities are provided to hunters with disabilities. There are "no hunting zones" associated with trails, overlooks and all buildings and facilities on the Refuge.

Waterfowl Hunting

Mallard, wood duck, northern pintail, Canada goose, green-winged teal, and American wigeon are the most common waterfowl harvested on the Refuge. Waterfowl hunting is permitted in Mohawk, Oneida and Cayuga Pools as well as other areas from designated hunt stands. Hunt stands are generally accessed on foot from associated parking areas. Hunters must stay within 100 feet of their assigned hunt stand marker unless actively pursuing a crippled bird. The Refuge maintains one accessible hunt stand for use by persons with disabilities. Approximately 35 hunt stands may be available each year although the actual number is occasionally lower due to the water conditions in the waterfowl hunt areas. Waterfowl hunting is permitted on Tuesdays, Thursdays and Saturdays during the first split of New York State's regular waterfowl season. The season ends when the first split closes or when gun deer season starts (the third Saturday in November), whichever comes first. The Refuge holds a youth only hunt day on the first Sunday of the State's waterfowl season. The hunt is limited to 25 youth hunters who must attend an orientation prior to hunting.

Hunt times are legal start (1/2 hour before sunrise) to 12p.m. (noon). Hunters must check out no later than 1p.m. Permits are issued through a random drawing at 5a.m. at the permit station. Hunters for opening day and the first two Saturdays are selected in a pre-season, random drawing. On all other hunt days any eligible hunter may participate in the drawing. Permit fees are $10 on Saturdays and $5 on Tuesdays and Thursdays. Up to three hunters may share a permit. Holders of a Golden Age Passport or America the Beautiful Senior Pass receive 50% off. Waterfowl hunters must possess and use at least 6 decoys and are limited to possessing no more than 20

approved non toxic shells while afield. All persons hunting waterfowl on the Refuge must hold a valid Federal Migratory Bird Conservation Stamp, a New York State hunting license, Waterfowl Identification Certificate of Completion, and be registered with the federal Harvest Information Program (HIP). Waterfowl hunting seasons and bag limits are determined by the NYSDEC within federal guidelines following a series of task force meetings. Dates are generally set by August. The Refuge receives between 300 and 400 waterfowl hunter visits per year with total harvest varying based on the number of stands available Table 3-11. Duck harvest in New York State for the years spanning 1999-2007 was approximately 204,900 birds/year. Goose harvest in New York State for the years spanning 1999-2007 was approximately 117,500 birds/year (Table 3-12). Refuge harvest for ducks during the same time span was 768 birds/year. Refuge harvest for geese during the same time span was 33 birds/year (Table 3-13).

Table 3-11 Waterfowl Hunters on Iroquois NWR during Years 2003-2007

Type	2003	2004	2005	2006	2007	Fees	
Waterfowl Hunt	473	467	517	211	322	Tuesday/Thursday Saturday	$5* $10*
						*Fee is halved for people with Golden Age/Senior/Access Pass	
Youth Waterfowl Hunt	21	20	22	18	16	No fee	

Table 3-12 Historical Waterfowl Harvest 2003-2007, New York State Totals

Duck Species Composition	2003	2004	2005	2006	2007
Mallard	88,900	85,379	79,593	83,448	92,049
Domestic Mallard	853	870	704	738	714
Black Duck	19,985	15,438	23,714	20,973	22,656
Mallard x Black Duck Hybrid	1,280	2,174	2,426	1,699	1,249
Mottled Duck	0	0	0	0	0
Gadwall	2,062	1,522	2,113	2,215	1,606
Wigeon	3,272	2,609	2,896	6,572	4,817
Green-winged Teal	14,153	10,654	11,583	14,327	17,215
Blue-winged/Cinnamon Teal	996	1,087	2,035	443	1,160
Northern Shoveler	711	290	1,017	369	892
Northern Pintail	2,631	1,884	2,191	2,954	2,587
Wood Duck	21,265	20,439	21,444	16,468	25,510
Redhead	356	870	1,800	665	3,211
Canvasback	569	580	313	148	446
Greater Scaup	6,330	2,392	2,896	3,766	4,192
Lesser Scaup	4,267	1,957	2,348	3,397	4,014
Ring-necked Duck	4,338	4,856	3,365	4,579	2,943
Goldeneyes	9,743	5,581	8,531	6,277	7,849
Bufflehead	13,442	8,118	9,079	7,606	13,468
Ruddy Duck	71	145	391	74	357
Long-tailed Duck	3,157	6,195	4,638	5,531	10,646
Eiders	585	0	497	357	0
Scoters	3,858	4,905	3,065	3,212	4,154
Hooded Merganser	3,129	2,029	2,974	2,068	2,497
Other Mergansers	5,547	5,726	5,009	3,914	4,371

Other Ducks	0	0	78	0	0
Total Duck Harvest	211,500±11 %	185,700 ± 8%	194,700±10 %	191,800±10 %	228,600±14 %
Goose Species Composition					
Canada Goose	96,750	109,305	119,980	113,856	138,122
Snow Goose	3,712	4,460	8,821	6,799	10,078
Blue Goose	237	0	0	164	0
Ross's Goose	0	0	0	82	0
White-fronted Goose	0	0	0	0	0
Brant	10,400	5,834	4,700	3,400	4,800
Other Geese	0	0	0	0	0
Total Goose Harvest	111,100±10 %	119,600±11 %	133,500±10 %	124,300±11 %	153,000±17 %

From USFWS Waterfowl Harvest Estimates by year *http://www.fws.gov/migratorybirds/reports/HuntingStatistics/Migratory%20bird%20hunting%20activity%20and%20harvest%20during%20the%202006%20and%202007%20hunting%20seasons%20-%20Preliminary%20Estimates.pdf* (USFWS 2008c)

Table 3-13 Iroquois NWR Waterfowl Harvest 2003-2007

Duck Species Composition	**2003**	**2004**	**2005**	**2006**	**2007**
Mallard	257	295	326	64	235
Black Duck	26	13	20	3	44
Mallard x Black Duck Hybrid	1	1	0	0	0
Northern Pintail	51	45	61	17	16
American Wigeon	60	51	61	79	17
Green-winged Teal	215	115	304	19	191
Blue-Winged Teal	7	12	4	2	1
Wood Duck	24	22	71	4	132
Northern Shoveler	11	2	6	7	2
Hooded Merganser	2	9	6	2	1
Gadwall	11	4	11	19	3
Bufflehead	1	0	1	2	0
Ringneck Duck	7	2	16	3	1
Scaup sp.	0	0	1	5	0
Canvasback	0	0	0	1	0
Ruddy Duck	1	0	1	0	1
Merganser sp.	3	4	0	0	0
American Coot	0	0	0	1	0
Total Duck Harvest	677	575	889	228	644
Goose Species Composition					
Canada Goose	20	62	66	13	6
Total Goose Harvest	20	62	66	13	6

Small Game Hunting

The Refuge receives approximately 370 small game hunter visits per year (Table 3-14). Refuge small game species may be taken from October 1 through the end of February and include squirrel, fox, opossum, raccoon, weasel, ruffed grouse and coyote during their respective seasons. Hunting is in accordance with New York State hunting laws. The NYSDEC sets the season dates annually. From 2004 to 2008, all hunters were required to obtain a free daily permit from one of five self-service kiosks before hunting on the Refuge. At the end of the hunt day hunters must return the harvest report section of the permit. That changed in 2009 with the implementation of standardized hunting forms for the entire NWRS. Hunters were then just required to obtain hunting permit which they were able to maintain for the entire hunting season. All hunters using a shotgun must use approved non-toxic shot. For added safety during New York State's regular firearms deer season and muzzleloader deer season, all hunters must wear a minimum of 400 square inches of solid-colored hunter orange clothing or material in a conspicuous manner on head, chest and back.

Table 3-14 Permits Issued for Upland Small Game Hunting on Iroquois NWR during Years 2003-2008

Type	2003	2004	2005	2006	2007	Fees
Small Game	339	408	382	352	287	No Fee; daily permit required

Grouse harvest for hunters participating in New York's statewide Grouse Hunting Log program steadily increased from 597 to 909 between 2004 and 2007. This program records grouse harvest and flush rates from a sample of grouse hunters across the state. In the Refuge's ecozone (the Lake Plains) grouse harvest was 13 in 2004, 14 in 2005, 28 in 2006, and 23 in 2007. Compared to the six other state ecozones, the Lake Plains region had the lowest grouse harvest in all four years. Refuge grouse harvest between 2003 and 2007 totaled 7 birds (Table 3-15).

Table 3-15 Grouse Harvest 2004-2007, New York State

	Number Grouse Harvested				
Region	**2003**	**2004**	**2005**	**2006**	**2007**
Iroquois NWR	1	1	3	0	2
Lake Plains Ecozone	No data	13	14	28	23
New York State	No data	597	725	870	909

From NY DEC Grouse Hunting Log Results: *http://www.dec.ny.gov/animals/45727.html* (NYSDEC 2009a)

Migratory Bird Hunting (Non-Waterfowl)

Migratory bird hunting activity on the Refuge is light. The Refuge receives approximately 12 migratory bird hunter visits per year. Game birds including woodcock, snipe and rail may be taken within their respective seasons, and are managed as part of the small game hunt on Iroquois NWR. Hunting is in accordance with New York State hunting laws. The NYSDEC sets the season dates annually. From 2004 to 2008, all hunters were required to obtain a free daily permit from one of five self-service kiosks before hunting on the Refuge. At the end of the hunt day hunters must return the harvest report section of the permit. That changed in 2009 with the implementation of standardized hunting forms for the entire NWRS. Hunters were then just required to obtain hunting permit which they were able to maintain for the entire hunting season. All hunters using a shotgun must use approved non-toxic shot. For added safety during New York State's regular firearms deer season and muzzleloader deer season, all hunters must wear a minimum of 400 square inches of solid-colored hunter orange clothing or material in a

conspicuous manner on head, chest and back. All areas east of Sour Springs Road, except for no hunting zones, are open for woodcock, snipe and rail hunting. All persons hunting migratory birds on the Refuge must hold a valid New York State hunting license and be registered with the federal Harvest Information Program (HIP).

American woodcock harvest in New York State averaged 9,400 birds between 1999 and 2007. The Eastern United States average for 1999 through 2007 was 87,600 birds harvested. Refuge woodcock harvest average for 2002-2008 was 2.9 birds per year.

Rail harvest in New York State was relatively low between 1999 and 2007. The highest harvest year was 2005 with approximately 700 birds taken. In 2000 and 2003, zero birds were taken. Less than 50 birds were harvested in 2001, 2002, and 2004 annually. In 1999, 2006, and 2007, approximately 500 total birds were harvested. Rail harvest on the Refuge between 2002 and 2007 was zero.

Big Game Hunting

White-tailed deer and wild turkey are the only big game species legally hunted on the Refuge. The Refuge is open to hunting of white-tailed deer during the State's bow, muzzleloader and gun (regular) seasons. Hunting is in accordance with New York State hunting laws. The NYSDEC sets the season dates annually. From 2004 to 2008, all hunters were required to obtain a free daily permit from one of five self-service kiosks before hunting on the Refuge. At the end of the hunt day hunters must return the harvest report section of the permit. That changed in 2009 with the implementation of standardized hunting forms for the entire NWRS. Hunters were then just required to obtain hunting permit which they were able to maintain for the entire hunting season. For added safety during New York State's regular firearms deer season and muzzleloader deer season, all hunters must wear a minimum of 400 square inches of solid-colored hunter orange clothing or material in a conspicuous manner on head, chest and back. Permanent tree stands are prohibited. Temporary, portable tree stands in accordance with state regulations are acceptable and must be removed at the end of the day. Hunters with disabilities may obtain a refuge access pass to park off road in one of two designated parking areas. Once hunters have the pass, use of the parking areas is on a first come, first served basis.

The Refuge receives over 3,000 deer hunter visits per year (Table 3-16). Total deer harvested from the Refuge each year between 2003 and 2007 ranged from 150 to 223 animals annually (Table 3-17).

Table 3-16 Permits Issued for Deer Hunting on Iroquois NWR during Years 2003-2008

Type	2003	2004	2005	2006	2007	Fees
Deer	2,928	2,984	2,983	3,533	4,063	No Fee; daily permit required

Table 3-17 Historic Deer Harvest, State of New York (NY) and Iroquois NWR

Year	Adult Male		Fawn Male		Adult Female		Fawn Female		Unknown	Total	
	NY	INWR	NY	INWR	NY	INWR	NY	INWR	INWR	NY	INWR
2007	104,451	86	21,096	26	76,367	64	17,227	21	25	219,141	222
2006	96,569	46	18,336	28	60,102	67	14,101	23	6	189,108	150
2005	89,015	47	16,373	31	61,179	78	13,647	18	11	180,214	185
2004	88,733	47	21,022	27	80,196	55	18,455	12	14	208,406	155
2003	107,533	57	26,883	28	94,376	90	24,296	27	21	253,088	223

State data from NYDEC Historic Deer harvest (*http://www.dec.ny.gov/outdoor/42246.html*) (NYSDEC 2009b)

Turkey hunting is permitted in the spring only. Hunters must submit an application and a $5 processing fee to be entered into a random drawing for 50 available permits. The permits are good for the entire month of May, except for the first Sunday, which is reserved for the Youth Hunt. The entire Refuge, except no hunting zones, is open to turkey hunting. Turkey hunters must turn in a harvest report, whether they hunted or not, by June 7. Failure to do so will deny them the opportunity to enter the drawing the following year. The Refuge holds a youth only hunt day on the first Sunday in May. The hunt is limited to 25 youth hunters who must attend an orientation prior to hunting (Table 3-18). Hunting is in accordance with New York State Hunting laws. The NYSDEC sets the bag limits and other regulations annually.

The Refuge receives approximately 150 turkey hunter visits per year. Statewide spring turkey harvest numbers between 2003 and 2007 averaged approximately 30,000 turkeys. Orleans County harvested a total of 1,058 turkeys between 2003 and 2007. Genesee County harvested a total of 1,483 turkeys between 2003 and 2007. The Refuge's total turkey harvest for the same time span was 22 birds (Table 3-19).

Table 3-18 Permits Issued for Turkey Hunting on Iroquois NWR, 2003-2007

Type	2003	2004	2005	2006	2007	Fees
Spring Turkey Hunt	50	50	50	50	50	Yearly entry fee: $5
Youth Turkey Hunt	5	6	11	3	2	No fee

Table 3-19 Spring Turkey Harvest, State of New York and Iroquois NWR, 2003-2007

	2003	2004	2005	2006	2007
Iroquois NWR	8	4	3	1	6
Genesee County	322	372	226	286	277
Orleans County	266	212	151	198	231
State Total	36,800	26,300	24,910	27,745	35,625

State data from NY DEC Spring Turkey Harvest (*http://www.dec.ny.gov/outdoor/30420.html*) (NYSDEC 2009c)

Trapping

Upland and marsh trapping are allowed on the Refuge in accordance with New York State hunting laws. The NYSDEC sets the trapping seasons and bag limits annually. Each year, the Refuge issues up to 50 trapping permits for each type of trapping (Table 3-20). Upland trapping permits include raccoon, opossum, weasel, red fox, gray fox, skunk and coyote. There is no fee for upland trapping permits. Marsh trapping permits include muskrat, beaver and mink. There is a $50 fee for marsh trapping permits. Trapping permits are issued on a first come first serve basis until trapping seasons start or all of the permits have been issued, whichever comes first. Trappers must comply with all special conditions in the permit regarding trap locations and checking traps. Trappers must turn in a monthly trapping report whether they trapped or not. Failure to do so denies them the privilege of trapping the following year. The number of trappers actively engaged in trapping in a given year is partially dependant on the fur market.

Table 3-20 Permits Issued for Trapping on Iroquois NWR, 2003-2008

Type	2003-04	2004-05	2005-06	2006-07	2007-08	Fees

Marsh Trapping	13	17	10	13	21	$50 per year
Upland Trapping	17	18	13	15	17	No fee

The Refuge received anywhere from 149 to 366 marsh trapping visits and 41 to 251 upland trapping visits per year between 2003 and 2008. Table 3-21 shows the harvest of animals by year for the Refuge.

Table 3-21 Trapping Harvest by Species on Iroquois NWR, 2003-2008

Species	2003-04	2004-05	2005-06	2006-07	2007-08
Muskrat	837	1,568	1,494	1,908	498
Mink	24	26	30	26	20
Raccoon	38	68	61	34	11
Red Fox	22	17	18	10	8
Gray Fox	0	0	0	1	1
Opossum	85	52	24	26	0
Beaver	2	1	0	0	4
Skunk	15	20	5	2	1
Weasel	0	1	1	0	0
Coyote	4	0	0	0	1
Total	1,027	1,753	1,633	2,007	544

Fishing

New York State has a diversity of fish species and many great fishing opportunities. Over the past seven years close to one million fishing licenses have been sold annually (NYSDEC 2008c). The only data available for license sales in the vicinity of the Refuge are from Orleans County in 1997 and between 1999 and 2001. In 1997, 13,501 licenses were sold and the number of annual sales averaged 12,625 for 1999 to 2001 (NYS Sea Grant 2009).

Fishing is a traditional outdoor pastime deeply rooted in America's natural heritage. Fishing is also a legitimate and appropriate public use on wildlife refuges. Regulations permitting fishing on refuges are, to the extent practicable, consistent with state fish and wildlife laws, regulations, and management plans. USFWS objectives for fishery programs on refuges are to

- effectively maintain healthy and diverse fish population resources through the use of scientific management techniques;
- promote public understanding of, and increase public appreciation for, America's natural resources and the Service's role in managing the NWRS;
- provide opportunities for quality recreational and educational experiences; and
- minimize conflicts between anglers and other visitors.

The Service defines a quality fishing experience on a national wildlife refuge as one that

- maximizes safety for anglers and other visitors;
- causes no adverse impact on populations of resident or migratory species, native species, threatened and endangered species, or habitat;

- encourages the highest standards of ethical behavior in regard to catching, attempting to catch, and the releasing of fish;
- is available to a broad spectrum of the public that visits, or potentially would visit, the refuge;
- provides reasonable accommodations for individuals with disabilities to participate in refuge fishing activities;
- reflects positively on the NWRS;
- provides uncrowded conditions;
- creates minimal conflict with other priority wildlife-dependent recreational uses or refuge operations;
- provides reasonable challenges and harvest opportunities; and
- increases visitor understanding and appreciation for the fisheries resource.

Fishing accounts for a moderate part of the Refuge's visitor activity each year (approximately 1,900 visits), especially in the summer and early fall. The Refuge strives to enhance fishing opportunities by maintaining appropriate fishing areas and habitat that supports a diverse fish population. The most sought-after fish species include northern pike, bass, bullhead, yellow perch and crappie. Other species that are caught include pumpkinseed, carp, and bluegill. While no Refuge permits are required, fishing at Iroquois NWR requires a valid state fishing license. The NYSDEC publishes fishing seasons and limits annually.

The Refuge provides a fact sheet pertaining to fishing which includes information on open and closed areas and other Refuge-specific regulations. Bank fishing is permitted along Oak Orchard Creek where it passes under Route 63, Sour Springs Road and Knowlesville Road. Anglers may access Oak Orchard Creek by canoe or other un-motorized boats between Knowlesville Road and Route 63. The most popular fishing area is Ringneck Marsh where fishing is permitted year round from the dike on the west side and from Sour Springs Road. Ice fishing is allowed December 1 through the end of February (conditions permitting) on Ringneck Marsh. Fishing areas are also open to frogging by club, hand, spear or hook during state seasons. Firearms are not allowed in the taking of frogs.

Wildlife Observation and Photography

Wildlife observation, including the observation of plants and other natural features, is the single most popular recreational use of the Refuge. The Refuge is a designated watchable wildlife site with numerous overlooks that include Cayuga, Schoolhouse, Ringneck and Mallard. In addition to overlooks, Iroquois NWR has several maintained trails including Kanyoo, Onondaga, Swallow Hollow and Feeder Road. Refuge staff and volunteers conduct Refuge tours and walks for schools and civic groups. The Refuge partners with the Buffalo Audubon Society to offer public nature opportunities including bird walks, owl prowls, canoe tours and woodcock walks.

The Refuge receives more than 28,000 visits on the trails and overlooks each year.
The majority of Refuge visitors come during the spring, early summer and fall months to take advantage of favorable trail conditions and opportunities for viewing annual spring and fall bird migrations and enjoy the brilliance of New York's fall foliage. The Refuge receives nearly half its annual visitation during the months of March and April. Refuge trails and roads are used

during the winter months when snow conditions are conducive to cross-country skiing or snowshoeing.

USFWS defines a quality wildlife observation experience on a national wildlife refuge as one that has the following attributes:

- Observations occur in a primitive setting, using safe facilities and provide an opportunity to view wildlife and its habitat in a natural environment.
- Observation facilities or programs maximize opportunities to view the spectrum of wildlife species and habitats of the Refuge.
- Observation opportunities, in conjunction with interpretive and educational opportunities, promote public understanding of and increase public appreciation for America's natural resources and the role of the NWRS in managing and protecting these resources.
- Viewing opportunities are tied to interpretive and educational messages related to stewardship and key resource issues.
- Facilities blend with the natural setting, station architectural style, and provide viewing opportunities for all visitors, including persons with disabilities.
- Design of observation facilities minimize disturbance to wildlife while facilitating the visitor's views of the spectrum of species found on the Refuge.
- Observers understand and follow procedures that encourage the highest standards of ethical behavior.
- Viewing opportunities exist for a broad spectrum of the public.
- Observers have minimal conflict with other priority wildlife-dependent recreational uses or Refuge operations.

Environmental Education, Interpretation, and Outreach

Environmental education, interpretation, and outreach are important tools that Refuge staff uses to inform and remind the public about Refuge issues and opportunities, such as bird migrations, seasonal habitat changes and special events. The Refuge provides slide shows, leads interpretive tours and hikes, creates educational exhibits, conducts activities and contests that offer hands-on learning opportunities, provides demonstrations and workshops, writes educational articles and gives informational interviews. There are six interpretive kiosks and 16 panel/signs on the Refuge to enhance visitor education and enjoyment. Over 2,700 people are reached through the Refuge's environmental education and interpretation efforts annually. This includes both on and off-site, activities and does not count media or website hits.

Refuge education, interpretation, and outreach programs focus on assisting youth and adults with becoming more environmentally literate and action oriented. Five primary functions provide the framework for these goals: creating environmental awareness, knowledge, values, skills, and action. Environmental education is provided primarily to elementary and middle school students to augment classroom study. Through a partnership with Canisius College and the Canisius Ambassadors for Conservation, the Refuge accommodated over 2,000 students in 2009. Additional students were taught offsite at school conservation field days, in classroom programs and at Earth Day celebrations.

Interpretation is a more informal method of teaching directed at casual audiences, such as individuals or families, who take part in programs on their own initiative rather than as part of a structured program. Interpretative programs often focus on awareness and knowledge in a fun and thought-provoking manner. Refuge outreach consists of communication with the public using a variety of methods. Refuge outreach goals aim to build a stronger base of public understanding, appreciation and support of the Refuge, NWRS, and Service trust resources beyond that portion of the American public that visits the Refuge. The Refuge website (*www.fws.gov/northeast/iroquois*) provides access to Refuge information including visitor opportunities, special events, nature programs, wildlife and management.

Refuge staff recognizes the critical link between public awareness of environmental issues and effective stewardship of the Refuge, the NWRS, and Service trust resources. Currently, Refuge education, interpretation, and outreach programs focus on the following five audiences:

- Congress
- Conservation Organizations
- Communities surrounding the Refuge, with a focus on school-age children and their educators, landowners, and local residents
- Communications media
- Corporations

The "100 by 100" campaign was developed to increase public awareness of the National Wildlife Refuge system by its 100th birthday which occurred on March 14, 2003.

Environmental education, interpretation, and outreach activities and tools the Refuge utilizes include

- the annual Spring Into Nature celebration;
- slide shows;
- guided hikes highlighting major Refuge themes and wildlife;
- National Fishing and Boating Day events;
- Earth Day activities;
- print and broadcast media, including the Refuge's web page;
- volunteer programs, including the Refuge Friend's group;
- publications; and
- over 20 interpretative kiosks and signs.

Education, interpretation and outreach efforts at Iroquois NWR focus on three general themes and their priority messages:

1. Iroquois NWR
   - The Refuge is a "good neighbor."
   - The Refuge is an enduring asset to the community.
   - The Refuge is a federal land base managed by the USFWS.

2. The NWRS

- Refuges are part of a national system comprising the world's largest collection of land and water managed specifically for wildlife.
- Refuges are national treasures.
- Refuges are places where wildlife comes first.

3. Service Trust Resources
- The Refuge emphasizes management of threatened and endangered species.
- The Refuge is committed to providing resting, nesting, and feeding habitat for waterfowl, other migratory birds and bird species of concern).
- The Refuge employs an ecosystem management approach with a focus on restoration and management of diverse wetlands, shrublands, grasslands, and biological diversity.

Activities not allowed on the Refuge

There are several activities that are not compatible with the purpose of the Refuge and therefore are not allowed on Refuge lands. These include snowmobiling, all-terrain vehicle (ATV) use, biking on trails (biking is allowed on Feeder Road), walking dogs off a leash, picking plants, camping, horseback riding and campfires, just to list a few.

Volunteers

The Refuge is fortunate to have a dedicated group of individuals who voluntarily assist the Refuge in various ways. Eighty six volunteers provided over 7,000 hours of volunteer time to Refuge activities in 2008 (Table 3-22). These volunteers assisted with environmental education programs and outreach events, conducted wildlife and habitat surveys, provided visitor services, banded birds, managed habitats and species, and carried out general maintenance tasks. In addition to helping the refuge achieve its objectives and strategies, this group of volunteers serves as an important link with the community at large, promoting refuge messages and garnering support for the NWRS.

Table 3-22 Volunteer Hours 2003-2008

	2003	2004	2005	2006	2007	2008
Number of Volunteers	27	30	30	30	30	86
Hours Contributed	3,498	3,035.5	3,381	4,756	4,349.5	7,086

Finding of Appropriateness of a Refuge Use

The six wildlife-dependent recreational uses discussed above (hunting, fishing, wildlife observation, photography, environmental education, interpretation) and the harvesting of fish and wildlife under state regulations have been administratively determined to be appropriate public uses of refuges, including Iroquois NWR. All other existing and proposed uses must be evaluated by the refuge manager. The refuge manager must file a "Finding of Appropriateness of a Refuge Use" for each existing use that does not fall under the categories listed above, and each time a new use is proposed. When refuge managers find a use is appropriate, the use then must be determined to be compatible before it is allowed on the Refuge. If it is determined that an existing use is not appropriate, the refuge manager will eliminate or modify the use as expeditiously as practicable. If it is determined that a new use is not appropriate, the refuge manager will deny the use and a compatibility determination will not be required. The Appropriate Refuge Use Policy clarifies and expands on the Compatibility Policy, which describes when refuge managers should deny a proposed use without determining compatibility.

Table 3-23 shows Appropriate Determinations conducted for Iroquois Refuge. Appendix B provides additional information about the Appropriate Refuge Uses Policy.

Table 3-23 Appropriateness Determinations

Appropriateness Determination	Approved	Not Approved
Haying	X	
Jogging and Bicycling	X	
Walking and Hiking	X	
Cross-country Skiing and Snowshoeing	X	
Furbearer Management	X	
Berry, Fruit and Nut Collecting		X
Commercial Forest Management	X	

Compatibility Determinations

Refuge managers must decide and determine if each public use is compatible with the purpose for which the Refuge was established by writing a Compatibility Determination. Public uses on national wildlife refuges fall into two categories: priority uses and secondary uses. Priority uses, as defined by Congress, include hunting, fishing, wildlife observation, photography, environmental education and interpretation. All other public uses on the Refuge are considered secondary uses. A list of Compatibility Determinations for the Refuge is shown in Table 3-24 and the entire written compatibility determination provided in Appendix B. Priority uses are reviewed every 15 years and secondary uses are reviewed every 10 years.

Table 3-24 List of activities that have been determined compatible on the Refuge

Compatibility Determination	Priority Uses	Secondary Uses
Hunting	X	
Fishing	X	
Wildlife Observation	X	
Wildlife Photography	X	
Interpretation	X	
Environmental Education	X	
Furbearer Management		X
Walking and Hiking		X
Cross Country Skiing/Snowshoeing		X
Jogging and Bicycling		X
Commercial Forest Management		X

Chapter 4

USFWS

Northern Goshawk

Environmental Consequences

- Introduction
- Physical Environment
- Biological Environment
- Socioeconomic Environment
- Refuge Cultural and Historical Resources
- Refuge Administration, Public Use, & Partnerships
- Cumulative Impacts
- Relationship between Short-term Uses of the Human Environment and the Enhancement of Long-term Productivity
- Unavoidable Adverse Impacts
- Potential Irreversible and Irretrievable Commitments of Resources
- Environmental Justice
- Summary of Consequences by Alternative

Chapter 4
Environmental Consequences

Introduction

This chapter describes the foreseeable consequences for the environment that would result under each of the three alternatives we propose in Chapter 2: Alternative A (Current Management) which serves as the baseline to which Alternative B and C are compared. Where detailed information is available, we present scientific, analytical comparisons of the alternatives and their consequences, which we term "impacts" or "effects." In the event that detailed information is unavailable, we base those comparisons on our professional judgment and experience. Our discussion focuses on the direct, indirect, short-term, beneficial and adverse, and cumulative effects likely to occur during this 15-year plan.

We organized this chapter by major resource headings. Under each heading, we discuss the context of the resource, and then discuss the beneficial or adverse effects that would result, regardless of the alternative we select for the final CCP. Finally, we discuss the beneficial and adverse effects of each of the alternatives. A summary comparing the effects of the three management alternatives is included at the end of the chapter in table 4.2.

Per Council of Environmental Quality (CEQ) and Service regulations on implementing the National Environmental Policy Act (NEPA), we assess the importance of the effects of the alternatives based on their context and intensity. The scale of their context ranges from site-specific to local, landscape, or regional. Although the area of the Refuge is only a small percent of the context in its ecosystem or region, we developed all of our management alternatives to contribute to the many conservation goals in those larger contexts. For each alternative, we based our evaluation of the intensity of the effects on the following factors:

- the expected degree or percent of change in the resource from current conditions;
- the frequency and duration of the effect;
- the sensitivity of the resource to such an effect or its natural resiliency to recover from such an effect; and
- the potential for implementing effective preventive or mitigating measures to lessen the effect.

The duration of those effects varies, from those occurring only once for a brief period in the 15-year period of this plan—for example, the effects of constructing a Visitor Contact Station (VCS)—to those occurring repeatedly or frequently during a given season of the year—for example, observing wildlife from Refuge trails.

Categorical exclusions are classes of actions which do not individually or cumulatively have a significant effect on the human environment, and are specifically detailed in 516 DM 8.5(B) and 43 C.F.R. Sections 46.210 and 46.215. Categorical exclusions apply except in exceptional circumstances (43 C.F.R. § 46.215). The following list of management activities are not analyzed in detail in this document because they would qualify for categorical exclusion under applicable regulations if independently proposed and are both trivial in effect and common to all alternatives.

- conducting environmental education and interpretation programs
- researching, inventorying resources, or otherwise collecting resource information
- operating and maintaining infrastructure and facilities
- recurring, routine management and improvements
- constructing small projects (e.g., boardwalks, berms, small water control structures, interpretive kiosks) or developing access for routine management
- planting native vegetation
- changing minor amounts or types of public use
- issuing new or revised management plans when only minor changes are planned
- enforcing Federal laws or policies

Physical Environment

Hydrology

As discussed in Chapter 3, the hydrology on much of the Refuge has been altered. We evaluated the effects on hydrology and water quantity as a result of potential management actions under each of the alternatives.

Impacts on Hydrology Common to all Alternatives

Approximately 4,000 acres of the Refuge wetland habitat is contained in 19 impoundments. Water levels are carefully managed to provide a variety of feeding, nesting, brood rearing, and resting habitats for migratory birds and resident wildlife. Water levels are adjusted within and between years to mimic natural hydroperiods associated with unaltered wetlands and to provide the best possible habitat for priority wildlife species. These changes in water levels result in subsequent changes in wetland vegetation and ultimately provide the desired habitat.

Under each alternative, adverse impacts on hydrology would be the continued use of impoundments. Although these areas benefit waterbird populations and other wildlife, dikes and the associated canals alter the natural flow of water. Dikes can block floodwaters, which help build soils and replenish nutrients. They can also restrict the flow of water off the land, causing extended periods of inundation which can result in the

loss of plant species that require periods of drying. Canals have the opposite effect of dikes, causing water to drain faster than what would be expected under natural conditions. They can cause wetlands to dry out, resulting in succession to vegetative communities that are better adapted to drier soils. Additionally, when natural waterways are channelized, they lose much of the structural heterogeneity that supports a diversity of species. Although there are negative consequences associated with impoundments, through the careful use of these management units, the Refuge has increased the availability of wetlands, a rare and declining habitat nationwide. Additionally, the hydrology of western New York was drastically and permanently altered by agricultural and other development pressures long before the refuge was established, therefore, a return to "natural" hydrologic conditions would be nearly impossible. Furthermore, careful water level management within impoundments can mimic natural hydroperiods as closely as possible, benefitting species associated with these managed wetlands.

Impacts on Hydrology Under Alternative A

Beneficial

Continued monitoring of water levels would allow the Refuge to improve management of its impoundments, benefitting these areas. By comparing proposed water levels with actual recorded levels, the Refuge can adapt its wetlands management based on water availability. Many of the impoundments are influenced by the water level in Oak Orchard Creek and can only be drained or filled when Oak Orchard Creek is at the desired level. The bathymetry data being collected for the impoundments would help determine how water levels differ throughout these management units during various manipulations and different Oak Orchard Creek water levels. In addition, monitoring of water control structures would ensure that debris does not obstruct the flow of water into or out of the impoundments. For Seneca Pool, allowing the water levels to fluctuate with the level of Oak Orchard Creek would emulate a more natural hydrology, with alternating periods of flooding and drying out, benefitting bottomland hardwoods species.

Adverse

Under this alternative, there would be no Refuge partnerships to improve land-use practices on upstream areas of the watershed. The continued extremes in hydrological regimes (from flooding to low-flow conditions) would not be ameliorated.

Impacts on Hydrology Under Alternative B

Beneficial

Refuge partnerships with land managers of upstream areas would help provide "buffer zones", through riparian and upland restoration efforts. Streamside forests have a beneficial effect on the hydrology of a watershed by moderating the flow of water. Vegetated areas absorb water during heavy rains and reduce overland flow, thereby minimizing flooding and erosion (Kundt 1988, Smardon and Felleman 1996). These areas also store more water than sparely vegetated or bare ground. Additionally, the shading that trees and shrubs provide reduces evaporation. Hence, streams that are bordered by forests and shrub vegetation will generally not dry out as quickly during

droughts as ones that are exposed (Moore et al. 2005). Additionally, the potential removal of the northeast dike around Seneca Pool would further restore the area's natural hydrology. Water levels would more closely mirror those in Oak Orchard Creek. There would be fewer impediments to water draining off the site, reducing water-retention times, thereby benefitting many wetland plants. Bathymetric mapping and water level monitoring will continue under this Alternative.

Adverse

The completion of the Oneida Pool construction project (creation of a dike to create two smaller sub-impoundments) is not expected to change the refuge hydrology. The site was previously impounded in 1974, and the flow of water into and out of the pool will not change as a result of this project.

Impacts on Hydrology Under Alternative C

Beneficial

Compared with Alternatives A and B, this alternative is expected to provide the most benefits to hydrology on the Refuge. The removal of all boards in Structure L of Oneida Pool would allow water levels to fluctuate "naturally" with a less restrictive flow. Seneca Pool water levels would continue to fluctuate with Oak Orchard Creek, and the installation of additional culverts under Feeder Road would increase hydrological connectivity. Furthermore, the removal of water control structures and dikes from Long and Knowlesville Marshes, would allow natural hydrological processes to be restored to that section of Oak Orchard Creek. Channelized portions of Oak Orchard Creek would additionally be restored to a more natural, meandering configuration, benefitting the area's hydrology.

Adverse

Adverse impacts on hydrology specific to this alternative are not anticipated.

Geology

The geology of the Refuge is not expected to be affected by any activities under Alternative A, B, or C. Construction of facilities (such as an expanded VCS), impoundment maintenance/improvement projects, or public use site improvements would disturb upper layers of soils, but not impact the underlying geology.

Soils

Generally, soils on the Refuge are productive and in good condition, with little contamination and able to support the diversity of habitats that would meet our biological management goals. We would manage them to minimize human disturbance, by prohibiting off-road vehicle use by the public, for instance. We evaluated and compared the management actions proposed for each of the Refuge CCP alternatives based on their potential to benefit or adversely affect Refuge soils.

Impacts on Soils Common to all Alternatives

We would continue to use best management practices in all management activities that might affect Refuge soils to ensure that we maintain soil productivity and minimize erosion.

Under each alternative, the Refuge would continue to use Service-approved chemicals to control invasive plants and for other management purposes (i.e. to create openings in emergent marshes to benefit a variety of waterbirds). Generally, the Refuge only sprays chemicals on the Field Station Approval list; as other pesticides require either Regional or Service Headquarter approval. We must request approval, through a Pesticide Use Proposal, for all uses of chemicals on the Refuge. The Refuge manager, regional pest management coordinator, and national pest management coordinator have the authority to approve chemicals and their application procedures. Glyphosate is the herbicide used most often on the Refuge. It is typically used in wetlands and grasslands and would likely be used in some of the shrub and forestlands in the future as we expand our treatment of invasive species. It can be applied to aquatic plants, but plant decomposition may result in oxygen depletion and lead to fish suffocation. Its use is restricted within 0.5 miles of intakes for potable water. It is essentially nontoxic to aquatic organisms when used according to label directions. Glyphosate is degraded by microbial action in both soil and water. It degrades in soil with an estimated half-life of 30 days. It is highly soluble, but adsorbs rapidly and tightly to soil (U.S. Forest Service 2007). Dicamba is another chemical that has been used recently in Refuge grasslands. It is only slightly toxic to birds and of low toxicity to fish. When used according to the label directions, dicamba poses little threat to wildlife. Dicamba does not bind to soil particles and is highly soluble in water, and is therefore highly mobile in the soil. Metabolism by soil microorganisms is the major pathway of loss under most soil conditions (Cornell University 2010).

Impacts on Soils Under Alternative A

Beneficial

Overall, the protection, maintenance, and restoration of habitats on the Refuge are expected to benefit soils. The physical, chemical, and biological weathering and other soil-formation processes would continue, benefitting vegetative communities and wildlife.

Adverse

No impact specific to this alternative are expected.

Impacts on Soils Under Alternative B

Beneficial

Benefits to soil would be similar to those described under Alternative A.

Adverse

Under this alternative, there would be some impacts to soils. The Refuge is proposing to expand the current Refuge headquarters by adding on an office wing and converting the existing headquarters to a VCS. In addition to an increase in square footage available for the public (i.e. for environmental education and interpretation), administrative areas would be expanded. The additional office space would be used to co-locate staff from other Service field sites. Although the exact footprint of the proposed facilities could vary slightly under each of the alternatives, the construction of any of the designs would have similar impacts on soils. Some ground disturbance is expected, as limited areas that are currently developed would be excavated. The expansion would also require a relatively small (probably less than half an acre) section of the grassy area adjacent to the current building to be removed to build the foundation of the expansion. The impacts to soils are expected to be minimal. All the construction would occur in the area that was previously built up for the current Refuge headquarters building and associated maintenance and storage facilities.

The construction of a non-motorized boat launch site (Map 2-15) along Oak Orchard Creek would cause some of the upper layers of soils to be disturbed and compaction of soils. The site would be able to accommodate five or six cars (several hundred square feet) in an area already disturbed along Sour Springs Road. Natural soil formation processes would no longer occur within the perimeter of the site. The accessible fishing pier (at Ringneck Marsh or along Oak Orchard Creek) would also create some soil disturbance. However, the area affected by these projects would comprise a negligible fraction of the total Refuge area, and the impacts are expected to be relatively minimal.

Completion of the Oneida Pool restoration project would cause some soil disturbance. The construction of Oneida dike would require placement of fill-dirt to be deposited on existing marsh soils. The dike would cover approximately three acres. Although current sediments would be altered, the affected area would represent less than 0.2 % of marsh soils, a minimal impact.

Impacts on Soils Under Alternative C

Beneficial

Soils in Oneida Pool, Knowlesville and Long Marsh would benefit from periodic drying out, allowing some of the thick organic layer to be oxidized.

Adverse

There would be similar impacts as discussed under Alternative B with regards to construction for expanding the office/visitor contact station, construction of a non-motorized boat launch site, and accessible fishing pier (Map 2-15).

The extension of Onondaga Trail would cause low levels of soil disturbance. This project would loop the trail through the Onondaga forested wetlands so that it reconnects near the beginning of the trail. Some sections of the trail could require elevated boardwalks or bridges. Pilings that support boardwalks/bridges would have to be driven into the soil.

However, long-term soil disturbance is not expected, and the impact of this project would be minimal.

Air Quality

Chapter 3, "Affected Environment," discusses the status of air quality in the landscape around the Refuge. Our approach was to evaluate the effects on the seven primary air pollutants (see Chapter 3, Air Quality) as defined by the Clean Air Act (CAA) of 1970 (as amended in 1990 and 1997), as well as greenhouse gases, which the Environmental Protection Agency (EPA) recently added under an amendment to the Act, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) (EPA 2009).

For the purposes of this EA, we did not estimate the relative amounts of potential air pollutants that would be emitted under each alternative. However, we believe that the impacts of Refuge management on air quality would not vary significantly under any of the alternatives. Hence, the discussion of beneficial and adverse effects on air quality has been combined in this section. We predict that Refuge land management, regardless of which alternative, would be expected to have a net positive effect on air quality. Maintaining vegetative cover, improving energy efficiencies, and limiting public uses to those that are appropriate, compatible, and wildlife-oriented activities would collectively help reduce any air quality impacts.

The potential beneficial effects of the management we evaluated include

- the potential of Refuge forest management to enhance carbon sequestration and reduce greenhouse gases; and
- the potential of continuing and expanding our energy efficiency practices to reduce the Refuge contribution to emissions.

The potential adverse effects of the management alternatives we evaluated include

- emissions from vehicles or equipment;
- particulates from burning prescribed fires as a management tool;
- emissions of methane from impounded areas;
- mowing to maintain grasslands;
- hydro-axing to maintain shrubland; and
- emissions from logging equipment from enhancing upland forests and removing conifer plantations.

Beneficial

Maintaining natural vegetation on the Refuge would continue to provide benefits to air quality with respect to the six air pollutants for which 1990 National Ambient Air Quality Standards (40 CFR part 50) have been established by the EPA. Trees have been shown to

reduce the concentration of ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and particulate matter (PM) less than 10 and 2.5 microns in diameter (PM10 and PM2.5), primarily through direct uptake and adhesion to stems and leaves (Escobedo et al. 2007). With respect to greenhouse gases, plants absorb CO_2 and as a result, vegetated areas can act as an important carbon sink (Heath and Smith 2004). This "carbon sequestration" is essentially the process by which plants take up carbon dioxide through photosynthesis, after which it is stored in plant biomass (wood) and in the soil. Generally, succession to forest stores the most carbon, and the rate of sequestration declines as trees mature (Heath and Smith 2004). Under each of the alternatives, some areas would succeed to forest, with the greatest acreage expected under Alternative C (See section on habitat impacts below).

As part of federal mandates, various energy efficiencies have been incorporated into the Refuge headquarter and shop buildings during the past few years, including: an upgraded boiler, insulated hot water pipes, tankless water heater, additional insulation in the attics and roofing (shop building), double/triple pane windows, on-demand controls for heating/cooling offices, motion sensors for lights in common areas, energy star compliant equipment, and timers for turning off equipment during non-work days and at night.

The new VCS, proposed under Alternative B and C, would follow Leadership in Energy and Environmental Design (LEED) certification under the Green Building Rating System, as developed by the U.S. Green Building Council (USGBC), which provides a suite of standards for environmentally sustainable construction (USGBC 2008). We would also investigate the feasibility of incorporating alternative energy sources, including geothermal heating, wind power (small single/double turbine), solar power, etc.

Adverse

Under each alternative, the Refuge would continue to use equipment, machinery, and vehicles in support of maintenance operations and general habitat and wildlife management activities. These would include 4-wheel all-terrain vehicles (ATV), weed eaters, lawn mowers, etc. that use gasoline, as well as diesel-powered dozers, backhoes, and tractors. The Refuge uses bio-diesel at the 20% mixture for most of the year, which is cut back to 5% during the winter months. A gas-powered generator is occasionally used. In compliance with Section 141 of the 2007 Energy Independence and Security Act [which requires federal agencies to acquire low greenhouse gas (GHG) emitting vehicles], the Refuge would continue to replace older vehicles with hybrid models, where feasible. Additionally, the Refuge would continue to implement the Service's 2008 Fleet Action Plan (USFWS Five-Year Fleet Plan Service Transportation Review Board Charter), with concomitant benefits to air quality. In summary, emissions associated with the sources discussed above, are expected to have minimal impacts on air quality.

Refuge visitation is likely to rise, regardless of alternative, with an associated increase in the number of vehicles on the Refuge. The low rate of speed necessitated would minimize emissions. In addition, the number of vehicles on the Refuge at any given time is not expected to be sufficiently large to create a significant impact to air quality.

As described in Chapter 3, prescribed burning would continue to be a valuable habitat management tool, under all alternatives. The primary gases released during prescribed fire include CO_2, CO, and water vapor, with other gases present in trace amounts (EPA 1998). With fire, the pollutant of primary concern is particulate matter. Particulates can reduce visibility or cause negative effects on the health of people with respiratory illnesses. Appropriate smoke management can minimize or nearly eliminate both of those negative effects. The consideration of the wind speed, direction, and mixing heights is all-important in managing smoke. In planning our prescribed burns, we would consider all those factors, and other environmental and geographical factors, as detailed in the Refuge Fire Management Plan (USFWS 2008). Based on our experience, we expect prescribed burning to produce no major, long-term negative impacts.

Because of the importance of impoundments as habitat for a range of priority wildlife species, the continued use of these managed wetlands would be a major component of Refuge management under all the alternatives. Wetlands act as carbon sinks (by incorporating decaying vegetation into sediment) thus sequestering carbon from the atmosphere and ultimately transporting it into wetland soils. However, wetlands also release methane (CH_4), a powerful greenhouse gas. Wetlands provide an anoxic (very low or no oxygen) environment abundant in organic matter. These conditions are conducive to methane-producing (methanogenic) bacteria that produce methane during the decomposition of organic material (EPA 2010). Current information regarding carbon storage and methane production potential of wetlands is highly uncertain and varies based on wetland location and type (Bridgham et al. 2007). We are uncertain if the Refuge impoundments act as a net source or sink for greenhouse gasses in the atmosphere. If these impoundments do act as a source, we believe that the amount of gasses released would be negligible with a minimal impact on air quality.

The use of mowing as a habitat management tool would continue under each alternative. Grasslands can function as carbon sinks if plant biomass is converted to soil (Buyanovsky and Wagner 1998). However, on the Refuge a portion of the grasses are removed following mowing as part of the cooperative haying program; if cut plant material were left on the grasslands it could prevent proper regrowth of favorable grass species. The hay is fed to livestock or used for bedding, resulting in a degree of conversion to CO_2 and CH_4. Of the approximately 1,000 acres of grassland on the Refuge, roughly 150 acres are hayed. Thus, in total, we expect that grasslands on the Refuge are a net sink of greenhouse gases, with a benefit to air quality.

Under each of the alternatives, the Iroquois Job Corps Center would continue to operate. This facility is administered by the U.S. Department of Labor on a 30-acre site, through a Memorandum of Understanding (MOU) with the Refuge. It consists of several dorms, classrooms, workshops, fitness areas, sport fields, and associated facilities that can support up to 255 students and approximately 110 staff. On average, less than 100 cars per day would access/depart the center, and associated emissions are expected to be minimal.

Water Quality

Water quality on the Refuge is largely influenced by land-use practices upstream of the Refuge. A recent study of the Oak Orchard Creek watershed found that some area farms and businesses continue to be sources of nitrogen, phosphorus, and sediments to the watershed (Makarewicz and Lewis 2009).

Impacts on Water Quality Common to all Alternatives

Beneficial
None expected.

Adverse
Some adverse direct and/or indirect impacts to water quality as a result of future Refuge management and public use activities are anticipated and include:

- vegetation trampling;
- grease/detergent from vehicles;
- septic systems associated with Refuge and the Iroquois Job Corps Center;
- dike removal/construction and other work impoundment restoration or maintenance projects, water control structures & culverts; and
- use of herbicides.

Under each alternative, Refuge visitation is expected to increase. However, vegetation trampling and associated soil erosion and possible impacts to water quality are expected to be minimal. Most of the public would be restricted to designated roads and trails. Activities (such as hunting) that allow the public to access vegetated areas are not expected to cause any significant vegetation or soil disturbance because they are spread out over a relatively large area.

As part of regular maintenance activities, some grease and cleaning chemicals could be washed off vehicles and equipment. This is not expected to impact water quality through the use of best management practices.

Impoundment maintenance and restoration projects are expected to occur to some degree under each alternative. These could include the construction or removal of portions of some dikes, installing or removing water control structures and culverts. Some soils would enter the water and sediments would be disturbed, and these are expected to increase turbidity. Consequences to water quality are expected to be short-lived and localized.

The use of herbicides on the Refuge would continue, regardless of alternative (for details of the chemicals used, see the "Soils" section above). Through the proper use of approved herbicides, impacts to water quality on the Refuge are expected to be minimal.

We believe that the septic systems at the Iroquois Job Corps Center can adequately accommodate the wastewater produced there without compromising groundwater quality.

Impacts on Water Quality Under Alternative A

Beneficial
None expected under this alternative.

Adverse
The predominant sources of water pollution are most likely to come from upstream areas of the Refuge, as described in Chapter 3. The water quality of Oak Orchard Creek as it flows through the Refuge is primarily dictated by agricultural and other activities in the upper portion of the watershed (Makarewicz and Lewis 2009). Under this alternative, Refuge partnerships would not improve upstream land-use practices that can ameliorate some of these effects, such as the restoration of riparian forest buffers (RFB). RFBs can improve water quality in different ways depending upon the pathway of delivery of water (Addiscott 1997). Nitrates and acidity may be improved when groundwater passes through the RFB (Spruill 2004) due to a combination of denitrification, biostorage, and changes in soil composition. Overland storm flows entering laterally from the uplands may have reduced suspended particulates, by adhering nutrients, inorganic toxins, and pesticides, as well as some dissolved nutrients and toxins. During stream flooding events, waters flooding out into the RFB may also shed sediments, nutrients and toxic materials as a result of particulate trapping and binding of materials on the leaf litter and soils within the RFB. The RFB is also an important source to the stream of high quality dissolved and particulate organic matter which is delivered both vertically and laterally. RFBs provide shade and evaporative cooling to streams, maintaining lower summertime temperatures critical to some biota (Correll 1996).

In order to keep area roads safe during the colder months, road salt is applied by municipalities. The chloride ions (Cl) present in salt can have a negative impact on freshwater ecosystems (Kaushal et al. 2005) and potable water, and is considered a pollutant by the EPA (EPA 2006). These road deicing materials are used on all paved roads around the Refuge, except the seasonal non-paved part of Sour Springs Road. Feeder Road is not salted but plowed to allow access for hunters, trappers, and staff. Under this alternative, Refuge partnerships would not focus on reducing the impacts of deicing operations on local waterways.

Impacts on water Quality Under Alternative B

Beneficial
We expect that our partnership efforts with upstream landowners would improve water quality on the Refuge and in the watershed. One way to minimize negative effects of agricultural and development land-use is through the use of vegetated strips along streams and drainages.

The Refuge would continue to work with the local municipalities on determining a better alternative (such as an environmentally friendly deicer) to the conventional deicing methods, which would help reduce impacts to the Refuge.

The Refuge would periodically conduct water quality testing of Oak Orchard Creek to obtain baseline data and detect trends over time. This would help determine if the partnership efforts in upstream areas are having the expected positive effects on water quality.

Adverse
Under this alternative, a small parking area and accessible fishing pier along Oak Orchard Creek could have a minimal impact on water quality.

Under this alternative, there would be an increased demand placed on the Refuge septic system as a result of the expanded VCS, but the current system is expected to be sufficiently sized to accommodate the additional wastewater volume. If municipal sewage lines were to become available in the vicinity of the Refuge in the future, we would evaluate tying into that system.

Impacts on Water Quality Under Alternative C

Impacts are expected to be similar to those described under Alternative B.

Noise

Noise impacts are expected to be similar under each alternative. Source of noise would include traffic, mechanized equipment (mowing, haying, brush-hogging, chainsaws, etc), firearms, and construction projects. Noise from traffic would be minimal on Refuge drives, due to low speeds and limited use. During the hunting season, there would be noise from firearms, but only during daylight hours and very infrequently. Construction and equipment-related noise would be of short duration. In general, noise generated by any of these sources could potentially have discernable, but temporary effects on nearby wildlife and people.

Visual Resources

Visual resources (aesthetics) would not differ among the alternatives, and impacts are expected to be minimal. The upgraded VCS, proposed in Alternatives B and C, would be the same height and exterior design as the current headquarters building. A potential small wind turbine (as a source of alternative, renewable energy) would be approximately 20 ft tall. It would likely be of a type that could be installed on or next to an existing building. We believe that the turbine would be readily accepted by most of the public, given that it would be part of the Refuge's commitment to minimizing its impact on the environment (by becoming less reliable on fossil fuels) and reducing operating costs.

Biological Environment

Habitat Types

The management activities proposed in the alternatives that would affect habitats on the Refuge include prescribed fires, mowing/haying, treating invasive or unwanted vegetation with herbicides, constructing new trails, constructing new public use facilities such as trails, photo blinds, and changing opportunities for public use. In this section, direct impacts on habitats under the three management alternatives are discussed. Potential indirect consequences to wildlife resulting from changes in habitat are addressed under the wildlife impact sections.

Impacts on Habitats Common to all Alternatives

Geographical Information System (GIS) Database

Regardless of alternative, we would continue to develop a comprehensive GIS-based database for the Refuge and the surrounding landscape to map and analyze habitat types and conditions, rare species populations, other ecological features, land use issues, and other relevant information for long-term planning and monitoring of resources. The use of a GIS-based system allows the Refuge to track the effects of its management on a variety of habitats.

Managing Invasive Plants

Under each alternative, the Refuge would control or eradicate invasive plants, including purple loosestrife, common reed, black swallow-wort, non-native honeysuckles, autumn olive and multiflora rose. Left unchecked, these species can alter the structure and function of beneficial vegetative communities on the Refuge, with negative consequences to wildlife, Refuge operations, and visitors. Control methods include mechanical, biological, and chemical. Removing plants manually would cause some minor soil disturbance of short duration. The primary biological control on the Refuge is aimed at purple loosestrife, using *Galerucella* beetles which have been shown to have no adverse impacts on native plant communities (Blossey et al. 1994). Service-approved herbicides would be used to control invasive plants when deemed necessary. Broad-spectrum herbicides, such as glyphosate and dicamba products, when applied by boom applicator, also kill non-target species of plants. Typically, selective application would be used, unless the site covered was too large, requiring a method more effective for treating a broader area. We believe the reduction of competitive invasive or nuisance species outweighs the loss of some beneficial vegetation.

Administering the Refuge

We plan some administrative activities, such as constructing new or rehabilitating existing facilities and improving roads. Most of the impacts on natural habitats resulting from those actions would be minor, temporary, and confined to sites that have already been altered in the past for those uses.

Offering Public Use

The present level of public use on Refuge lands consists mostly of hunting, fishing, wildlife observation and photography, environmental education and interpretation. The latter two would have no perceptible direct or indirect impacts to habitats, as visitors generally are confined to designated roads, trails, or specially provided access points and overlooks. Irrespective of alternative, however, public visitation and use would increase on its own as the public becomes more familiar with and aware of the opportunities provided by the Refuge.

With respect to hunting, both direct benefits and adverse impacts to Refuge habitats can be expected. Deer hunting benefits a variety of vegetative communities by keeping deer populations within the carrying capacity of the habitat, thus reducing excessive damage to vegetation caused by over-browsing and maintaining understory habitat for other species (Rawinsky 2008). Conversely, some direct adverse impacts on vegetation may occur as a result of hunting activities. However, those impacts should be minimal, because big game hunting is regulated, and the Refuge prohibits the use of ATVs, off-road vehicle travel, permanent stands and blinds, camping, and fires, which are most likely to damage vegetation. Hunter trampling of vegetation is likely to be further minimized as a result of the high acreage to hunter ratio, limited number of hunt days, and time of year (dormant season). Under alternatives B and C the Refuge would be closed to wandering which will also reduce impacts to Refuge habitats.

Emergent Marsh

Impacts on Emergent Marsh Under Alternative A

Beneficial

Under this alternative, the current extent (approximately 2,581 acres) of emergent marsh is not expected to change. During years of adequate rainfall, continuing management of this habitat in Refuge impoundments would create a mosaic of marsh and open water in different stages of marsh development, providing conditions for a diversity of wetland plant species. Based on the time of year and intended wildlife use, drawdowns and subsequent water level manipulations would promote the growth of annual wetland plants and minimize germination of perennial emergent vegetation (Baldassarre 1994). Physical or chemical methods would also be used to set back succession. Without this level of management, the impoundments would likely be dominated by only a few plant species during drier years or open water when there is above-average rainfall, and structural heterogeneity would diminish. Additionally, increased data on water levels and bathymetry would allow more informed management decisions to be made which should support the development of hemi-marsh, a desired wetland habitat type. Management of the muskrat population at optimal levels is also expected to benefit impounded marshes. At appropriate densities, muskrats help create and/or maintain hemi-marsh by creating openings in otherwise dense stands of cattail. However, muskrats need to be managed to prevent dike damage, as some burrow into and compromise the integrity of these structures.

Adverse
The natural marshes fringing portions of Oak Orchard Creek on the Refuge are currently not being monitored and subsequently controlled for invasive plants. Without such management, the quality of this rare habitat could decline.

Impacts on Emergent Marsh Under Alternative B

Beneficial
Benefits to emergent marshes in the impoundments are expected to be similar to those under Alternative A, and the acreage of this habitat would remain the same at approximately 2,581 acres. Overall, the emergent marshes on the Refuge would be maintained in a series of successional stages from open water to dense emergent vegetation, including areas of hemi-marsh. In addition, the completion of the Oneida Pool construction project resulting in two smaller sub-impoundments would further allow for more fine-tuned impoundment management to take place, and would support the development of a more productive marsh. Increased monitoring would also improve opportunities for adaptive management.

Natural emergent marshes would benefit from Refuge partnership efforts to minimize sources of pollution and sediment in upstream areas of Oak Orchard Creek.

Adverse
Construction of the dike that would divide Oneida Pool into two sub-impoundments would result in the loss of approximately three acres of marsh.

Impacts on Emergent Marsh Under Alternative C

Beneficial
There are no positive consequences expected to emergent marshes on the Refuge under this alternative.

Adverse
Impoundment management under this alternative would cause a decrease (by approximately 170 acres or 7%) in emergent marsh. There would be some conversion of marsh to forested wetlands in Oneida Pool following removal of the water control structure. In addition, discontinuing impoundment water level management would result in stable water levels. Depending on their bathymetry, some impoundments would convert to more open water, while shallower areas would become densely vegetated. We expect a reduction in the quality of this habitat, as the acreage of hemi-marsh would decline. Annual plant species would not be supported, except in extreme drought conditions during the spring time, and droughts in the summer would be too late for seed germination and growth of most species. High water levels would likely create some clearings in the vegetation during extreme wet periods. Regulating the location of muskrat trapping would likely also result in some additional openings in marsh stands, but regeneration of vegetation is not expected to occur if mud flats are not exposed, since without periodic drying out of an impoundment, the seed bank contained in the marsh

bottom would not have a chance to germinate (van der Valk and Davis 1978). Furthermore, stable water levels may show an increase in undesirable vegetation such as water lily, phragmites, etc that do not flourish in a well managed system.

Returning some of the Oak Orchard Creek watershed on the Refuge to a more natural, free-flowing system is expected to also result in the loss of some emergent marshes as a result of succession to wetland shrubs and forest.

Open Water

Impoundment management is the primary way in which the Refuge affects the acreage of open water. Because water level control in the impoundments is highly dependent on rainfall, the acreage of open water varies annually according to the timing and intensity of precipitation. Water quality impacts are discussed under that topic above.

Impacts on Open Water Under Alternative A

Impacts (beneficial and adverse) to open water are unlikely to change under this alternative. As a result of water level controls and managing of emergent marshes, the acreage of this habitat is expected to remain at current levels. Open water currently covers approximately 822 acres. However, this number changes annually based on water level management.

Impacts on Open Water Under Alternative B

Beneficial
Benefits to open water are not expected under this alternative.

Adverse
Under this alternative, there would be a minimal reduction in open water following the construction of the Oneida dike and subsequent management of the sub-impoundments. However, it would remain above the 250-acre minimum (see Objective 1.6).

Impacts on Open Water Under Alternative C

Beneficial
None anticipated.

Adverse
Alternative C would result in a reduction of open water. Boards in the water control structures would be set at fixed positions, and depending on the bathymetry and rainfall, some marshes would convert to open water, while others would become drier and succeed to marsh, shrubs, or forested wetlands. The net effect is expected to be a loss of approximately 156 acres (19% decline) in open water.

Mudflats

Mudflats are created as a result of impoundment drawdowns. Because water level control in the impoundments is highly dependent on rainfall, the acreage of mudflats that can be provided varies annually according to the timing and intensity of precipitation.

Impacts on Mudflats Under Alternative A

Impacts to mudflats are unlikely to change under this alternative. As a result of water level controls and managing of emergent marshes, the acreage of this habitat is expected to remain at current levels. Mudflat acreage ranges between about 50 and 150 acres, annually.

Impacts on Mudflats Under Alternative B

Same as under Alternative A.

Impacts on Mudflats Under Alternative C

Beneficial
None anticipated.

Adverse
Under this alternative, there would be no more drawdowns, resulting in a reduction in mudflats during spring migration. The availability of mudflats would become less reliable as they would only occur during droughts.

Forested Wetlands

The primary management activity affecting forested wetlands on the Refuge is water-level manipulation and the level of connectivity to Oak Orchard Creek. The differences in the application of these hydrological tools form the basis of the impacts discussions under the three alternatives.

Impacts on Forested Wetlands Under Alternative A

Beneficial
Forested wetlands are expected to increase by 120 acres from the current size under this alternative. Continuing to allow the water levels in Seneca Pool to fluctuate with the level of Oak Orchard Creek would benefit the bottomland hardwood species as it would allow them to periodically dry out. Without the "drying out" period, the opportunity for recruitment will diminish and eventually the canopy will open up and areas of the forest will be replaced by a different vegetative community (i.e. scrub-shrub), which is less useful habitat for waterfowl (Francis 1983, Allen et al. 1988) and other wildlife. Research also suggests that long periods of inundation can negatively impact forested wetlands, leading to decreases in tree vigor and growth (King 1995, Schlaegel 1984), and

regeneration (Young et al. 1995). There is also evidence that the extended flooding regimes can shift tree species composition towards more flood-tolerant species (Karr et al. 1990, King 1995, King and Allen 1996).

Adverse
No adverse impacts are anticipated under this alternative.

Impacts on Forested Wetlands Under Alternative B

Beneficial
Positive consequences to forested wetlands in the impounded areas of the Refuge would be similar to those discussed under Alternative A. However, under this alternative, the amount of acreage will increase slightly from Alternative A (30 more acres). Forested wetlands are expected to additionally benefit from Refuge partnerships that aim to incorporate riparian buffers and upland restoration as part of upstream land-use practices. We also believe that efforts to reduce the impact of road salt on the aquatic resources of the Refuge would be beneficial to these vegetative communities. The improved hydrology and water quality would likely have positive effects on forested wetlands on the Refuge.

Adverse
No adverse impacts are anticipated under this alternative.

Impacts on Forested Wetlands Under Alternative C

Beneficial
Under this alternative, the acreage of forested wetlands are expected to increase by 415 acres in comparison to existing conditions. With relatively stable water levels, emergent marshes in impoundments that are relatively shallow would likely revert to forested wetlands. In addition, the restoration of the natural hydrology and reforestation of areas that drain into Oak Orchard Creek (between Knowlesville Road and Route 63) would additionally benefit this vegetative community. For Seneca Pool, the increased connectivity with Oak Orchard Creek would aid in recruitment. Restoring channelized portions of Oak Orchard Creek to a more natural flow pattern would also likely benefit forested riparian habitat.

Adverse
No adverse impacts to forested wetlands are anticipated under this alternative.

Grasslands

The major management actions affecting Refuge grasslands are mowing (and associated commercial haying), herbicide spraying, and prescribed burning. Under each alternative, these tools would continue to be used to maintain the desired composition and early successional structure of these vegetative communities. The difference between the

alternatives is primarily a function of the amount of grasslands that would be maintained under each management scenario.

Impacts on Grasslands Common to all Alternatives

Beneficial

One of the primary goals of the grassland management program is to consolidate, where possible, grassland sites into larger units, thereby reducing habitat fragmentation. Fragmented natural communities are subjected to high rates of invasion by non-native and invasive species, changes in microclimate, and other factors that result in further degradation (Lindenmayer and Fischer 2006). These consequences of fragmentation can be classified as "edge-effects." Though beneficial to some species, pronounced edges can be detrimental to others, and the intensity and severity of edge-effects tend to be inversely related to the ratio of the area compared to its perimeter or "edge" (Soule 1986). This means that smaller habitat fragments have proportionally more edges. Other direct benefits of the grassland management program include the reintroduction or reappearance of native herbaceous and grass species in the fields being maintained in early succession, and the long-term persistence of high quality early successional habitats, which are relatively rare in the east. Grassland vegetation would also benefit from prescribed fire through the return of nutrients to the soil by combustion of dead plant biomass, reduction of litter, and creation of openings where grasses and fire-adapted herbaceous vegetation can establish.

Adverse

The direct impacts would be the temporary removal of vegetation because of haying, burning prescribed fires, or applying herbicides. We would conduct those primarily to maintain fields in early succession, set back woody encroachment, or control invasive species. The regimes are intense and relatively infrequent, ranging from every two to four years depending on the response. Their direct effects are of short duration, in that vegetation regrows quickly during the growing season.

Mowing is non-selective in that some desired species would be expended in order to control woody invasive species at the most effective times of the year. Although haying removes excess biomass from fields that would otherwise inhibit regrowth of desirable species, it also entails a loss of nutrients from the area. There would also be less organic matter which would otherwise decompose and become part of the soil matrix.

Prescribed fires can result in the potential loss of some non-fire adapted vegetation. This unintended consequence would apply more to high seed-producing annuals that do not develop robust root systems or regenerative structures below ground, as perennials do. Their mortality would be more of a function of the depth of organic and mineral soil and the severity and duration of the fire at a given spot (Miller 2000). Repeated use of prescribed fire shifts the balance from less fire tolerant communities or species to fire-tolerant communities. However, fire seldom completely consumes all the biomass in a burn unit; instead, the result is usually a patchy distribution of completely or partially burned and unburned vegetation.

Impacts on Grasslands Under Alternative A

Beneficial
Within Alternative A, grassland coverage would be reduced from current levels (1,186 acres) to roughly 1,047 acres on the Refuge. Grasslands would be expected to range from warm season grasses to forb-dominated. The gradual removal of some fence-lines and hedgerows would create larger areas of contiguous grassland. Some planting of native grasses would increase the diversity of these areas.

Adverse
Management under the current scenario would mean that some of the grasslands would remain fragmented and small. In addition, woody vegetation and goldenrod would continue to dominate certain areas, at the expense of more beneficial species.

Impacts on Grasslands Under Alternative B

Beneficial
Under this alternative, the quality of existing grasslands would improve through decreased fragmentation, and larger areas would be maintained in a grass-dominated state (less forb-dominated). Increased efforts to remove hedgerows would further benefit these areas. There would be an increase in diversity on some units through the planting of native grasses.

Adverse
This alternative would result in the loss of 112 acres (about 9%) of grassland habitat compared to current levels. The Refuge would allow some small and fragmented areas to succeed to shrub and forest, thereby increasing connectivity and patch size for those habitats.

Impacts on Grasslands Under Alternative C

Beneficial
Benefits to grasslands would be similar to those expected under Alternative A.

Adverse
Alternative C would result in the greatest loss of grasslands. Approximately 650 acres (or 55%) of grassland would be lost through succession to shrubland and forest.

Shrublands

As with grasslands, shrublands require continuing management efforts to set back succession, or they will succeed to forest and lose the characteristics that support shrub dependent wildlife species.

Impacts on Shrublands Common to all Alternatives

Under each alternative, hydro-axing would likely be the preferred method to set back succession in order to maintain a desired shrubland structure. We may use other mechanical means including cutting with a brushhog or hydraulic mower, or girdling larger shrubs or trees depending on the stem diameter. All these tools would remove smaller size plants in treatment areas. Additionally, chainsaws could be used in winter to cut scattered trees within shrublands, thus eliminating the need to cut entire tracts of shrubland with the hydro-ax or mowers. We may also use herbicides to chemically girdle trees that are growing within shrublands. As discussed previously, there would be some impacts associated with herbicide use, but these would be minimized through targeted application.

Impacts on Shrublands Under Alternative A

Beneficial
We do not anticipate positive impacts to shrublands under Alternative A.

Adverse
Under this alternative, about 445 acres of this habitat would succeed to forest. Shrubland management would result in a relatively small amount (526 acres or 54%) of shrublands compared to current levels. The Refuge would be unable to substantially slow the natural succession of these vegetative communities to forest.

Impacts on Shrublands Under Alternative B

Beneficial
Same as Alternative A.

Adverse
There would continue to be a decline in shrublands from current levels, with the size of this habitat stabilizing at about 538 acres after 15 years.

Impacts on Shrublands Under Alternative C

Beneficial
This alternative would not benefit shrublands on the Refuge.

Adverse
Under Alternative C, there would be a substantial decline in shrublands with less than 10% of the current acreage remaining due to succession and little to no management.

Upland Forest

Impacts on Upland Forests Common to all Alternatives

No impacts common to all the alternatives are expected.

Impacts on Upland Forests Under Alternative A

Beneficial
Under this alternative, upland forest acreage would increase (from 1520 acres to 1985 acres) due to succession of shrublands. Existing upland forest would succeed to older age stands. The Refuge would continue to rely on natural tree fall gaps within the mature forest to create a multi-layered forest structure with a diversity of dead and down woody debris.

Adverse
Under this alternative, there would be no concerted effort to remove plantations. Management of these pine and spruce stands, consisting mostly of non-native species, would primarily involve the removal of trees when they interfere with other management actions. Areas occupied by plantations would not be available for native, more diverse forests. Plantations would continue to slowly expand through colonization of adjacent areas.

No forest management would take place in upland forest stands under this alternative. The lack of forest management would result in a decrease in desired habitat conditions for many species of wildlife including breeding and nesting songbirds.

Impacts on Upland Forests Under Alternative B

Beneficial
This alternative is expected to result in a larger upland forest component (2,141 acres) on the Refuge consisting of a diversity of age classes. The increased acreage of forest would come from the conversion of shrublands and, eventually, small grassland units. The aim would be to select habitat fragments adjacent to existing forests, thereby increasing patch size. The gradual removal of pine and spruce plantations and natural regeneration or planting of native trees would further benefit native forests. Commercial forest management would be implemented under this alternative and will consist of contractors removing trees to accomplish habitat management. This will occur in both plantations and other upland forest areas. Impacts to upland forests will be an increase in better quality habitats.

Adverse
No negative consequences to forests are anticipated under this alternative.

Impacts on Upland Forests Under Alternative C

Beneficial

Benefits to forests would be similar to those expected under Alternative B, but there would be an additional increase in the acreage of this habitat under this alternative. The gradual removal of pine and spruce plantations and natural regeneration or planting of native trees would further benefit native forests

Adverse

No negative consequences to forests are anticipated under this alternative.

Fish and Wildlife

The population of fish and wildlife on the Refuge is affected by habitat management, the regulation of public use and access, and other programs that are part of operating a refuge. The focus of these programs would vary under each alternative, resulting in different consequences to fish and wildlife.

Impacts on Fish and Wildlife Common to all Alternatives

Beneficial

Managing Habitat

Habitat management techniques, such as maintaining impoundments, prescribe burning, mowing/commercial haying, hydro-axing and other mechanical methods would be carried out to improve cover, food availability, and breeding conditions for a variety of wildlife species.

Managing Invasive Plants

Under each alternative, the Refuge would control or eradicate invasive plants, such as purple loosestrife, common reed, black swallow-wort, non-native honeysuckles, autumn olive and multiflora rose. Nuisance plants would also be controlled to create openings in emergent marshes and to reduce the competitive forb species in grasslands and non-native shrubs in shrublands. Minimizing the presence of invasive plants on the Refuge would provide improved foraging and breeding opportunities, suitable cover, and other benefits to native wildlife species.

Furbearer Management

Trapping of marsh and upland furbearing species as a management technique would continue under each alternative and is expected to have direct and indirect effects on wildlife. Benefits include the management of population of muskrat, beaver, as well as raccoon and some other upland mammals that would otherwise reach populations higher than are considered optimal. Overcrowding can make populations more susceptible to disease outbreaks and negatively impact habitat or prey populations. At suitable densities, muskrat populations can help maintain hemi-marsh conditions which are used by a suite of birds and other wildlife.

The removal of animals under a furbearer management program can have additional positive impacts. Reductions in the populations of nest predators such as raccoon have a positive effect on nesting birds by increasing productivity. The degree to which predator management benefits hatchling and/or fledgling success can vary widely depending on the timing of the removal of predators, the size of the habitat unit, habitat isolation and adjacent land use. Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands.

Adverse

Managing Habitat

Habitat management activities that are aimed at setting back succession, such as prescribed burning, mowing/haying, and hydro-axing would injure or kill some small to medium-sized animals that are unable to find refuge or otherwise flee. However, we believe the risk to be low or the impact to be slight at the population level, and always of short duration. Prescribed fires in grasslands would be scheduled between April 1 and June 15, with a frequency of every three to five years. Some nests (mostly turkey and waterfowl) could be destroyed, but many of the affected birds would likely re-nest in other suitable habitat. Prescribed burning in grasslands typically generates fast-moving, surface fires which rarely burn down to the soil, and many small mammals could find shelter in the unburned duff. There could presumably be occasional snake mortality.

Mowing and commercial haying would occur between July 15 and October 15, a time-frame chosen specifically to avoid impacting nesting birds. Some double-brooded species could lose their second nest, but during this time of year, over 95% of birds are done nesting, and the effects of these activities are expected to be minimal.

The temporary loss of cover, lasting several days to weeks, resulting from prescribed fires and mowing/haying could make some species (especially small mammals and snakes) more vulnerable to predation. Displaced small mammals would move from treated areas into adjacent habitat, resulting in increased competition with established populations.

Hydro-axing would be conducted in the winter on frozen ground or on dry soils in the summer, resulting in cover loss. These time periods (January-February or July-August) are outside of the nesting season and would not impact breeding birds. Overall, we expect all the management techniques discussed to have a minimal impact to wildlife, which would be outweighed by the positive effects resulting from improved habitat.

Managing Invasive Plants

Impacts from the use of herbicides could be expected as a result of efforts to control or eradicate invasive plants. As discussed in the soil and water quality sections, the types of chemicals used on the Refuge are expected to have a minimal effect on fish and wildlife species. Accessing areas for spraying could cause some disturbance, with nesting birds

being most vulnerable. When nests are approached too closely, adult birds may flush, exposing the eggs to weather conditions or predators. Herbicide applications will be conducted during the non-breeding season or away from nesting areas to minimize these impacts.

Furbearer Management

Indirect impacts of furbearer management include disturbance to birds. However, these effects are expected to be infrequent, temporary, and localized. Direct impacts would include the removal of individual target and non-target animals. Management of targeted species is regulated by the NYSDEC which has established seasons for New York's furbearers. These seasons are strictly regulated, with specific times when furbearer management is allowed, and the harvest of these species is monitored to help understand population trends. Non-target species may occasionally be killed, but the experience of the trappers and types of traps used limit these events. To date, all reported non-target animals have been other furbearers that were accidentally caught outside their typical habitat (for instance, a raccoon being trapped in a marsh trap intended for muskrat).

Administering the Refuge

We plan some administrative activities under each alternative, including monitoring refuge water levels, checking adequacy of refuge signs, distributing brochures, patrolling, conducting real property inventories, mowing roadsides and visitor parking areas, etc. However, Refuge staff would ensure that the impacts would be kept to a minimum by scheduling, as well as a many activities conducted for administering the refuge are already at or near facilities already developed or disturbed. Therefore, most of the impacts from these actions would be minor and temporary.

Birds

The discussion of consequences to bird populations is organized by taxa or guild, including waterfowl, breeding marsh birds, shorebirds, raptors, and migratory songbirds. The focus of the impact discussions is on listed species, although one or more common species representing most of the taxonomic groups are also covered.

Impacts on Birds Under Alternative A

Beneficial

Waterfowl

During years of average rainfall, continuing management of emergent marsh would create a mosaic of dense marsh, hemi-marsh, and open water, benefitting a range of migrating waterfowl, a management priority. For instance, dabbling ducks have been shown to prefer hemi-marsh, especially in the spring and summer (Murkin et al. 1997). In contrast, diving ducks tend to utilize areas with more open water and less vegetation (Murkin et al. 1997). Furthermore, we would continue to provide long-term benefits to spring migrating geese utilizing the marshes. The Refuge would also continue to provide

ample brood habitat for waterfowl in emergent marshes. Likewise, resident Canada goose production would be expected to remain stable.

Breeding Marsh Birds
Grebes, least bittern, rails, American bittern, and black tern breeding opportunities would continue to be provided. These breeding marsh birds require hemi-marsh, which is expected to remain at current levels under this alternative through direct habitat management and by maintaining optimal densities of muskrat. On the Refuge, breeding black terns rely heavily on muskrat structures (feeding platforms and abandoned houses) located in areas with a 50:50 vegetation to open water ratio (Hickey and Malecki 1997). We believe that the marsh life cycle pattern that creates this favorable interspersion of vegetation and open water would continue to be provided under this alternative. Suitable conditions would continue to be provided for habitat generalists that can utilize a wide range of marsh conditions, such as American coot and common moorhen (Allen 1985, Bannor and Kiviat 2002).

Shorebirds
Mudflats are relatively rare in the vicinity of the Refuge. The Refuge would continue to benefit interior migrating shorebirds by providing approximately 50 acres of resting and foraging areas during the Fall migration (and roughly 150 acres in the Spring).

Additionally, habitat is expected to remain available for upland sandpiper, an obligate grassland species occasionally found on the Refuge which is declining regionally as abandoned farmlands revert to forest (Norment 2002, Murphy 2003)

Raptors
Current management has supported two active bald eagle nests (the first nest built in 1986 and the second in 2001). Average productivity (combined for both nests) has been about 2 since 1986. During drawdown years, several immature eagles (up to 12) have been seen foraging on the Refuge. Long-term benefits would include the protection of nesting and roosting areas, while the availability of open water would directly benefit bald eagles by providing foraging habitat (for nesting adults and immature birds). Osprey would also continue to benefit under alternative A, having similar foraging requirements to bald eagles.

Management under this alternative is not expected to impact the short-eared owl, as grasslands would decrease only slightly. These birds primarily forage in grasslands and other open areas, with voles and other small mammals being their main prey item (Dechant et al. 2001a). A screech owl is a habitat and prey generalist (Gehlbach 1995) and would not be affected under this alternative. Conversely, a barred owl has more specific habitat requirements, preferring large tracts of forest (Allen 1987). The forest conditions required for this species are not anticipated to change much under this alternative.

A mixture of open and forested habitat would provide hunting and nesting areas for the red-tailed hawk, a forest-edge species (Bednarz and Dinsmore 1982, Speiser and

Bosakowski 1988). In contrast, red-shouldered hawks are typically found in more densely wooded areas (Bednarz and Dinsmore 1982) and require large contiguous wooded tracts of 250 to 620 acres (Johnsgard 1990). Populations of the red-shouldered hawk are not likely to change under this alternative. Northern harriers utilize open areas such as grasslands and marshes for foraging and breeding (Apfelbaum and Seelbach 1983), and their life history requirements would continue to be supported by the Refuge. Cooper's hawks have relatively broad nesting requirements, and can tolerate a higher degree of forest fragmentation than sharp-shinned hawks (Bildstein et al. 2000, Curtis et al. 2006), but we believe breeding and foraging habitat would remain relatively unchanged for both species. Habitat would continue to be provided for the American kestrel, a species that favors grasslands with nearby trees.

Migratory Songbirds

Current management would gradually provide larger areas of contiguous grassland in a range of successional stages, supporting a diversity of grassland birds, primarily bobolink and savannah sparrow, as well as Eastern meadowlark, grasshopper sparrow, and Henslow's sparrow. Management under Alternative A would tend to favor grassland birds that are not area-sensitive and can tolerate some level of fragmentation. These would include the grasshopper sparrow, which has a moderate sensitivity to fragmentation (Vickery et al. 1994), and Vesper sparrow which will utilize small grasslands (Swanson 1996). Sedge wrens would also continue to benefit (Herkert 1991). In addition, there would be reduced predation on grassland bird by mammals and raptors that gain cover and perch sites from hedgerows which are being removed at a rate of approximately one mile every five years. On the Refuge, grassland bird nest success was shown to be greater in larger fields, with shapes that minimized edges and maximized core grassland habitat (Norment and Windig 2006).

Field sparrow, a forest edge and shrubland species (Dechant et al. 2001b) would continue to be supported. Blue-winged warbler numbers would not change. A habitat generalist, this species uses a variety of successional habitats, including woodland clearings, forest edges, and old fields (Dunn and Garrett 1997). Habitat generalists, such as the downy woodpecker (Schroeder 1982), that can utilize a range of forest types would not be affected. Conditions would remain the same for northern flicker, another edge species (Moore 1995).

Wood thrush, an upland forest species (DeGraaf and Rappole 1995), would remain at current levels. Forested wetlands on the Refuge are expected to continue to benefit future populations of cerulean warbler, a high priority species on the Refuge. Most woodpeckers would likely remain unaffected. Relatively common forest edge species, such as the Eastern wood-pewee (Hespenheide 1971) and rose-breasted grosbeak (Stauffer and Best 1980) would be unaffected.

Adverse

Waterfowl
Drawdowns (approximately 500 acres annually) would displace some waterfowl. In addition, Oneida Pool is currently not providing optimal habitat, and under this alternative, use of this area by waterfowl would not increase.

Breeding Marsh Birds
Some black terns and other obligate marsh birds preparing to nest would have to seek other habitat when some impoundments were drained (typically in late April). Suitable habitat would be available elsewhere in the wetland complex.

Shorebirds
Woodcock, a forest shorebird, require an interspersion of shrubland and grassland habitat (Sepik et al. 1993), which is expected to decline as a result of succession to forest under this alternative.

Raptors
The northern goshawk requires relatively large tracts of intact forest (Squires and Reynolds 1997) and would likely continue to be rare on the Refuge, as forest fragmentation would remain. Similarly, habitat conditions for barred owl and red-shouldered hawk would not significantly improve.

Migratory Songbirds
There would continue to be impacts from fragmentation (and associated edge effects), which would disproportionately affect area-sensitive species of grassland birds.

Bird species utilizing shrublands, such as black-billed cuckoo, golden-winged warbler, yellow-breasted chat, common yellowthroat (Fletcher and Koford 2002), American goldfinch (Middleton 1979) and a host of other migratory songbirds would likely decline on the Refuge as shrublands convert to forest habitat.

Impacts on Birds Under Alternative B

Beneficial

Waterfowl
Benefits to waterfowl would be similar to those described under Alternative A. In addition, migrating waterfowl, spring migrating geese, and breeding waterfowl would benefit from the increase in hemi-marsh that would result from the construction of two Oneida Pool sub-impoundments. No impacts are expected to species using artificial nest structures as the structures will be removed as they deteriorate or are determined to be under utilized. Species using these structures would slowly begin to utilize natural nest cavities as forests mature.

Breeding Marsh Birds
Breeding marsh birds would benefit from the increased hemi-marsh conditions, resulting from the conversion of less suitable open water and dense marshes.

Shorebirds
Benefits to shorebirds using mudflats would be similar to those under Alternative A.

Grassland habitat structure would improve, benefitting upland sandpiper.

Raptors
The creation of the Oneida Pool sub-impoundments would increase foraging opportunities for bald eagle and osprey.

Forest owl and hawk species discussed under Alternative A would be expected to increase as a result of an increase in the acreage of available habitat.

Short-eared owl and northern harrier would benefit from less fragmented, higher quality grassland habitats. American kestrel numbers would likely stay the same, even with a decline in grassland acreage.

Migratory Songbirds
Although the acreage of grassland would decline, the quality of remaining areas would improve through increased patch-size, which would benefit area-sensitive grassland species, such as the Henslow's sparrow. Habitat size is the most important factor influencing Henslow's sparrow numbers; they are rarely encountered in grasslands less than 250 acres in size (Herkert 1994). Grasshopper sparrow numbers would likely remain stable, as these birds can utilize moderate to large patches (Vickery et al. 1994). The reduction of hedgerows and increased distance to forest edges used by raptors and other predators would result in decreased predation on grassland bird species.

Cerulean warbler and wood thrush numbers would likely increase as the age structure and diversity of forested wetlands improve.

Adverse

Waterfowl
Under this alternative, a relatively small (approximately 3 acres) of marsh would be lost as a result of the construction of the new Oneida dike. This could reduce habitat for migrating waterfowl, breeding marsh birds, and breeding waterfowl. However, the improved quality of marshes overall (i.e. an increase in the acreage of hemi-marsh) would likely off-set this impact.

Breeding Marsh Birds
Adverse impacts would be similar to those discussed under Alternative A.

Shorebirds
Woodcock numbers would decline as a consequence of conversion of shrubland to forest.

Raptors
There could be a slight decline in sharp-shinned hawk, a forest edge species, as fragmentation is reduced.

Migratory Songbirds
Some grassland species, such as sedge wren, bobolink, and savannah sparrow would decline as less acreage of grassland would be available. Grasshopper sparrow, a species that can tolerate smaller habitat patches, which would be converted to other habitat under this alternative, would also decline.

Bird species utilizing shrublands, such as black-billed cuckoo, golden-winged warbler, yellow-breasted chat, common yellowthroat (Fletcher and Koford 2002), American goldfinch (Middleton 1979) and a host of other migratory songbirds would likely decline on the Refuge as shrublands convert to forest habitat.

Under this alternative, a potential 20 ft small residential wind turbine would be constructed on or adjacent to the VCS. Wind turbines have the potential of killing birds that may fly into the blades. Turbines placed at the refuge would consist of a "housed" design, where the blades are located inside a metal cage or be of a "vertical axis" design. These types of wind turbines are considered to be much safer for birds than wind turbines that have exposed blades. Impacts to wildlife are expected to be minimal.

Impacts on Birds Under Alternative C

Beneficial

Waterfowl
As discussed in the habitat sections, open water and forested wetlands would increase, resulting in additional habitat for migrating waterfowl that utilize these areas. Spring migrating geese are not expected to be affected. Under this alternative, predation due to snapping turtles could be reduced, which would increase productivity of breeding waterfowl.

Breeding Marsh Birds
For breeding marsh birds, only species that utilize dense marsh habitat would increase, such as rails and American bittern. More adaptable species, such as common moorhen and American coot would likely not be significantly affected.

Shorebirds
Upland sandpiper would likely respond in a similar manner as discussed under Alternative A.

Raptors
Birds of prey that are found in forested areas would benefit from an increase in their habitat, and would include barred owl, red-shouldered hawk, and northern goshawk. Breeding opportunities would likely improve for Copper's and sharp-shinned hawk, which prefer relatively dense forests with closed canopies for nesting (Wiggers and Kritz 1991, Trexel et al. 1999).

Migratory Songbirds
Grassland bird species (such as Henslow's sparrow) that require larger, contiguous areas of grassland would continue to benefit under this alternative.

Cerulean warbler would benefit from decreased wetland forest fragmentation and an increase in the acreage of this habitat (Hamel et al. 2005). This alternative would also favor other migratory birds that prefer larger forest tracts, such as wood thrush, as well as the least and Acadian flycatcher. Common vireo species on the Refuge (red-eyed and warbling) would benefit from increased forest cover (Banks et al. 1999, Dunford et al. 2002).

Additionally, with a decrease in forest edge, nest parasitism by brown-headed cowbird would be expected to decline (Howell et al. 2007).

Adverse

Waterfowl
This alternative would result in a reduction in available habitat for species that utilize hemi-marsh (teal, pintail, and wigeon). Additionally, during fall migration, there would not be water available in Oneida Pool during most years (for species that utilize forested wetlands). There would be less brood habitat available, resulting in a decline in productivity. An increase in disturbance would be expected due to non-motorized boat access on Ringneck Marsh.

Breeding Marsh Birds
Under this alternative, there would be a decline in species that require hemi-marsh (grebes, least bittern, and black tern).

Shorebirds
Since drawdowns would no longer occur, the acreage of mudflats would decrease, negatively affecting shorebird use of the Refuge. The succession of shrublands to forest would cause a reduction in woodcock, an upland shorebird.

Raptors
Although the acreage of open water would not change significantly, there would be some reduction in foraging efficiency for bald eagles (immature birds and nesting adults) and osprey as drawdowns that can concentrate fish would no longer be conducted.

Raptors that prefer grasslands, such as short-eared owl, northern harrier, and American kestrel could decline as the acreage of these foraging areas would decline. This could be off-set to some degree by the improved quality (larger tracts) of remaining grasslands which are more likely to be used for breeding, at least by northern harrier (Vickery et al. 1994). Cooper's and sharp-shinned hawk foraging would likely decrease as forest edge habitat declined (Palmer 1988). There would be a decline in edge habitat favored by red-tailed hawk.

Migratory Songbirds
Grassland birds that are not area sensitive would decrease, as most small grassland units would be converted to forest. As a result, species such as bobolink, savannah sparrow, grasshopper sparrow, and sedge wren would decline.

Black-billed cuckoo (Deeble 2001), golden-winged warbler (Hamel et al. 2005), yellow-breasted chat (Ricketts and Ritchison 2000), field sparrow, blue-winged warbler, and other migratory songbirds utilizing shrublands would decline as their habitat decreased.

Northern flicker numbers would be reduced as forest fragmentation declined, as would white-breasted nuthatch, also an edge species (Peck and James 1987).

Under this alternative, a potential 20 ft small residential wind turbine would be constructed on or adjacent to the VCS. Wind turbines have the potential of killing birds that may fly into the blades. Turbines placed at the refuge would consist of a "housed" design, where the blades are located inside a metal cage or be of a "vertical axis" design. These types of wind turbines are considered to be much safer for birds than wind turbines that have exposed blades. Impacts to wildlife are expected to be minimal.

Mammals

Mammals on the Refuge consist largely of relatively common species found across the northeast. Most of these species are able to utilize a variety of terrestrial woodland habitats, and their populations on the Refuge would not be expected to change under each alternative. Thus, the discussion of impacts to mammals will focus largely on species closely associated with aquatic, grassland, and interior forest habitats.

Impacts on Mammals Under Alternative A

Beneficial
No additional benefits, based on current impacts, are expected under this alternative.

Adverse
Drawndowns of impoundments would affect approximately 500 acres annually. These activities would displace muskrats, resulting in an increase in competitive interactions with animals in adjacent habitat.

Impacts on Mammals Under Alternative B

Beneficial
Muskrat populations would likely increase with higher quality marsh (hemi-marsh). Otters would benefit from improved water quality resulting from changes in upstream land-use practices and efforts to reduce impacts of deicing near Refuge waterways.

Tree bats may increase as some shrublands convert to forest and as trees mature, offering more roosting opportunities.

Adverse
Red squirrels would likely decline as conifer plantations are removed.

Grassland species (such as field mice, voles, and woodchuck) would have reduced habitat available to them.

Adverse impacts to muskrat would be similar to those described under Alternative A.

Impacts on Mammals Under Alternative C

Beneficial
Beaver populations could increase with free-flowing stream conditions. Otters would benefit from better water quality and improved fish populations.

Summer populations of tree bats would increase as forests expand.

Muskrat would no longer be displaced as drawdowns of impoundments are eliminated.

Adverse
Species dependent on grassland would decrease as the acreage of suitable habitat declines.

Muskrat would decline as the proportion of hemi-marsh decreases. Mink could be adversely affected as their prey (which include muskrat) declines.

Reptiles and Amphibians

Impacts on Reptiles and Amphibians Under Alternative A

Beneficial
Jefferson salamanders could benefit from impoundment drawdowns if these create fishless pools surrounded by cattails, which are favored breeding areas for this species (Regosin et al 2005).

Adverse
Under this alternative, Refuge partnerships would not improve upstream land-use practices and deicing operations on nearby county roads would continue to contribute salt to Refuge waterways. As a result, amphibians (including Jefferson salamanders) and turtles (including spotted turtle) would continue to be affected by low or declining water quality.

Additionally, frogging would be continued under fishing regulations, impacting populations of bullfrog and green frog.

Impoundment drawdowns could displace some turtles and frogs. While seeking suitable habitat, increased exposure could make some individuals more prone to predation.

Impacts on Reptiles and Amphibians Under Alternative B

Beneficial
Jefferson salamanders would benefit as described under Alternative A. Amphibians and turtles would benefit from improved water quality. Refuge frog populations would benefit as frogging for bullfrogs only would be permitted on the Refuge.

Adverse
The effects of impoundment drawdowns would be similar to those discussed under Alternative A. Frogging for bullfrogs would impact bullfrog populations.

Impacts on Reptiles and Amphibians Under Alternative C

Beneficial
Amphibian species (*Ambystoma* salamanders, wood frogs, western chorus frogs, spring peepers) that utilize forested wetlands would increase as more vernal pools become available. Wood turtles would benefit from improved riparian habitat and a potential increase in beaver ponds.

Adverse
Potential breeding areas (fishless ponds in cattail marshes) would no longer be available without drawdowns, possibly impacting Jefferson salamanders. Amphibian species that are found in emergent marshes (bullfrog, leopard frogs, and green frogs) would decline, as the acreage of more suitable hemi-marsh decreased. Additionally, frogging would be continued under fishing regulations, impacting populations of bullfrog and green frog.

There would also be a possible decrease in numbers of larger snapping turtle due to removal efforts. In New York, box turtle have been shown to favor areas of high habitat heterogeneity such as old fields (Madden 1975), areas that would decline under this alternative.

Fish

Impacts on Fish Under Alternative A

Beneficial
None expected.

Adverse:
Continued drawdowns would prevent a more diverse (both in terms of age classes and species) fish community from developing in impoundments. Currently, very few fish survive periodic drawdowns. For instance, northern pike use shallow water marshes as spawning and nursery areas, so water-level manipulations during the spring would affect their recruitment. Bluegill and other sunfishes would be similarly affected. Those that do are typically species that can tolerate muddy, oxygen-poor waters, such as bullhead and carp. Fish in Oak Orchard Creek and tributaries on the Refuge would continue to be affected by low or declining water quality for reasons discussed previously under that section.

Impacts on Fish Under Alternative B

Beneficial
Oak Orchard Creek fish populations would benefit from improved water quality.

Adverse
Fish communities in impoundments would continue to be dominated by species that can tolerate periodic drawdowns.

Impacts on Fish Under Alternative C

Beneficial
Under this alternative there would be no more managed drawdowns, and a more permanent fish community would develop in those areas and may include some top-level predators such as northern pike and bass, as well as black crappie, sunfish, yellow perch, and bullhead. Additionally, the improved hydrology of Oak Orchard Creek would benefit species that prefer a more free-flowing system. As under Alternative B, fish populations would benefit from improved water quality.

Adverse
None anticipated.

Invertebrates

The status of invertebrates on the Refuge is not well known. Hence, the discussion of impacts will largely center on the effects of large-scale, habitat alterations under each of the alternatives.

Impacts on Invertebrates Under Alternative A

Beneficial
None anticipated.

Adverse
Aquatic species (and those with aquatic larvae, such as dragonflies) would continue to be affected by current water quality. In addition, grassland species and those that feed in these areas (such as butterflies and bees) would decline as the acreage of this habitat is gradually decreased and foraging opportunities reduced. This would indirectly affect a host of insectivores (various birds, bats, spiders, etc.) by reducing their prey base.

Impacts on Invertebrates Under Alternative B

Beneficial
Aquatic invertebrates would benefits from upstream habitat management and other water quality improvement partnership efforts. Populations of species inhabiting hemi-marsh would also increase, as would forest-dwelling species.

Adverse
There would be similar impacts to those described under Alternative A.

Impacts on Invertebrates Under Alternative C

Beneficial
In addition to the benefits of improved water quality, there would be improved conditions for species found in free-flowing habitats and forested wetlands as these areas would increase.

Adverse
There would be a decline in species found in emergent marsh and grasslands.

Invasive Species

Impacts associated with the control of invasive species that are common to all alternatives are previously addressed in various sections (Water Quality, Soils, etc). In the section below, management of exotic plants under each of the alternatives is discussed.

Impacts on Invasive Species Under Alternative A

Beneficial
Under this alternative, the Refuge would continue to control or eradicate invasive plants in the impoundments, shrublands, forest, and grasslands. By preventing these non-native plants from becoming dominant, native plant community diversity and structure is maintained, benefitting wildlife.

Adverse
Monitoring and control of invasive plants would not occur in the section of Oak Orchard Creek between Route 63 and Knowlesville Road.

Impacts on Invasive Species Under Alternative B

Beneficial
In addition to the benefits described under Alternative A, the Refuge would monitor for and control outbreaks of non-native plants in the wetlands located between Route 63 and Knowlesville Road.

Adverse
None anticipated.

Impacts on Invasive Species Under Alternative C

Impacts would be similar to Alternative B.

Threatened and Endangered Species

The Refuge currently does not support any federally threatened or endangered species. However, as detailed in Chapter 3, the Refuge is being considered as a potential reintroduction site for the Karner blue butterfly, a grassland species. Potential impacts associated with this action are discussed. Consequences to State-listed species are evaluated under the taxonomic sections above.

Impacts on Threatened and Endangered Species Under Alternative A

Beneficial
None anticipated.

Adverse
Karner blue butterfly suitable habitat would likely remain unavailable on the Refuge.

Impacts on Threatened and Endangered Species Under Alternative B

Beneficial
Under this alternative, there is an improved potential for reintroduction of the Karner blue butterfly. The quality of the western grassland unit (closest to the Tonawanda Wildlife Management Area) would be improved through the removal of trees and planting of lupines. Indirect effects could include improved opportunities for wildlife observation and environmental education.

Adverse
None anticipated.

Impacts on Threatened and Endangered Species Under Alternative C

Impacts would be similar as described under Alternative B.

Rare Plants and Significant Ecological Communities

Rare plants on the Refuge include Georgian bulrush and smooth bur-marigold. Hemlock-northern hardwood forest, beech-maple mesic forest, and deep emergent marsh represent three rare vegetative communities on the Refuge.

Impacts on Rare Plants and Significant Ecological Communities Under Alternative A

Beneficial
Georgian bulrush and smooth bur-marigold could be maintained at small populations as part of hemi-marsh management.

Adverse
The status of Georgian bulrush and smooth bur-marigold would remain uncertain and we would not know how impoundment management might be affecting these species.

For hemlock-northern hardwood forest and beech-maple mesic forest, there would continue to be a lack of information (unknown age structure). There would also be no research projects associated with the Milford Posson Research Natural Area, which is a focal area for these rare forest types.

Deep emergent marsh, which occurs primarily along Oak Orchard Creek, would continue to be affected by poor water quality as partnership efforts to restore upstream riparian areas would not be realized. Likewise, deicing operations would continue to impact water quality, as environmentally friendly alternatives would not be sought. In addition, areas along Oak Orchard Creek would not be monitored or controlled for exotic plants, possibly allowing this rare community to further decline.

Impacts on Rare Plants and Significant Ecological Communities Under Alternative B

Beneficial
Under this alternative, impacts to rare plants would be similar to Alternative A. For the hemlock-northern hardwood and beech-maple forest there would be increased opportunities for research and, possibly, restoration.

Deep emergent marsh would benefit from improved water quality as a result of Refuge partnership efforts (upstream watershed restoration and working to implement less harmful deicing chemicals on public roads). Furthermore, exotic species would be monitored and controlled, reducing competition and benefitting native deep emergent marsh species.

Adverse
None anticipated under this alternative.

Impacts on Rare Plants and Significant Ecological Communities Under Alternative C

Beneficial
Same as under Alternative B.

Adverse
The loss of some suitable conditions could result in a decline of Georgian bulrush and smooth bur-marigold. These species require hemi-marsh conditions and benefit from periodic drawdowns for regeneration.

Socioeconomic Environment

Under each alternative, the Refuge would provide socioeconomic benefits by providing recreational opportunities and through the contribution of money to local economies through the following processes:

- purchasing of goods and services within the local community for Refuge operations;
- spending of salaries by Refuge personnel; and
- spending in the local area by Refuge visitors.

In addition, as required by the Refuge Revenue Sharing Act (16 U.S.C. 715s, as amended) the Refuge would continue to offset the tax losses by making an annual payment in lieu of taxes to the local townships. In our discussion, all monetary values are in 2009 dollars.

Impacts on Socioeconomics Under Alternative A

Beneficial
Currently, more than 43,000 visitors annually come to the Refuge. Over the 15-year plan, we would expect this number to go up by providing recreational opportunities for visitors to experience as well as increased use of public lands in general. This is already shown in the number of deer hunters visits experienced in 2006 to 2007 where we recorded an increase of 15 percent. They would continue to contribute to the local economy through consumption of goods and services, equipment rentals, and other expenditures associated with recreational opportunities made available on the Refuge. In addition, Refuge staff and work-related expenditures would continue to contribute to the local economy. Under this alternative, these recurring costs associated with salaries and annually completed Refuge projects would total approximately $725,000 per year, and some percentage of this would be spent in the surrounding area. A detailed analysis and discussion of how money associated with national wildlife Refuges makes its way through local economies can be found in, "Banking on Nature 2006: The Economic Benefits to Local

Communities of National Wildlife Refuge Visitation" (Carver and Caudill 2007). They estimated that, on average, approximately four dollars were generated in the local economy for every dollar spent by the Service.

Adverse
No adverse impacts are anticipated.

Impacts on Socioeconomics Under Alternative B

Beneficial
Increase in Refuge visitation is expected to be higher than in Alternative A. The overall number is unknown, but the refuge is already experiencing an increase in use as described as described in Alternative A. The Refuge visitation reached 70,000 in 2009 due to additional programs and more accurate ways in measuring use. This use is expected to increase slightly since the refuge is proposing expanding several programs in which the public can participate as well as increased outreach efforts. Increase in visitation would likely increase expenditures in the local economy. Construction of the expanded VCS would temporarily make several construction jobs available and building materials and other goods would have to be purchased from surrounding businesses. Furthermore, an additional 4.5 staff and increases in work-related expenditures from proposed projects under this alternative would increase the contribution to the local economy. Recurring salary and project costs would approximate $1,245,000 annually.

Adverse
No adverse impacts are anticipated.

Impacts on Socioeconomics Under Alternative C

Beneficial
Under this alternative, there would also be 4.5 staff positions added to current levels. Benefits would be similar to those under Alternative B, with an annual recurring cost estimated at $1,194,000.

Adverse
No adverse impacts are anticipated.

Refuge Cultural and Historical Resources

Potential impacts to cultural resources would be primarily associated with construction or impoundment projects, as discussed under each of the alternatives.

Impacts on Cultural and Historical Resources Common to all Alternatives

Beneficial
Under each of the alternatives, the Refuge would continue to protect known and potential archeological sites from unauthorized disturbance and looting.

Adverse
No adverse impacts are anticipated.

Impacts on Cultural and Historical Resources Under Alternative A

There are no projects planned under this alternative that would impact (beneficially or adversely) cultural resources on the Refuge.

Impacts on Cultural and Historical Resources Under Alternative B

Beneficial
Same as Alternative A.

Adverse
Possible risks to cultural resources on the Refuge could be associated with the construction of a non-motorized boat launch site along Oak Orchard Creek and the construction of Oneida Pool dike. However, we would continue to assess all projects for their potential to impact cultural resources and follow all compliance requirements.

Impacts on Cultural and Historical Resources Under Alternative C

Beneficial
Same as Alternative A.

Adverse
In addition to the projects listed under Alternative B, this alternative would include the extension of Onondaga Trail. Risks to cultural resources would be assessed for each project and assessed accordingly.

Refuge Administration

Work Force and Budget

Within all the alternatives, the Refuge would expand the VCS, estimated to cost $3,500,000. Under Alternative A, the current work force of six full time equivalent (FTEs) would be maintained. Refuge projects and base salaries would total approximately $725,000 annually. Alternative B would add 4.5 FTEs and combined with Refuge projects the recurring base cost would be about $1,245,000 annually. Similarly, Alternative C would add 4.5 FTEs, but Refuge project spending would be less than under Alternative B, and the annual recurring cost would be approximately $1,194,000. See Appendix F for a detailed breakout of the budget estimates under each alternative.

Facilities and Maintenance

Facilities and maintenance operations would remain largely the same under each alternative. The consequences of the expanded VCS are discussed under various resource sections, such as soils, water quality, and air quality. Each of the alternatives differs slightly with respect to public use improvements, and the impacts of those are discussed under the following sections. Overall, Refuge visitors would continue to benefit from new or upgraded facilities, and a variety of maintenance projects (repairing dikes and water control structures) would help habitat management efforts.

Refuge Public Use and Access

The following section discusses impacts to the six priority public uses (hunting, fishing, wildlife observation and photography, interpretation, and environmental education) as well as other facilitative recreational opportunities. As described previously, Iroquois NWR receives a moderate and increasing level of public use with an average of 43,000 visits per year, offering public access to premiere sites with outstanding opportunities for wildlife-dependent recreational activities. Since refuge lands are held in the public trust by the Service, we seek to permit access for compatible, priority wildlife-dependent public uses unless, 1) Federal trust resources would be impacted; 2) the activity would detract from achieving refuge purposes or the Refuge System mission; or 3) administrative resources are not available to ensure a safe, quality experience.

Impacts on Public Uses and Access Common to all Alternatives

Beneficial

Having well-maintained visitor facilities and programs is important for encouraging and welcoming visitors to public lands. It reflects on the Service's responsibility to spend taxpayer dollars effectively and efficiently. It is also important to protect public safety and refuge resources, both of which can be directly impacted or compromised when facilities deteriorate. Under all alternatives, we would continue to take this responsibility seriously and insure all facilities are up to Service standards and safe conditions.

The beneficial impacts of providing at least the existing level of wildlife-dependent activities will help to meet demands for outdoor recreation and education, as documented in the New York Statewide Comprehensive Outdoor Recreation Plan (SCORP) that is prepared periodically by New York State Parks, Recreation and Historic Preservation. Hunters, anglers, birders, and photographers would find high quality opportunities to engage in their favored pastimes. Refuge staff believe that visitor use is increasing over time as local residents and visitors become more aware of refuge opportunities. All six priority public uses would continue to be offered on the Refuge, benefitting visitors of all ages, skill levels, and socioeconomic backgrounds.

Adverse
Under each alternative, the Refuge Headquarters/VCS would be open on weekdays and weekends in the spring and fall. There would not be opportunities for visitors to come to the office on the weekends in the summer and winter.

Some conflicts between different public uses are expected. During hunting seasons, wildlife observers or photographers may not be provided with an optimal experience in waterfowl areas. Additionally, hunters may sometimes disturb other users when they get close to or on trails, areas that are off-limits for that use. Likewise, non-hunters could stray off trails, disturbing hunters and causing potential safety issues. Overall, information provided at the VCS and the posting of signs at various access points during the hunting season would keep these adverse consequences to a minimum.

Impacts on Public Use and Access Under Alternative A

Beneficial
The current level of visitor facilities and programs will continue to provide residents and visitors opportunities to experience nature in all seasons. As described before, Refuge staff assume that as local residents and visitors become even more aware of refuge opportunities, that visitor use will likely have a slight increase over time. We do not anticipate that this increase would adversely affect resources or their use or enjoyment by visitors, because the increases we project for the refuge would be well distributed and minimal.

Adverse
The visitor services area is outdated and unable to fully meet the current and future needs of visitors. As mentioned in Chapter 1, during public scoping for this plan, area residents requested that the Refuge increase opportunities and access for recreational activities (e.g., boating, hunting, and wildlife photography). Additionally, some people would also like to see more trails, more youth activities, and more access for persons with disabilities.

Impacts on Public Use and Access Under Alternative B

Beneficial
Alternative B would increase opportunities for wildlife-dependent public use and access by enhancing those programs and facilities at the refuge. Providing new public recreation opportunities would enable people to participate in outdoor activities where they otherwise could not. As a byproduct of this new interaction, increased public awareness, improved community relations and enhanced support of the refuge mission would result.

As we state in Chapter 2, we propose a new Headquarters/visitor contact facility at the site of the current building. We predict that a newer facility would increase public awareness of, and visitation to, the refuge, and would enable staff to provide better customer service.

Adverse
Under this alternative, areas currently open (July 16 – February 28 or 29) would be closed to the public, with the exception of permitted hunters or under a Special Use Permit. Therefore, compared with Alternative A, there would be a decreased opportunity to visit off-trail areas of the Refuge. We would expect a certain level of inconvenience during the actual demolition or construction of refuge facilities. Our use of practices that alert and safeguard refuge visitors should mitigate those effects somewhat. The adverse effects generally are short-term, and more than offset by the long-term gains in public education and appreciation.

Impacts on Public Use and Access Under Alternative C

Impacts would be similar to those described under Alternative B.

Hunting

Impacts on Hunting Under Alternative A

Beneficial
The Refuge would continue to provide a range of hunting opportunities for hunters of all skill levels.

Adverse
Deer hunts could become overcrowded because their numbers would remain unrestricted. In addition, the current permit system for all hunts would not be standardized.

Impacts on Hunting Under Alternative B

Beneficial
Under this alternative, the permit process and fees schedule would be more standardized. There would be increased opportunities for waterfowl hunting following implementation of "free roam" areas and because Cayuga Pool would be kept open to waterfowl hunting during part of the deer season. The potential for a deer quota hunt would create less crowding, resulting in an improved quality hunting experience. There would be an overall increase in the number of permits from 50 to 85 offered for the spring turkey season. The quality of youth turkey and waterfowl hunting could potentially improve as these hunts would start prior to adult hunting season. Hunting early in the season could improve a hunter's chance of success because game is less wary and could be more accessible. Additionally, there would be improved opportunities for accessible hunting for those people that have disabilities.

Adverse
Onondaga Trail would no longer be available for hunter access under this alternative as it would be closed throughout the entire hunting season. This alternative also would result in a decreased opportunity to hunt other migratory birds as they would not be hunted

during the waterfowl season. There would be a potential decrease in regular firearm deer hunting opportunities if the quota system were implemented. Although the permit limit number would increase to 85 permits, each individual would only have at most 11 days to hunt the refuge during the spring turkey season.

Impacts on Hunting Under Alternative C

Beneficial
As under Alternative C, the permit process and fees would be more standardized. This alternative would result in improved deer hunting opportunities for hunters with disabilities and youth hunters. The quality of deer hunts would be expected to improve following implementation of a quota system. The youth turkey and waterfowl hunting quality would potentially be improved by scheduling these prior to adult hunts. In addition, a fall turkey season would be opened in correspondence with the closure of the spring turkey season and thus increasing fall hunting opportunities.

Adverse
The deer quota hunt would reduce hunting opportunities. Closing the spring turkey season would reduce the opportunity for turkey hunting and could increase the potential for conflict with other hunters (for instance, as the number of fall turkey hunters increases). Waterfowl hunting opportunities would decline as a result of changes in Oneida Pool (loss of open water and marsh). There would be decreased opportunities to hunt other migratory birds as well.

Fishing

Impacts on Fishing Under Alternative A

Beneficial
Adequate fishing opportunities would be available on the Refuge under Alternative A.

Adverse
None expected.

Impacts on Fishing Under Alternative B

Beneficial
Under this alternative, there would be increased opportunities for accessible fishing due to the addition of a fishing pier.

Adverse
Frogging for bullfrogs only would be permitted on the Refuge.

Impacts on Fishing Under Alternative C

Beneficial
There would be increased access to fishing areas via non-motorized boats on Ringneck Marsh after the breeding and nesting season.

Adverse
No adverse impacts to fishing would be expected under this alternative.

Wildlife Observation and Photography

Impacts on Wildlife Observation and Photography Under Alternative A

Beneficial
Adequate opportunities for wildlife observation (overlooks, trails) would continue to be provided.

Adverse
There would not be adequate photography opportunities provided under this alternative. Hunting on Onondaga Trail during certain times of the year would limit wildlife observation and photography opportunities at this location.

Impacts on Wildlife Observation and Photography Under Alternative B

Beneficial
Under this alternative, there would be increased and higher quality opportunities for observing and photographing wildlife. The following activities that facilitate wildlife observation and photography would continue to be allowed: ski/snowshoe, bicycling, jogging, and hiking. All these would be permitted on authorized trails only. Closing Onondaga Trail to hunters throughout the year would benefit wildlife observation and photography opportunities. A new trail with overlook would be created at the VCS as well as two new photography blinds would be installed at more accessible locations to replace two that have deteriorated after many years.

Adverse
No negative impacts would be expected.

Impacts on Wildlife Observation and Photography Under Alternative C

Beneficial
Same as Alternative B.

Adverse
Same as Alternative B.

Environmental Education, Interpretation, and Outreach

Impacts on Environmental Education, Interpretation, and Outreach Under Alternative A

Beneficial
Approximately 2,000 students per year would continue learning about basic biology, as well as wetlands and migratory birds. A growing percentage of the local and regional community would continue to become aware of the Refuge through its outreach program.

Adverse
Environmental education programs would be unable to accommodate more students. With regard to interpretation, the Refuge would not be able to meet demand. Quantitative data regarding the number of people reached through Refuge outreach efforts would continue to be unavailable. In addition, the latest technological tools to reach a wider audience would not be utilized. Some other users could change their planned activities due to crowds associated with school groups, but this would be expected to have a minimal effect as they could utilize other trails on the Refuge.

Impacts on Environmental Education, Interpretation, and Outreach Under Alternative B

Beneficial
This alternative would result in increased and higher quality environmental education and interpretive programs. Indirect benefits would include a greater understanding by the public of the importance of the Refuge and its management. There would be increased and more focused outreach resulting in a greater awareness of the Refuge, the Refuge System, and the Service.

Adverse
None are anticipated.

Impacts on Environmental Education, Interpretation, and Outreach Under Alternative C

Beneficial
We would expect an increase over those described under Alternative B.

Adverse
Same as Alternative B.

Other Activities

Impacts of several non-priority uses are discussed below. Those that are permitted typically facilitate wildlife observation.

Skiing/Snow shoeing
Minimal impacts to wildlife or habitats are expected due to the time of year. Some other user (e.g. hunters and trappers) conflicts may occasionally occur, but are expected to be minimal.

Bicycling
Since this would only be allowed on public roads and Feeder Road, minimal disturbance to wildlife and birds is expected.

Hiking
This activity would be restricted to trails and would cause a minimal disturbance to migrating, breeding, and nesting birds.

Activities not allowed on the Refuge include, but not limited to:

- snowmobiling
- all-terrain vehicle (ATV) use
- biking on trails, other than Feeder Road
- walking dogs off a leash
- picking plants
- camping
- horseback riding
- campfires

Berry picking causes some disturbance to wildlife and decreased food resources available to birds and other wildlife and would no longer be permitted under Alternative B and C.

Refuge Partnerships

Impacts on Refuge Partnerships Under Alternative A

Beneficial

Landscape Scale Conservation
Under this alternative, the Refuge would continue to foster relationships with partners to build a science-based, ecosystem-level conservation planning approach.

Support for Refuge Programs
We would continue to garner grassroots support from the Friends group, volunteers, and other local partners. The Refuge's relationship with the Iroquois Job Corps Center would allow continued training for students, with the Refuge benefiting from building projects, office support, and assisting with outreach programs such as Spring Into Nature.

Research
The current level of research projects would be maintained (approximately two research projects annually) which provide increased information available on which to base future management decisions.

Adverse
No impacts anticipated under Alternative A.

Impacts on Refuge Partnerships Under Alternative B

Beneficial

Landscape Scale Conservation
Same as Alternative A.

Support for Refuge Programs
This alternative would result in an increased number of local partners, in particular they would increase through watershed protection projects.

Research
Under this alternative, there would be increased opportunities for research projects on the Refuge.

Adverse
None anticipated.

Impacts on Refuge Partnerships Under Alternative C

Consequences are expected to be similar to those described under Alternative B.

Cumulative Impacts

According to the CEQ regulations on implementing NEPA (40 CFR 1508.7), a cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes the other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time. This cumulative impacts assessment includes the actions of other agencies or organizations, if they are interrelated and influence the same environment. Therefore, this analysis considers the interaction of activities at the Refuge with other actions occurring over a larger spatial and temporal frame of reference.

Cumulative Impacts on the Physical Environment

Air Quality
We expect there to be cumulative positive effects on air quality through the restoration of

habitats. Although the Refuge would continue to use prescribed fires for maintaining certain habitats, we anticipate that air quality impacts associated with those actions would be temporary and localized.

With respect to climate change, we believe that the Refuge would be a net carbon sink over the 15-year planning period, with Alternative C likely having the greatest sequestration capacity due to the conversion of impounded wetlands, grasslands, and shrublands to forest. The amount of carbon that would potentially be released by the Refuge as a result of associated energy use was not estimated for this EA. However, under each alternative, the Refuge would continue to lower its carbon emissions. As we work to implement many of the strategies for achieving Service-wide carbon neutrality by 2020 (USFWS 2009c: Draft Strategic Plan for Climate Change), Refuge energy use is expected to decline. These actions would include conversion to hybrid vehicles, upgrading energy efficiencies in facilities, video-conferencing, and green purchasing. These actions, combined with those of other Service offices and the federal government in general, would likely result in a beneficial reduction in the rate of greenhouse gas emissions nationally.

In terms of preparing for the predicted impacts of climate change, each management alternative, but especially Alternatives B and C, would contribute to increasing resiliency and redundancy in the landscape. They incorporate strategies that improve the ability of an area to adapt to more extreme weather events and shifting climate zones which are important components of the response to this crisis, as recommended in various regional, national, and international reports:

- Confronting Climate Change in the Great Lakes Region: Impacts on our Communities and Ecosystems (Kling et al. 2003)
- Draft Strategic Plan for Climate Change (USFWS 2009)
- Preliminary review of adaptation options for climate-sensitive ecosystems and resources. (U.S. Climate Change Science Program 2008)
- Climate Change 2007: Impacts, Adaptation and Vulnerability (International Panel on Climate Change 2007)

Some of these strategies (which are proposed under various alternatives in this draft) include increasing connections between wetlands and waterways to improve their ability to withstand frequent floods and droughts; minimizing or reversing habitat fragmentation (on the scale of the Refuge and regionally, such as through off-site habitat improvements in conjunction with partners); and improving water quality.

Water Quality and Soils

We anticipate that there would be positive cumulative impacts on water quality and soils as a result of collaborative partnerships among the Oak Orchard Creek watershed landowners, citizen groups, Oak Orchard Watershed Protection Alliance, and state and federal partners. That is particularly relevant to reducing phosphorus loads to Lake Ontario and improving upstream land uses to reduce soil erosion and sedimentation.

Additionally, partnership efforts to find environmentally friendly deicing practices would help reduce sodium concentrations in the watershed. These positive benefits would be realized primarily under Alternatives B and C.

We predict no major, adverse, cumulative impacts on water quality and soils under any of the alternatives. We would use best management practices (BMPs) on any roads, trails, or other infrastructure construction sites to ensure those impacts are avoided or minimized. Any forest management that would take place will be done so that all BMPs are followed and monitored closely. All projects are few, and dispersed on the Refuge, so their local effects would not be additive.

Noise

No cumulative impacts to noise are anticipated as a result of any of the alternatives.

Cumulative Impacts on the Biological Environment

Each of the alternatives would maintain or improve biological resources on the Refuge and in the Oak Orchard Creek and Lake Ontario watersheds. The combination of our management actions with our state, federal and university partners could result in beneficial cumulative effects by

- increasing protection and management for federal- and state-listed threatened and endangered species;
- protecting sensitive wetlands habitats;
- maintaining grasslands;
- reducing nuisance, invasive plants; and
- improving water quality.

Habitat improvements under the alternatives should benefit rare or declining species and species listed as threatened or endangered. In particular, we target migratory waterfowl, breeding marsh birds, bald eagles, and migratory landbirds. Grassland management would benefit a variety of bird species and other wildlife that require this regionally declining habitat. Furthermore, invasive species monitoring and control efforts would limit the spread of these exotics.

Under each alternative, we would continue to allow activities that result in the direct loss of individual wildlife; hunting, fishing, and furbearer management. While hunting and fishing fall under the priority public use category, trapping would be permitted to serve as a management tool. We describe the site-specific impacts of these programs earlier in this chapter and in Appendix B, "Compatibility Determinations." In our professional judgment and experience, we do not think those programs would cause a significant cumulative effect on the respective populations of the wildlife species harvested, for reasons discussed below.

Under the Migratory Bird treaty Act, the Service regulates the take of migratory birds through Migratory Bird Hunting Frameworks. These guidelines provide season dates, bag limits, and other options for the States to select that should result in the level of harvest determined to be appropriate based upon Service-prepared annual biological assessments detailing the status of migratory game bird populations. More details on the current population status of migratory waterfowl and other game species is provided in annual monitoring reports made available by the USFWS Migratory Bird Program at http://www.fws.gov/migratorybirds/NewsPublicationsReports.html. The Refuge adopts State bag limits, although it has the option to be more restrictive, if deemed necessary. Because seasonal bag limits are set at what are believed to be sustainable levels based on annual national and regional population data, as well as other factors, hunting of waterfowl and other migratory birds (i.e. woodcock) on the Refuge would not be expected to have a significant cumulative impact on the populations of those species.

The following non-migratory bird species would continue to be hunted under other programs: ring-necked pheasant, ruffed grouse and wild turkey. Ring-necked pheasants are non-native, and although their decline would adversely affect some hunting opportunities, it would not have a negative biological impact. The cumulative effects of turkey hunting are expected to be minimal. Almost all of the game harvested would come from the Refuge or nearby WMA populations and would not have regional or national consequences to the species. Ruffed grouse are declining in the State, and locally their numbers are considered low, but stable due to lack of suitable habitat. Hunting would not affect populations on a larger scale and cumulative impacts are not expected.

In much of the northeast, deer populations continue to increase and have reached densities in some areas that are above the carrying capacity of the habitat. A deer harvest is essential in helping to maintain the herd at or below the carrying capacity of its habitat. When deer overpopulate, they over-browse their habitat, and can completely change the species composition of a forest, in addition to reducing its overall biodiversity (Cote et al. 2004). Tree seedlings can be killed by over-browsing, limiting recruitment. The failure of forests to regenerate due to over-browsing by deer would have negative impacts on future resident and migratory populations of native wildlife. Over-browsing by deer can also affect nesting songbirds in upland areas. A study conducted in Pennsylvania showed that both species diversity and abundance declined in areas with high densities of deer as a result of reduced nesting habitat (deCalesta 1994). Additionally, deer overpopulation can lead to outbreaks of devastating diseases such as hemorrhagic disease, bluetongue, and chronic wasting disease. Furthermore, overpopulation leads to starvation, more numerous car-deer collisions, and poorer herd health overall. Regulated hunting has proven to be an effective deer population management tool and has been shown to be the most efficient and least expensive technique for removing deer and maintaining deer at desired levels (Northeast Deer Technical Committee 2009).

Deer have restricted home ranges and local hunting efforts would not affect regional populations. The deer population in Wildlife Management Unit 8G, which encompasses the Refuge, is approximately 15-30 deer per square mile. This is about average for New York State. The Refuge is likely on the high end of that range due to the amount of dense

cover available to deer. Furthermore, the deer population in the vicinity of the Refuge is still considered higher than optimal, indicating that current hunting levels are not affecting the population substantially (NYDEC 2009d). This information confirms that decades of deer hunting on the Refuge and surrounding private lands has not had a local cumulative adverse effect on the deer population. Therefore, continuing to allow hunting on the Refuge should not have negative cumulative impacts on the deer herd; but instead, should support better overall herd health and maintain or increase habitat biodiversity.

The mammal species that could be taken under the small game hunting and furbearer management programs include gray squirrel, cottontail rabbit, weasel, raccoon, opossum, coyote, skunk, red/gray fox, muskrat, beaver, and mink. Populations of these species are believed to be stable on the Refuge and nearby surrounding areas, and their regulated take is not anticipated to affect regional or national levels. No cumulative impacts are expected. Some positive effects, as discussed previously in this chapter, include reduced predation on migratory bird eggs and nestlings by predatory game. In addition, the management of muskrat would help maintain hemi-marsh conditions, benefitting waterfowl and breeding marsh birds. Furthermore, damage to dikes and other Refuge infrastructure caused by muskrat and beaver would be minimized.

Fishing would not have a significant cumulative impact on the species taken. None of the species found on the Refuge are considered rare, and their numbers are believed to be stable. Fished species on the Refuge consist of locally reproducing populations and their take would not comprise a regional impact. Frogging would continue under Alternatives A and C, with a minimal impact to local populations.

Public use opportunities that do not include the direct take of fish and wildlife (wildlife observation and photography and environmental education) would continue under each alternative. Each of these activities has some level of disturbance to wildlife associated with them, even though they occur on a relatively limited area of the Refuge (trails, overlooks, fishing areas, etc.). Breeding and nesting birds can be affected, affecting productivity. Likewise, resting or foraging birds that are using the Refuge during their migration could also be disturbed, negatively affecting their energetics. During migration, birds have limited energy (fat) reserves and a reduction in resting or foraging opportunities due to human disturbance can increase their risk of mortality due to exhaustion or starvation. However, cumulatively, these impacts are not expected to be significant as levels of disturbance are expected to be of low intensity and limited to a relatively small area of the Refuge.

Cumulative Impacts on the Socioeconomic Environment

Cumulative impacts on the socioeconomic environment are not expected to be significant under any of the alternatives.

Cumulative Impacts on the Cultural Resources

The overall cumulative effect of each alternative is expected to increase the protection and interpretation of cultural resources on the Refuge.

Relationship between Short-term Uses of the Human Environment and the Enhancement of Long-term Productivity

NEPA Section 102(C)(iv) (CEQ Regulations Part 1502.16) requires Federal agencies to disclose the relationship between local short-term uses of the human environment and the maintenance and enhancement of long-term productivity. The Service expects that the proposed alternatives would lead to long-term productivity through the life of the CCP (15 years). This discussion focuses on the tradeoffs between short-term environmental costs and long-term environmental benefits.

In this section, we consider the relationship between local, short-term uses of the human environment and maintaining the long-term productivity of the environment. By long-term, we mean that the impact would extend beyond the 15-year period of this draft CCP/EA.

Under all of the alternatives, our primary aim is to maintain or enhance the long-term productivity and sustainability of natural resources on the Refuge, in the Oak Orchard Creek watershed, and migratory birds and other far-ranging species, across the whole range of each of the species.

Habitat protection and restoration actions across all alternatives often entail short-term negative impacts to ensure the long-term productivity of the Refuge. Many of the cyclic management actions in the alternatives, namely, prescribed burning, controlling invasive plants and animals, and managing grasslands, can have dramatic short-term impacts. Those include the direct mortality of some plants and animals, the displacement of species, and the temporary displacement or cessation of certain types of public use. However, the near-term and long-term benefits of those actions generally offset their short-term impacts, practices that often mimic the natural and thus sustainable processes necessary for long-term habitat health. We describe many of them in more detail earlier in this chapter, under their applicable issues or concerns.

As we discussed in “Impacts on Public Use,” the short-term disruption that habitat management causes in the current means, locations, and timing of public uses, should, in the long term, help sustain the greatest diversity of opportunity for the greatest number of people. In addition, diverse opportunities for public use should provide the best long-term positive economic impact on local communities. That mirrors the widely accepted premise that maintaining diversity in natural systems helps ensure their long-term resiliency. We would design our proposed programs in outreach and environmental education to explain our actions and what some may perceive as inconveniences to visitors may encourage visitors to be better stewards of our environment.

In summary, we predict that the alternatives would contribute positively in maintaining or enhancing the long-term productivity of the environment with minimal inconvenience or loss of opportunity for the American public.

Unavoidable Adverse Effects

Unavoidable adverse effects are the effects of those actions that could cause harm to the human environment and that cannot be avoided, even with mitigation measures. All of the alternatives would result in some minor, localized, unavoidable adverse effects. For example, prescribed fires to maintain grasslands would produce minor, short-term, localized, adverse effects. Increased visitation could have unavoidable effects. However, we do not believe that any of these effects would rise to a significant level.

Many of the habitat management and facility construction projects in the alternatives have a certain level of unavoidable adverse effects, especially during the actual construction. Those effects are mitigated to some degree by the use of practices and precautions that safeguard water quality, avoid sensitive or irreplaceable habitats, or time the actions or include features to avoid or minimize impacts on fish and wildlife. The adverse effects generally are short-term and more than offset by the long-term gains in habitat quality and fish, wildlife, and plant productivity.

Some habitat types on the Refuge would be adversely affected. In Alternative C, for example, if our analysis determines that the purposes of the Refuge are better served by allowing the fields to transition to shrub and forest, the fields of grassland would convert to shrub or forest habitat. That would affect the wildlife that depends on grassland habitat. However, it is important to recognize that in virtually all situations where that might happen, the original, historic habitat type was likely forest.

Forest habitat is also likely to undergo changes in species composition and structure as we create a more natural forest composition in pine plantations and other upland forests. We know of no species tied specifically to those planted forests, so we do not expect significant adverse consequences.

All of these unavoidable adverse effects on the physical and biological environment would be relatively local and more than offset by the long-term benefits for the diversity and ecological health of the broader landscape.

Some impacts on certain individuals or neighbors are unavoidable, but our responsibility is to provide equal opportunities to the American public, not a select few. We believe we have sought a fair balance in minimizing and mitigating adverse impacts while providing quality recreational opportunities to the public. All of what we propose in the arena of public use results from public involvement and input during the planning process.

Potential Irreversible and Irretrievable Commitments of Resources

NEPA Section 102(C)(v) (CEQ Regulations Part 1502.16) requires Federal agencies to consider any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Irreversible commitments of resources are those that cannot be undone, except perhaps in the extreme long-term. One example is an action that contributes to a species' extinction. Once extinct, it can never be replaced and is an irreversible loss. By comparison, irretrievable commitments of resources are those that are lost for an extended period of time, but could be undone given sufficient time and resources, although there may be a loss in productivity or use for a time. An example of an irretrievable commitment is converting what was once a mature forest and actively managing and maintaining it in an early successional forest habitat condition. If, for some reason, that early successional forest habitat was no longer an objective, those acres could progress gradually to mature forest again over a period of 70 or more years, or we could determine it best to expedite that reversion by planting shrubs and trees and controlling invasive plants.

We do not believe there are any actions proposed under any alternative that are irreversible. With regards to irretrievable actions, only a few examples fall into this category and primarily relate to the construction of administrative and visitor facilities, such as buildings, roads and trails. They are considered irretrievable because in the future, any facility we construct could potentially be dismantled and the site restored; however, while standing, they represent a loss in habitat productivity.

All the alternatives include plans to build additional space onto the existing VCS, and Alternatives B and C propose additional trails, fishing piers and docks and parking areas. We describe the site-specific impacts of those actions earlier in this chapter. Based on the impact footprint of those facilities, in comparison to other developments in this rural landscape, and coupled with the benefits we believe would result from engaging the community and visitors in natural resources, we do not believe a significant cumulative impact would occur.

Environmental Justice

President Clinton signed Executive Order No. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" on February 11, 1994, to focus Federal attention on the environmental and human health conditions of minority and low-income populations, with the goal of achieving environmental protection for all communities. The order directs Federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high, adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The order is also intended to promote nondiscrimination in Federal programs substantially affecting human health and the environment, and to provide minority and low-income communities

access to public information and participation in matters relating to human health or the environment.

Overall, we expect none of the alternatives would place disproportionately high, adverse environmental, economic, social, or health effects on minority or low-income persons. Our programs and facilities are open to all who are willing to adhere to the established Refuge rules and regulations, and we do not discriminate in our responses for technical assistance in managing private lands.

Refuge Resource or Program	Alternative A (Current Management)	Alternative B	Alternative C
		Physical Environment	
Hydrology	Connectivity of Seneca Pool to Oak Orchard Creek would continue to benefit the areas hydroperiod.	Seneca Pool hydroperiod would improve with partial dike removal. Refuge partnership efforts to restore upstream riparian buffer zones would create less extreme water levels in Oak Orchard Creek.	In addition to B, improved hydrology in Seneca Pool.
Soils	Some low intensity, short duration negative effects from annual use of herbicides and prescribed fire would be expected.	In addition to A, low intensity, short duration negative effects from public use improvement projects.	Same as B.
Air Quality	Prescribed burning would have a minimal impact on air quality. A gradual conversion to hybrid vehicles and other energy conservation efforts would reduce the level of fossil fuel use.	Same as A.	Same as A.
Water Quality	Oak Orchard Creek would continue to be affected by low or declining water quality.	Upstream habitat restoration efforts and other partnership efforts would help improve water quality in Oak Orchard Creek.	Same as B.
Noise	Noise impacts associated with, traffic, and firearms are expected to be of relatively short duration, attenuated by vegetation, and therefore, minimal.	In addition to A, noise impacts associated with construction of the Visitor Contact Station (VCS) and other public use projects will be short in duration and therefore minimal	Same as B.
Visual Resources	No impacts are anticipated under this Alternative.	Conversion of the Refuge headquarters into a VCS would not create any significant visual impacts.	Same as B.
		Biological Environment	
Habitats	Emergent marsh acreage and quality would not change. Open water acreage would remain at current levels. Mudflats would stay the same most years, depending on rainfall.	Emergent marsh acreage would remain at current levels, and there would be an increase in desired hemi-marsh conditions. Open water: same as A. Mudflats: same as A.	Decrease emergent marsh acreage and a smaller component would be hemi-marsh. Open water would decline by approximately 19% but would remain above the 250-acre minimum. The acreage of mudflats would decline in

Refuge Resource or Program	Alternative A (Current Management)	Alternative B	Alternative C
	Forested wetlands would remain at current levels. Oak Orchard Creek riparian wetlands would continue to be impacted by poor or declining water quality and potential invasive plants. Although a range of grassland types would continue to be provided, fragmentation would remain an issue. The acreage of shrubland would decline due to succession to forest. Upland forest would increase in acreage. Non-native conifers associated with plantations would gradually expand their range.	Age structure and diversity of forested wetlands would improve; their acreage would remain as under A. Improved water quality and surveillance and control of invasive vegetation would benefit Oak Orchard Creek riparian wetlands. A minimal amount of grassland would be lost, and there would be decreased fragmentation and habitat quality would increase. Shrubland acreage would decline, but not as much as under A. There would be an increased acreage and diversity of age classes of upland forests. Plantations would be converted to native upland forests.	spring and their availability would be less reliable. Forested wetland acreage and quality would increase. In addition to positive consequences under B, riparian wetlands of Oak Orchard Creek would benefit from a more free-flowing system. More grassland would be lost than under B, but remaining areas would be less fragmented and of higher quality. Over 90% of the shrubland on the Refuge would succeed to forest. Upland forests: same as B. Plantations: same as B.
Birds	Waterfowl and breeding marsh birds would continue to benefit from impoundment management. Shorebirds would remain stable. Bald eagles and osprey would benefit. Raptors and other birds favoring edge habitat would benefit. Shrubland birds would gradually decline. Grassland species, particularly non-area sensitive birds would remain stable.	Waterfowl and breeding marsh bird numbers would remain stable or increase. Shorebirds would benefit as under A. Bald eagles and osprey numbers would not change. There could be a slight decline in some edge-species. Shrubland birds would gradually decline. Area-sensitive grassland birds would benefit. A 20 foot, “housed” wind turbine located at the Refuge headquarters site would be safe for birds.	Waterfowl, breeding marsh bird, and shorebird numbers would gradually decline. Bald eagle and osprey would remain as under A. Edge species, shrubland, and grassland birds would decline. Interior forest species would increase. A 20 foot, “housed” wind turbine located at the Refuge headquarters site would be safe for birds.
Mammals	Most mammal numbers would remain unchanged, although aquatic species could continue to be impacted by poor or declining water quality in Oak Orchard Creek.	Most mammals would remain stable, with aquatic species increasing. Grassland species could decline slightly.	Same as B, except that grassland species would further decline.

Refuge Resource or Program	Alternative A (Current Management)	Alternative B	Alternative C
Reptiles and Amphibians	Aquatic species could continue to be impacted by poor or declining water quality in Oak Orchard Creek.	Aquatic species would benefit.	Same as B.
Fish	Water quality in Oak Orchard Creek would continue to impact fish. Continued drawdowns would prevent a more permanent fish community from becoming established in some impoundments.	Fish would benefit from improved water quality in Oak Orchard Creek. Continued drawdowns would prevent a more permanent fish community from becoming established in some impoundments.	Fish would benefit from improved water quality in Oak Orchard Creek and more permanent fish communities would develop in some impoundments.
Invertebrates	Aquatic invertebrates would be unchanged by current water quality in Oak Orchard Creek.	Aquatic invertebrates would benefit from improved water quality in Oak Orchard Creek.	Aquatic invertebrates would benefit from improved water quality in Oak Orchard Creek. Grassland species would decline and forest species increase.
Threatened and Endangered Species	Habitat would remain unavailable for Karner blue butterfly reintroduction. Status of most State-listed species on the Refuge would remain unchanged.	Opportunity for Karner blue butterfly reintroduction would improve. Conditions for several State-listed species would improve through decreased fragmentation and improvements in habitat quality.	Opportunity for Karner blue butterfly reintroduction would improve. Habitat conditions for some State-listed species would improve (forested), while conditions for others would decline (grassland, marsh and shrublands).
Invasive Species	While invasive species in impoundments and grasslands would be controlled, the potential for infestations in other areas would increase.	Management of invasive species would increase.	Same as B.
Rare Plants and Significant Ecological Communities	Rare plants would remain unchanged due to refuge management. Significant ecological may be adversely affected by poor water quality and lack of information on their condition.	Impacts to rare plants similar to A. Significant ecological communities would benefit from improved water quality and increased knowledge from research.	Rare plants would decline as refuge drawdowns would be eliminated. Impacts to significant ecological communities similar to A.
Impacts of Global Warming	Gradually addressing need for increased baseline data collection and monitoring. Fragmentation would remain a concern. Hydrological connectivity and water quality would not be sufficiently addressed.	Need for increased, GIS-based baseline data collection and monitoring being addressed. Reduced fragmentation would increase resiliency. Improved hydrological connectivity and water quality would buffer against some of the anticipated changes in extreme rainfall and associated consequences.	Same as B.
Cultural Resources			

Refuge Resource or Program	Alternative A (Current Management)	Alternative B	Alternative C
Archeological and Historic Resources	Compliance with the Archaeological Resources Protection Act, the Native American Graves Protection & Repatriation Act, and the National Historic Preservation Act.	Same as A.	Same as A.
		Socioeconomics	
Economic Impacts	Currently, more than 43,000 visitors annually to the Refuge continue to contribute to the local economy through consumption of goods and services, equipment rental, guide services.. Refuge staff and work-related expenditures would continue to contribute to the local economy. Annual recurring costs (salaries and projects) would be approximately $725,000.	Increase in Refuge visitation to an estimated 70,000 over 15 years would increase expenditures in the local economy. An additional 4.5 staff and increases in work-related expenditures from proposed projects under this alternative would increase the contribution to the local economy. Annual recurring costs (salaries and projects) would be approximately $1,245,000.	Impact would be the same as B. Refuge visitation would rise to 70,000 per year. The Refuge would add 4.5 staff and annual recurring costs would be about $1,194,000.

Public Use			
Hunting	Refuge currently providing a range of hunting opportunities for hunters of all skill levels. Current permit system is not standardized. Deer hunts are sometimes considered overcrowded because it is unrestricted.	Permit process and fees more standardized. Increased opportunity for waterfowl hunting. Less crowding, resulting in improved quality hunting experience. Youth turkey and waterfowl hunting quality potentially improved (start hunt prior to adult hunting season). Improved opportunity for accessible hunting. Decreased opportunity to hunt other migratory birds. Potential decrease in regular firearm deer hunting opportunity if quota system is implemented. Increase in spring turkey hunting permits, but overall decrease in hunting opportunity. Other migratory bird hunting opportunities would continue to be provided on WMAs.	Permit process and fees more standardized. Improved deer hunting opportunities for hunters with disabilities and youths. Quality of deer hunt expected to improve. Youth turkey and waterfowl hunting quality potentially improved. Potential deer quota hunt would reduce opportunities. Reduced opportunity for turkey hunting and potential for increased conflict with other hunters. Waterfowl hunting opportunities would decline as a result of changes in Oneida Pool (loss of open water and marsh). Decreased opportunity to hunt other migratory birds. Other migratory bird hunting opportunities would continue to be provided on WMAs.
Fishing	Adequate fishing opportunities are available on the Refuge.	Increased opportunity for accessible fishing. Frogging for bullfrogs only would be permitted on the Refuge.	Increased access to fishing areas. (via non-motorized boat on Ringneck Marsh).
Wildlife Observation and Photography	Adequate opportunities for wildlife observation being provided. Adequate photography opportunities not being provided. The following activities would continue to be allowed: Skiing/snow shoeing, bicycling, and hiking.	Increased and higher quality opportunities for observing and photographing wildlife. The following activities that facilitate wildlife observation and photography would be continue to be allowed: ski/snow shoe, bicycling & jogging. Hiking would be allowed on trails only.	Same as B.
Environmental Education (EE), Interpretation, and Outreach	Annually approximately 2000 students learning about basic biology, as well as wetlands and migratory birds. Currently unable to accommodate more students. Continue to provide opportunities for interpretation. Indirectly benefits the Refuge and System through increased awareness. Currently unable to meet demand.	Increasing opportunity and quality of EE programs. Increased opportunity and quality of interpretive programs. Indirect benefits would include greater understanding of the importance of the Refuge and its management. Increased and more focused outreach. Increased	Increase in EE, interpretation and outreach over B.

	Outreach has resulted in an increasing percentage of the local and regional community has become aware of the Refuge. Quantitative data is currently unavailable. Not currently utilizing latest technological tools to reach a wider audience.	awareness of the Refuge, System and Service.	
Other Activities	Continue to provide berry picking – minimal disturbance to wildlife and decreased food resources available to birds and other wildlife.	Berry picking would no longer be allowed on the Refuge.	Same as B
Access	Except for restricted access during the primary bird breeding/nesting season (March 1 – July 15), the Refuge is open.	Access to the general public would be limited to trails, the VCS, overlooks, and fishing areas only. Permitted hunters would be allowed to access other areas on the Refuge during appropriate seasons.	Same as B.
Refuge Partnerships			
Landscape Scale Conservation	Improved and strengthened relationships with partners to build a science-based, ecosystem-level conservation planning approach.	Same as A.	Same as A
Support for Refuge Programs	Continue to garner grassroots support from Friends, volunteers, and other local partners. Our relationship with Iroquois Job Corps Center would provide training opportunities for students, and the Refuge would benefit from building projects provided by students.	Increased number of local partners.	Same as B
Research	Current level of research projects would be maintained (approximately two research projects annually). Need for additional research projects (and associated information needs) not being met.	Increased opportunities for research projects on the Refuge and more information available on which to base future management decisions.	Same as B

Chapter 5

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Chapter 5
Consultation and Coordination with Others

Public Involvement Summary

Effective conservation usually begins with effective community involvement. To ensure that our future management of the Refuge considers the issues, concerns, and opportunities expressed by the public, we used a variety of public involvement techniques in our planning process.

Public scoping. In the spring of 2008, staff at Iroquois NWR sought public input on all aspects of refuge management as part of the CCP process. An introductory newsletter was mailed to over 360 refuge neighbors, sporting groups, local politicians, conservation groups and state agencies to inform them of the planning process. Copies of the newsletter were also available at the refuge visitor contact station, through the refuge website, and at community outreach events. Iroquois NWR hosted public meetings on April 8, 9 and 10, 2008 in Batavia, Albion and the Refuge Headquarters in Alabama, respectively. Each day the public could attend either an open house style meeting in the afternoon, or a more structured meeting in the evening. Approximately 20 people attended over the three days. Participants were encouraged to actively express their opinions and suggestions. The public meetings allowed us to gather information and ideas from local residents, adjacent landowners, and various organizations and agencies. A written public comment period was also open from February 26 – April 30, 2008 during which time people could mail, email or drop off comments.

Newsletters. In addition to the introductory newsletter described above from April 2008, we distributed "planning newsletter" updates in September 2008 and January 2009. In these newsletters, we shared the Refuge vision statement and goals, summarized the comments received in scoping, and described our progress through the process.

"Federal Register" Notice. We published our Notice of Intent (NOI) in the "Federal Register" on February 26, 2008 stating we intended to prepare "a comprehensive conservation plan (CCP) and an associated National Environmental Policy Act (NEPA) document for Iroquois National Wildlife Refuge (NWR)".

Workshops. The rationale of our workshops was to generate a range of possible solutions that would address issues of resource management and public use at the Refuge. In 2008 and 2009, we held workshops with various biological and public use experts from governmental and other organizations in discussing the vision, goals, objectives, strategies, and consequences at the heart of this plan.

The input we obtained from our public meetings, newsletters and workshops has been used to prepare this draft CCP/EA, which will be released for 30 days of public review and comment. During that period, we will hold an additional public meeting to give the public opportunity to comment. If you prefer to send your comments in writing, we also invite you to mail them to the address below.

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List of Preparers

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Chapter 5

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Swallow Hollow Ribbon Cutting

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USFWS

Least Bittern

Glossary & Acronyms

- Glossary of terms
- List of acronyms

Glossary

accessibility	the state or quality of being easily approached or entered, particularly as it relates to complying with the Americans With Disabilities Act.
accessible facilities	structures accessible for most people with disabilities without assistance; facilities that meet UFAS standards; ADA-accessible [E.g., parking lots, trails, pathways, ramps, picnic and camping areas, restrooms, boating facilities (docks, piers, gangways), fishing facilities, playgrounds, amphitheaters, exhibits, audiovisual programs, and wayside sites.].
adaptive management	the process of treating the work of managing natural resources as an experiment, making observations and recording them, so the manger can learn from the experience.
alluvium	clay, silt, sand, gravel, or similar detrital material deposited by running water.
alternative	a reasonable way to fix an identified problem or satisfy a stated need [40 CFR1500.2 (cf. "management alternative")].
amphibian	a class of carnivorous, ectotherms (body temperature regulated by outside heat sources) whose living members have a moist, glandular skin that is permeable to water and gases. Most amphibians have a well-defined aquatic, larval stage in their life cycle and then undergo metamorphosis into adults. Depending on the species, adults may occupy aquatic or terrestrial habitats. Frogs, toads, and salamanders are examples.
appropriate use	a proposed or existing use on a refuge that meets at least one of the following three conditions: 1. the use is a wildlife-dependent one; 2. the use contributes to fulfilling the refuge purpose(s), the System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the National Wildlife Refuge System Improvement Act was signed into law; or 3. the use has been determined appropriate as specified in section 1.11 of that act.
approved acquisition boundary	a project boundary that the Director of the U.S. Fish and Wildlife Service approves upon completion of the planning and environmental compliance process. An approved acquisition boundary only designates those lands which the Service has authority to acquire or manage through various agreements. The approval of an acquisition boundary does not grant the Service jurisdiction or control over lands within the boundary, and it does not make lands within the refuge boundary part of the National Wildlife Refuge System. Lands do not become part of the System until the Service buys them or they are placed under an agreement that provides for their management as part of the System.
aquatic	growing in, living in, or dependent upon water.
avian	of or having to do with birds.

bathymetry	the measurement of water depth at various places in a body of water; *also* **:** the information derived from such measurements
basin	the land surrounding and draining into a water body (cf. "watershed").
best management practices	land management practices that produce desired results [N.b. Usually describing forestry or agricultural practices effective in reducing non-point source pollution, like reseeding skidder trails or not storing manure in a flood plain. In their broader sense, practices that benefit target species.].
biological diversity or biodiversity	the variety of life and its processes and includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.
bird conservation region	ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues.
breeding habitat	habitat used by migratory birds or other animals during the breeding season.
community	the locality in which a group of people resides and shares the same government.
compatible use	"The term 'compatible use' means a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge."—National Wildlife Refuge System Improvement Act of 1997 [Public Law 105-57; 111 Stat. 1253].
compatibility determination	a required determination for wildlife-dependent recreational uses or any other public uses of a refuge.
comprehensive conservation plan	mandated by the 1997 Refuge Improvement Act, a document that provides a description of the desired future conditions and long-range guidance for the project leader to accomplish purposes of the refuge system and the refuge. CCPs establish management direction to achieve refuge purposes. [P.L. 105-57; FWS Manual 602 FW 1.4].
conifer	a tree or shrub in the phylum Gymnospermae whose seeds are borne in woody cones. There are 500–600 species of living conifers (Norse 1990).
conservation	managing natural resources to prevent loss or waste [N.b. Management actions may include preservation, restoration, and enhancement.].
conservation easement	a non-possessory interest in real property owned by another imposing limitations or affirmative obligations with the purpose of returning or protecting the property's conservation values.
conservation status	assessment of the status of ecological processes and of the viability of species or populations in an ecoregion.

cool-season grass introduced grass for crop and pastureland that grows in spring and fall and is dormant during hot summer months.

cooperative agreement a usually long-term habitat protection action, which can be modified by either party, in which no property rights are acquired. Lands under a cooperative agreement do no necessarily become part of the National Wildlife Refuge System.

cover-type the current vegetation of an area.

critical habitat according to U.S. Federal law, the ecosystems upon which endangered and threatened species depend.

disturbance any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment.

drainage basin an area mostly bound by ridges or other similar topographic features, encompassing part, most, or all of a watershed.

early successional habitat succession is the gradual replacement of one plant community by another. In a forested ecosystem, tree cover can be temporarily displaced by natural or human disturbance (e.g., flooding by beaver, or logging). The open environments created by removal of tree cover are referred to as 'early-successional' habitats because as time passes, trees will return. The open conditions occur 'early' in the sequence of plant communities that follow disturbance.

easement a non-possessory interest in real property owned by another imposing limitations or affirmative obligations with the purpose of returning or protecting the property's conservation values. An agreement by which landowners give up or sell one of the rights on their property [E.g., landowners may donate rights-of-way across their properties to allow community members access to a river (cf. "conservation easement").].

ecology the study of the relations between organisms and the totality of the biological and physical factors affecting them or influenced by them.

ecoregion a territory defined by a combination of biological, social, and geographic criteria, rather than geopolitical considerations; generally, a system of related, interconnected ecosystems.

ecosystem a natural community of organisms interacting with its physical environment, regarded as a unit.

edge effect the phenomenon whereby edge-sensitive species are negatively affected near edges by factors that include edge-generalist species, human influences, and abiotic factors associated with habitat edges. Edge effects are site-specific and factor-specific and have variable depth effects into habitat fragments.

effects effects, impacts, and consequences, as used in the environmental assessment, are synonymous. Effects may be direct, indirect, or cumulative.

emergent wetlands wetlands dominated by erect, rooted, herbaceous plants.

endangered species any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register.

environment the sum total of all biological, chemical and physical factors to which organisms are exposed.

environmental analysis an analysis of alternative actions and their predictable short-term and long-term environmental effects, incorporating physical, biological, economic, and social considerations.

environmental assessment a systematic analysis of site-specific or programmatic activities used to determine whether such activities have a significant effect on the quality of the physical, biological, and human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary.

environmental education curriculum-based education aimed at producing a citizenry that is knowledgeable about the biophysical environment and its associated problems, aware of how to help solve those problems, and motivated to work toward solving them.

environmental impact statement (EIS) a detailed, written analysis of the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources [cf. 40 CFR 1508.11].

evaluation examination of how an organization’s plans and actions have turned out — and adjusting them for the future.

exotic species a species that is not native to an area and has been introduced intentionally or unintentionally by humans; not all exotics become successfully established.

fauna all animal life associated with a given habitat, country, area or period.

federal land public land owned by the Federal Government, including national forests, national parks, and national wildlife refuges.

federal-listed species a species listed either as endangered, threatened, or a species at risk (formerly, a “candidate species”) under the Endangered Species Act of 1973, as amended.

finding of no significant impact (FONSI) supported by an environmental assessment, a document that briefly presents why a Federal action will have no significant effect on the human environment, and for which an environmental impact statement, therefore, will not be prepared [40 CFR 1508.13].

flora	all the plants found in a particular place.
floodplain	flat or nearly flat land that may be submerged by floodwaters; a plain built up or in the process of being built up by stream deposition.
flyway	any one of several established migration routes of birds.
focal species	a species that is indicative of particular conditions in a system (ranging from natural to degraded) and used as a surrogate measure for other species of particular conditions. An element of biodiversity selected as a focus for conservation planning or action. The two principal types of targets in Conservancy planning projects are species and ecological communities.
forested land	land dominated by trees [For impacts analysis in CCP's, we assume all forested land has the potential for occasional harvesting.
forested wetlands	wetlands dominated by trees.
fragmentation	the disruption of extensive habitats into isolated and small patches. Fragmentation has two negative components for biota: the loss of total habitat area; and, the creation of smaller, more isolated patches of habitat remaining.
geographic information system	(GIS) a computerized system to compile, store, analyze and display geographically referenced information [E.g., GIS can overlay multiple sets of information on the distribution of a variety of biological and physical features.].
glacial drift	a load of rock material transported and deposited by a glacier. Glacial drift is usually deposited when the glacier begins to melt.
glacial moraine	consists of soils formed over sandy glacial till and generally of the steeper soils formed over water-sorted sand and gravel.
glacial till	drift that is deposited directly from glacial ice and therefore not sorted.
glacio-fluvial	geomorphic feature whose origin is related to the processes associated with glacial meltwater.
goals	broad statements of direction; end results or positions to be achieved.
grasslands	land on which the natural dominant plant forms are grasses and forbs; an ecological community in which the characteristic plants are grasses.
green tree reservoir (impoundment)	consist of bottomland hardwood forest land which is shallowly flooded in the fall and winter.
habitat conservation	protecting an animal or plant habitat to ensure that the use of that habitat by the animal or plant is not altered or reduced.
habitat	the place or type of site where species and species assemblages are typically found and/or successfully reproduce. [N.b. An organism's

habitat must provide all of the basic requirements for life, and should be free of harmful contaminants.].

historic conditions the composition, structure and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgement, were present prior to substantial human-related changes to the landscape.

hydrology the science of waters of the earth: their occurrences, distributions, and circulations; their physical and chemical properties; and their reactions with the environment, including living beings.

hydroperiod the cyclical changes in the amount or stage of water in a wetland habitat

Important Bird Area an international bird conservation initiative to identify the most important places for birds, and to conserve them

impoundment a body of water, such as a pond, confined by a dam, dike, floodgate, or other barrier, which is used to collect and store water for future use.

invasive species an alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

inventory a list of all the assets and liabilities of an organization, including physical, financial, personnel, and procedural aspects.

invertebrate any animal lacking a backbone or bony segment that encloses the central nerve cord.

issue any unsettled matter that requires a management decision [E.g., a Service initiative, an opportunity, a management problem, a threat to the resources of the unit, a conflict in uses, a public concern, or the presence of an undesirable resource condition.] [N.b. A CCP should document, describe, and analyze issues even if they cannot be resolved during the planning process (FWS Manual 602 FW 1.4).].

lake an inland body of fresh or salt water of considerable size occupying a basin or hollow on the earth's surface, and which may or may not have a current or single direction of flow.

land protection plan (LPP) a document that identifies and prioritizes lands for potential Service acquisition from a willing seller, and also describes other methods of providing protection. Landowners within project boundaries will find this document, which is released with environmental assessments, most useful.

land trusts organizations dedicated to conserving land by purchase, donation, or conservation easement from landowners.

landscape a heterogeneous land area composed of a cluster of interacting ecosystems that are repeated in similar form throughout.

late-successional — species, assemblages, structures, and processes associated with mature natural communities that have not experienced significant disturbance for a long time.

local agencies — generally, municipal governments, regional planning commissions, or conservation groups.

management plan — a plan that guides future land management practices on a tract [N.b. In the context of an environmental impact statement, management plans may be designed to produce additional wildlife habitat along with primary products like timber or agricultural crops (cf. "cooperative agreement").].

management strategy — a general approach to meeting unit objectives [N.b. A strategy may be broad, or it may be detailed enough to guide implementation through specific actions, tasks, and projects (FWS Manual 602 FW 1.4).].

marshlands — areas interspersed with open water, emergent vegetation (hydrophytes), and terrestrial vegetation (phreatophytes).

mission statement — a succinct statement of the purpose for which the unit was established; its reason for being.

monitoring — a process of collecting information to evaluate if an objective and/or anticipated or assumed results of a management plan are being realized (effectiveness monitoring) or if implementation is proceeding as planned(implementation monitoring).

national environmental policy act of 1969 — (NEPA) requires all Federal agencies to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in planning and implementing environmental actions [Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision-making(cf. 40 CFR 1500).].

national wildlife refuge system — (Refuge System) all lands and waters and interests therein administered by the Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish and wildlife, including those that are threatened with extinction.

native — a species that, other than as a result of an introduction, historically occurred or currently occurs in a particular ecosystem.

native plant — a plant that has grown in the region since the last glaciation, and occurred before European settlement.

natural conditions — conditions thought to exist from the end of the Medieval Warm Period to the advent of the industrial ear (app. 950AD to 1800AD) based upon scientific study and sound professional judgment.

neotropical migrant bird — a bird species that breeds north of the U.S./Mexico border migrate and winters primarily south of the U.S. border in Mexico, the West Indies, or Central or South America.

non-consumptive, wildlife-oriented recreation — wildlife observation and photography and environmental education and interpretation (cf. “wildlife-oriented recreation”).

non-native species — see “exotic species”.

nuisance species — plants and animals (sometimes called nonnatives or exotics) that threaten the native fish, wildlife, and plants and impede recreational activities.

objective — cf. “unit objective”.

Obligate — able to exist or survive only in a particular environment or by assuming a particular role

partnership — a contract or agreement among two or more individuals, groups of individuals, organizations, or agencies, in which each agrees to furnish a part of the capital or some service in kind (e.g., labor) for a mutually beneficial enterprise.

physiographic area — a bird conservation planning unit with relatively uniform vegetative communities, bird populations, and species assemblages, as well as land use and conservation issues, developed by Partners in Flight.

population — an interbreeding group of plants or animals. The entire group of organisms of one species.

population monitoring — assessing the characteristics of populations to ascertain their status and establish trends on their abundance, condition, distribution, or other characteristics.

preferred alternative — the Service’s selected alternative identified in the Draft Comprehensive Conservation Plan.

prescribed fire — the application of fire to wildland fuels, either by natural or intentional ignition, to achieve identified land use objectives [FWS Manual 621 FW 1.7].

priority general public use — a compatible wildlife-dependent recreational use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.

private land — land owned by a private individual or group or non-government organization.

protection — mechanisms like fee title acquisition, conservation easements, or binding agreements with landowners that ensure land use and land management practices will remain compatible with maintaining species populations at a site (cf. “long-term ”).

public — individuals, organizations, and non-government groups; officials of Federal, State, and local government agencies; Native American tribes, and foreign nations—includes anyone outside the core planning team, those who may or may not have indicated an interest in the issues, and those who do or do not realize that our decisions may affect them.

public land land owned by the local, State, or Federal Government.

rare community types plant community types classified as rare by any State program; includes exemplary community types.

refuge goals "descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but do not define measurable units." (Writing Refuge Management Goals and Objectives: A Handbook, FWS January 2004).

refuge purposes "the terms 'purposes of the refuge' and 'purposes of each refuge' mean the purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit." (National Wildlife Refuge System Improvement Act of 1997).

refuge lands lands in which the Service holds full interest in fee title or partial interest like an easement.

reptile a class of vertebrates whose skin is dry, lacking inglands, and covered with scales. Claws are present and skull, limb bones, vertebrae, muscles, and so forth are stronger and more advanced than those of amphibians. Egg fertilization is internal, there is no larval stage, and eggs have a protective, hard shell.

restoration management of a disturbed or degraded habitat that results in the recovery of its original state [E.g., restoration may involve planting native grasses and forbs, removing shrubs, prescribed burning, or reestablishing habitat for native plants and animals on degraded grassland.].

scoping a process for determining the scope of issues to be addressed by a comprehensive conservation plan and for identifying the significant issues. Involved in the scoping process are federal, state and local agencies; private organizations; and individuals.

shrublands habitats dominated by various species of shrubs, often with many grasses and forbs.

species the basic category of biological classification intended to designate a single kind of animal or plant. Any variation among the individuals may be regarded as not affecting the essential sameness which distinguishes them from all other organisms.

species of concern species not Federal-listed as threatened or endangered, but about which we or our partners are concerned.

state land state-owned public land.

state-listed species cf. "Federal-listed species".

step-down management plan a plan for dealing with specific refuge management subjects, strategies, and schedules, e.g., cropland, wilderness, and fire [FWS Manual 602 FW 1.4].

stopover habitat habitat where birds rest and feed during migration.

strategy a specific action, tool, technique, or combination of actions, tools, and techniques for meeting unit objectives.

succession the natural, sequential change of species composition of a community in a given area.

terrestrial living on land.

threatened species a Federal-listed, protected species that is likely to become an endangered species in all or a significant portion of its range.

trust resource a resource that the Government holds in trust for the people through law or administrative act [N.b. A Federal trust resource is one for which responsibility is given wholly or in part to the Federal Government by law or administrative act. Generally, Federal trust resources are nationally or internationally important no matter where they occur, like endangered species or migratory birds and fish that regularly move across state lines. They also include cultural resources protected by Federal historic preservation laws, and nationally important or threatened habitats, notably wetlands, navigable waters, and public lands like state parks and national wildlife refuges.].

understory the lower layer of vegetation in a stand, which may include short trees, shrubs, and herbaceous plants.

unit objective desired conditions that must be accomplished to achieve a desired outcome [N.b. Objectives are the basis for determining management strategies, monitoring refuge accomplishments, and measuring their success. Objectives should be attainable, time-specific, and stated quantitatively or qualitatively (FWS Manual 602 FW 1.4).].

upland dry ground (i.e., other than wetlands).

vernal pool depressions holding water for a temporary period in the spring, and in which various amphibians lay eggs.

vision statement a concise statement of what the unit could achieve in the next 10 to 15 years.

warm season grass a grass that grows most during the warmest seasons of the year.

watershed the geographic area within which water drains into a particular river, stream, or body of water. A watershed includes both the land and the body of water into which the land drains.

wetlands lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. These areas are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted to life in saturated soil conditions. “Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.”—Cowardin et al 1979.

wilderness	cf. “designated wilderness”.
wildfire	a free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands [FWS Manual 621 FW 1.7].
wildland fire	every wildland fire is either a wildfire or a prescribed fire [FWS Manual 621 FW 1.3].
wildlife-dependent recreational use	a use of a national wildlife refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation (National Wildlife Refuge System Administration Act of 1966).
wildlife management	manipulating wildlife populations, either directly by regulating the numbers, ages, and sex ratios harvested, or indirectly by providing favorable habitat conditions and alleviating limiting factors.
wildlife-oriented recreation	recreational activities in which wildlife is the focus of the experience [“The terms ‘wildlife-dependent recreation’ and ‘wildlife-dependent recreational use’ mean a use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.”—National Wildlife Refuge System Improvement Act of 1997].

Acronyms

ACRONYM	FULL NAME
ac	acre
ACJV	Atlantic Coast Joint Venture
ADA	Americans with Disabilities Act
AHMP	Annual Habitat Management Plan
ATV	All-terrain vehicle
BCA	Bird Conservation Area
BCR	Bird Conservation Region
BBS	Breeding Bird Survey
CAA	Clean Air Act
CAC	Canisus Ambassadors for Conservation
CCP	Comprehensive Conservation Plan
CCSP	Climate Change Science Program
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CH4	Methane
CO	Carbon monoxide
CO2	Carbon dioxide
CWCS	Comprehensive Wildlife Conservation Strategy
CWS	Canadian Wildlife Service
DDT	dichloro-diphenyl-trichloroethane
DU	Ducks Unlimited
EA	Environmental Assessment
Eagle Act	Bald and Golden Eagle Protection Act
EE	Environmental Education
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FINWR	Friends of Iroquois National Wildlife Refuge, Inc
FONSI	Finding of No Significant Impact
FTE	Full Time Equivalent
FWS	Fish and Wildlife Service
GHG	Greenhouse Gas
GIRAS	Geographic Information Retrieval Analysis System
GIS	Geographic Information System
ha	hectare
HFCs	Hydrofluorocarbons
HIP	Harvest Information Program
HMP	Habitat Management Plan
IBA	Important Bird Area
Improvement Act	National Wildlife Refuge System Improvement Act of 1997
IMP	Inventory and Monitorin Plan
Iroquois NWR	Iroquois National Wildlife Refuge
IO	Iroquois Observation
LEED	Leadership in Energy and Environmental Design
µg/m3	micrograms per square meter
MOU	Memorandum Of Understanding
NABCI	North American Bird Conservation Initiative
NAI	National Association of Intepretors
NAWCP	North American Waterbird Conservation Plan
NAWMP	North American Waterfowl Management Plan
NEPA	National Environmental Policy Act

NGO	Non-Governmental Organization
NNL	National Natural Landmark
NOAA	National Oceanic and Atmospheric Administration
NO2	Nitrogen Dioxide
N2O	Nitrous Oxide
NRCS	Natural Resources Conservation Service
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
NYCRR	New York Code of Rules and Regulations
NYNHP	New York Natural Heritage Program
NYSDEC	New York State Department of Environmental Conservation
O3	Ozone
PFCs	Perfluorocarbons
PIF	Partners In Flight
pm	particulate matter
ppm	parts per million
Refuge System	National Wildlife Refuge System
REA	Recreation Enhancement Act
RFB	Riparian Forest Buffer
RNA	Research Natural Areas
ROD	Record of Decision
Service	US Fish and Wildlife Service
SF6	Sulfur Hexafluoride
SGNC	Species in Greatest Need of Conservation
SO2	Sulfur Dioxide
std	Standard
SWG	State Wildlife Grant program
SWLO	Southwest Lake Ontario Basin
TNC	The Nature Conservancy
TSP	Total Suspended Particulates
UMVGL	Upper Mississippi Valley/Great Lakes
US	United States
USDA	United States Department of Agriculture
USEPA	Untied States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGBC	United States Green Building Council
USSCP	United States Shorebird Conservation Plan
VA	Veterans Affair
VCS	Visitor Contact Station
VSP	Visitor Services Professional
WMA	Wildlife Management Area

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Appendix A

USFWS

Cooper's Hawk

Wilderness Review

- Introduction
- Inventory Criteria
- Inventory Conclusions
  - Evaluation of Roadless
  - Evaluation of Size
  - Evaluation of Naturalness
  - Evaluation of Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation
- Conclusion

Introduction

The purpose of a wilderness review is to identify and recommend to Congress the lands and waters of the National Wildlife Refuge System that merit inclusion in the National Wilderness Preservation System (NWPS). Wilderness reviews are required elements of CCPs, are conducted in accordance with the refuge planning process outlined in the Fish and Wildlife Service Manual (602 FW 1 and 3), and include compliance with the National Environmental Policy Act (NEPA) and regulations on public involvement.

Wilderness Study Areas (WSAs) are areas that meet the criteria for wilderness identified in the Wilderness Act. Section 2(c) of the act gives the following definition:

> *A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions, and which 1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; 2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; 3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and 4) may also contain ecological, geological or other features of scientific, educational, scenic, or historical value.*

The wilderness review process has three phases: inventory, study, and recommendation. In the inventory phase, we identify lands and waters that meet the minimum criteria for wilderness as WSAs. In the study phase, we evaluate a range of management alternatives to determine whether a WSA is suitable for wilderness designation or management under an alternative set of goals and objectives that do not involve wilderness designation. In the recommendation phase, we forward a wilderness study report with recommendations on wilderness designation from the Director through the Secretary and the President to Congress. We prepare that report after our Regional Director has signed the record of decision for the final CCP.

We manage any areas recommended for designation to maintain their wilderness character in accordance with the management goals, objectives and strategies in the final CCP, until Congress makes a decision or we amend the CCP to modify or remove the wilderness proposal. If the inventory does not identify any areas that meet the WSA criteria, we document our findings in the administrative record for the CCP and end the study process. We will manage non-wilderness areas following the management direction outlined in the CCP.

Inventory Criteria

The wilderness inventory is a broad look at the planning area to identify WSAs. A WSA is a roadless area of undeveloped Federal land and water that meets the minimum criteria for wilderness as identified in Section2(c) of the Wilderness Act.

Minimum Wilderness Criteria

A WSA is required to be a roadless area or an island of any size, meet the size criteria, appear natural, and provide for solitude or primitive recreation.

Roadless — Roadless refers to the absence of improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use. A route maintained solely by the passage of vehicles does not constitute a road.

The following factors were the primary considerations in evaluating the roadless criteria.

A. The area does not contain improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use.
B. The area is an island, or contains an island that does not have improved roads suitable and maintained for public travel by means of motorized vehicles primarily intended for highway use.
C. The area is in federal fee title ownership.

Size — The size criteria can be satisfied if an area has at least 5,000 acres of contiguous, roadless, public land, or is sufficiently large that its preservation and use in an unimpaired condition is practicable.

The following factors were the primary considerations in evaluating the size criteria.

A. An area of more than 5,000 contiguous acres. State and private lands are not included in making this acreage determination.
B. A roadless island of any size. A roadless island is defined as an area surrounded by permanent waters or that is markedly distinguished from the surrounding lands by topographical or ecological features.
C. An area of less than 5,000 contiguous federal acres that is of sufficient size as to make practicable its preservation and use in an unimpaired condition, and of a size suitable for wilderness management.
D. An area of less than 5,000 contiguous acres that is contiguous with a designated wilderness, recommended wilderness, or area under wilderness review by another federal wilderness-managing agency such as the Forest Service, National Park Service, or Bureau of Land Management.

Naturalness — The Wilderness Act, section 2(c) defines wilderness as an area that "generally appears to have been affected primarily by the forces of nature with the imprint of human work substantially unnoticeable." The area must appear natural to the average visitor, rather than "pristine." The presence of historic landscape conditions is not required.

An area may include some human impacts provided they are substantially unnoticeable in the unit as a whole. In evaluating the naturalness criteria, we also consider significant hazards caused by humans, such as the presence of unexploded ordnance from military activity and the physical impacts of refuge management facilities and activities. An area may not be considered unnatural in appearance solely on the basis of the sights and sounds of human impacts and activities outside the boundary of the unit. We considered the cumulative effects of those factors, in conjunction with the size of the land base and its physiographic and vegetative characteristics in our evaluation of naturalness.

The following factors were the primary considerations in evaluating naturalness.

A. The area appears to have been affected primarily by the forces of nature with the imprint of human work substantially unnoticeable.
B. The area may include some human impacts provided they are substantially unnoticeable in the unit as a whole.
C. The presence of unexploded ordnance from military activity or the existence of other significant hazards caused by humans.
D. The presence of physical impacts of refuge management facilities and activities.

Solitude or Primitive and Unconfined Recreation — A WSA must provide outstanding opportunities for solitude or primitive and unconfined recreation. The area does not have to possess outstanding opportunities for both elements, and does not need to have outstanding opportunities on every acre. Further, an area does not have to be open to public use and access to qualify under this criteria; Congress has

designated a number of wilderness areas in the Refuge System that are closed to public access to protect resource values.

Opportunities for solitude refer to the ability of a visitor to be alone and secluded from other visitors in the area. Primitive and unconfined recreation means non-motorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport. These primitive recreation activities may provide opportunities to experience challenge and risk, self-reliance, and adventure.

These two elements are not well defined by the Wilderness Act, but can be expected to occur together in most cases. However, an outstanding opportunity for solitude may be present in an area offering only limited primitive recreation potential. Conversely, an area may be so attractive for recreation use that experiencing solitude is not an option.

The following factors were the primary considerations in evaluating outstanding opportunities for solitude or primitive unconfined recreation.

A. The area offers the opportunity to avoid the sights, sounds and evidence of other people. A visitor to the area should be able to feel alone or isolated.
B. The area offers non-motorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport.

Supplemental Values — The Wilderness Act states that an area of wilderness may contain ecological, geological, or other features of scientific, educational, scenic or historical value. Supplemental values of the area are optional, but the degree to which their presence enhances the area's suitability for wilderness designation should be considered. The evaluation should be based on an assessment of the estimated abundance or importance of each of the features.

Inventory Conclusions

Evaluating Roadless Criteria
The refuge landscape is interlaced and bordered with a number of roads. A major vehicle paved road (Route 63) bisects the refuge north-south, essentially splitting the refuge into two areas. Two other north-south roads that cut through the refuge are Feeder Road and Sour Springs Road. There are a number of other paved roads that also run throughout the refuge. The southwestern border of the refuge is Route 77.

Evaluating Size Criteria
The 10,828-acre Iroquois NWR refuge does meet the size criteria for a WSA. It is greater than 5,000 acres and its size is sufficient to preserve natural ecological processes. No lands within the refuge are contiguous to other agency-owned lands under review for wilderness areas.

Evaluating Naturalness Criteria
The refuge contains a number of features that preclude it from the Naturalness criteria. Numerous signs of human impact are obvious reminders of the refuge's past uses, including agriculture. European settlers expanded artificial drainage of the area to improve logging and farming operations, but, plagued by high costs, and a cycle of muck fires and floods, the outcome was marginal at best. By the 1950s, landowners were looking to further develop and convert the lands to other uses. Today, Iroquois National Wildlife Refuge is actively managed to provide the best possible habitat for the widest variety of wildlife. Over one half of the Refuge is wetlands including marshes, shrub-scrub wetlands and forested wetlands. The remaining habitats are upland and include grasslands, shrublands and forests.

After agricultural development, the Refuge area contained approximately 2,000 ha (5,000 acres) that normally was inundated in the spring, but mostly dry by fall, making all but the wettest areas suitable for farming. After Refuge establishment, the development of impoundments allowed some degree of management to provide nearly 1,600 ha (4,000 acres) of manageable wetlands. Refuge staff manages 19

water impoundments. These impoundments are enclosed by 18 different dike systems and 30 operating water control structures to manipulate and control water levels.

In addition to water control structures and dikes, Refuge infrastructure includes buildings and roadways that require regular maintenance. There are also overlooks, trails, signs, parking areas, and boundaries that are maintained. Facilities currently include the Refuge Headquarters and adjoining Visitor Contact Station, a divided shed for storage of flammable liquids and grain, a shop/maintenance building, and a hunting check station. There are also three houses owned and maintained by the Refuge, one of those houses is due for demolition. Along with storage for flammable liquids, there are above ground, uncovered fuel tanks.

Evaluating Solitude or Primitive and Unconfined Recreation Criteria
To protect nesting wildlife, all areas of the refuge, except overlooks and nature trails, are closed to the public between March 1 and July 15. The majority of Refuge visitors come during the spring, early summer and fall months to take advantage of favorable trail conditions and opportunities for viewing annual spring and fall bird migrations as well as the brilliance of New York fall foliage. March and April are the most popular months during which time the Refuge receives nearly half of its annual visitation. Refuge trails and roads are used some during the winter when snow conditions are conducive to cross-country skiing or snowshoeing. The Refuge receives more than 28,000 visits on the trails and overlooks each year.

Conclusion
Iroquois NWR does not meet the criteria for a WSA and should not be recommended for further evaluation of wilderness potential. An inventory of the Refuge concluded that while it does meet the size criteria, it does not meet the minimum requirements for wilderness with regard to roads, naturalness, and solitude or primitive and unconfined recreation. We will reevaluate this determination in 15 years with the revision of this CCP, or sooner if significant new information warrants a reevaluation. In summary, at this time additional study is not warranted.

Appendix B

Compatibility Determinations and Findings of Appropriateness

- Compatibility Determinations – Priority Public Uses
  - Wildlife Observation, Wildlife Photography, Environmental Education, & Interpretation
  - Migratory Game Bird Hunting
  - Big Game Hunting
  - Upland Game Hunting
  - Sport Fishing
- Findings of Appropriateness
  - Walking and Hiking
  - Jogging and Bicycling
  - Cross Country Skiing and Snowshoeing
  - Haying - Commercial
  - Forest Management – Commercial
  - Research Conducted by Non-refuge Personnel
- Compatibility Determinations – Other Uses
  - Walking and Hiking
  - Jogging and Bicycling
  - Cross Country Skiing and Snowshoeing
  - Haying - Commercial
  - Forest Management – Commercial
  - Research Conducted by Non-refuge Personnel

COMPATIBILITY DETERMINATION

USE: Wildlife Observation, Photography, Environmental Education and Interpretation

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The uses are wildlife observation, photography, environmental education and interpretation. Wildlife observation, photography, environmental education and interpretation are priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), and the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57).

(b) Where would the use be conducted?

Wildlife observation, photography, environmental education and interpretation will be allowed to occur on designated roads, trails, overlooks, and visitor contact facilities throughout the Refuge. Self-conducted wildlife observations and interpretation activities should take place at Feeder Road, Kanyoo, Onondaga and Swallow Hollow Nature Trails, and Cayuga, Mallard, Ringneck, and Schoolhouse Overlooks. Slide show presentations, program introductions, and exhibits will be conducted at the refuge visitor contact station or the refuge waterfowl check station. Excellent opportunities for wildlife observation, interpretation and photography will also occur along Oak Orchard Creek (from Knowlesville Road to Route 63), which can be accessed via non-motorized boats. Two photo blinds will be available one located on the south side of Rinkneck Marsh and the other will be a combination photo / hunting blind located in Sutton's Marsh. A yearly Refuge event includes a Spring into Nature celebration. Interpretive programs for the public are offered throughout the year, in conjunction with Iroquois Observations, in the Refuge visitor contact station and at trails and overlooks. Other programs held at the Refuge include waterfowl identification classes and youth hunt orientations, which are in cooperation with refuge

partners like the Finger Lakes and Western New York Waterfowl Association, the Wild Turkey Federation and the Buffalo Audubon Society..

A new nature trail beginning at the Refuge office will provide access to an observation tower that will overlook the wetlands that are just north of the refuge. The observation tower will be an elevated platform to allow visitors to see over the tall wetland vegetation. It will be located off of an existing refuge trail that is used seasonally for other refuge recreation, mostly waterfowl hunting access.

Refuge conducted environmental education and interpretation may be conducted at sites that are not located within the existing trails systems. Most of these will be associated with conducting EE of specific wildlife management actions and taking students into the field to discuss and show specific actions like wetland management and visiting a water control structure.

(c) When would the use be conducted?

Self-directed wildlife observation, photography, environmental education and interpretation will be allowed on the Refuge daily, year-round, sunrise to sunset unless a conflict with a management activity or an extenuating circumstance necessitates deviating from these procedures. Closures for events affecting human safety, or for nesting season and other sensitive times of the year are examples that would require these uses to be temporarily suspended.

Refuge conducted programs maybe on either side of the daylight times like conducting night interpretive programs on bats, bugs or owls. These would be done by refuge staff or in cooperation of a refuge partner.

(d) How would the use be conducted?

Wildlife observation, photography, environmental education and interpretation will be allowed to occur on the Refuge. As an integral part of these programs, we will incorporate the strategies found in Goal 4, Alternative B (Proposed Action) of the Draft CCP/EA for Iroquois National Wildlife Refuge. Refuge staff will be responsible for on-site evaluations to resolve public use issues; monitor and evaluate impacts; maintain boundaries and signs; meet with adjacent landowners and interested public; recruit volunteers; prepare and present interpretive programs; maintain existing trails and overlooks; revise leaflets and develop new ones; install kiosks and continually update kiosk information; develop needed signage; organize and conduct Refuge events; conduct regularly scheduled programs for the public; display off-site exhibits at local events; develop relationships with media; provide law enforcement and respond immediately to public inquiries.

Rehabilitation of existing visitor contact station/refuge office will provide approximately 5,000 square feet of area for conducting on-site interpretive programs, exhibits, Friends of Iroquois NWR book store and potential classroom area. This area would be rehabilitated after a new office wing is added that will house the Refuge Staff, Fisheries Staff and NYS Department of Environmental Conservation.

Adding access to a new observation tower that would be located to the north of the visitor contact station will require a new structure to be built as well as allowing access to this site during times of year when visitors have not been allowed before.

Wildlife Observation, Photography, Environmental Education, and Interpretation along Oak Orchard Creek can occur via a non-motorized boat or canoe along Oak Orchard Creek from Knowlesville Road to Route 63. You man launch canoes and non-motorized boats from any of the three road intersections (Knowlesville Road, Sour Springs Road and Route 63).

(e) Why is this use being proposed?

Wildlife observation, wildlife photography, environmental education, and interpretation are Priority Public Uses as defined by The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and, if compatible, are to receive enhanced consideration over other general public uses. These uses will be conducted to provide compatible educational and recreational opportunities for visitors to enjoy the resource and to gain understanding and appreciation for fish and wildlife, wildlands ecology and the relationships of plant and animal populations within the ecosystem, and wildlife management. They will enhance the public's knowledge of natural resource management programs and ecological concepts for better understanding the problems facing our natural resources, what effect the public has on wildlife resources, and to learn about the Service's role in conservation. Additionally, the public will be aware of biological facts upon which Service management programs are based, and to foster an appreciation as to why wildlife and wildlands are important to them. The authorization of these uses will produce a more informed public and advocates for Service programs. Likewise, these uses will provide opportunities for visitors to observe and learn about wildlife and wildlands at their own pace, in an unstructured environment, and to observe wildlife habitats firsthand.

Professional and amateur photographers will also be provided opportunities to photograph wildlife in their natural habitats. Photographic opportunities will result in increased publicity and advocacy for Service programs. These uses will also provide wholesome, safe, outdoor recreation in a scenic setting, with the realization that those who come strictly for recreational enjoyment will be enticed to participate in the more educational facets of the public use program, and can then become advocates for the Refuge and the Service.

AVAILABILITY OF RESOURCES:

The Refuge has a maintained trail system in place to support priority public uses. Allowing wildlife observation, wildlife photography, environmental education, and interpretation on these trails will not increase the maintenance or operational needs. Feeder Road is the main service road used by Refuge employees and also provides access to the Refuge for a variety of public uses, thus maintenance of this facility is on-going and no additional needs would be required.

The following breakdown shows the estimated amount of funds needed to administer the program.

Annual costs to administer these four activities:

Identifier	Cost
Trail/Road Maintenance*	$10000
Maintain Kiosks	$5000
News releases, brochures, fact sheets	$10,000
Program development and implentation	$5000
Routine Maintenance and Staff Days	$10,000
Hosting Special Events	$10,000
Law Enforcement	$5000
Total Cost	**$55,000**

*Refuge trails and roads are maintained for a variety of activities. Costs shown are a percentage of total costs for trail/road maintenance on the Refuge and are reflective of the percentage of trail/road use for this activity. Volunteers account for some maintenance hours and help to reduce overall cost of the program.

There would be a one time cost to construct an observation platform and provide trail access to it from the refuge headquarters, which is estimated to be about $40,000. Routine maintenance of these facilities is already indicated in the above figures.

One photo blind and one photo / handicapped accessible hunting blind will be constructed replace the two photo blinds the Refuge currently has. These are estimated to be about $40,000 for the one time construction and installation, annual maintenance and management are already considered in the above figures.

ANTICIPATED IMPACTS OF USE:

Wildlife observation and photography, environmental education, and interpretation can produce positive or negative impacts to the wildlife resource. A positive effect of public involvement in these priority public uses will be a better appreciation and more complete understanding of the wildlife and habitats associated with the Iroquois NWR. This can translate into more widespread and stronger support for the Refuge, the National Wildlife Refuge System and the Service.

The increase of refuge administrative building from the exiting 5,000 square feet to the anticipated 10,609 square feet will obviously impact more ground area. However, the new facility is expected to stay within previously disturbed ground that was fill material when the current office was built. The addition of Division of Fisheries will increase the daily traffic the office area from just Service employees, but also from partners, etc. that the Service cooperates with. Overall, we would expect a minor increase to the Refuge's overall visitation because of the new building since we will have enhanced our ability to conduct programs and handle larger crowds, as well as reaching out to other groups that are associated with the Division of Fisheries.

Constructing an observation platform, the photo blind, and the photo/hunting blind will increase traffic to these specific parts of the Refuge. Also, there will be trails/paths associated with these structures that will provide access to them and outside of the removal of vegetation, soil, and

temporary impacts during construction the remaining annual disturbance associated with these facilities are described below.

Wildlife observation and photography, environmental education, and interpretation has the potential to impact shorebird, waterfowl, and other migratory bird populations feeding and resting near the trails during certain times of the year.

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeal et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Studying the effects of human visitation on waterbirds at J.N. "Ding" Darling NWR, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Ardeids were quite tolerant of people but were disturbed as they took terrestrial prey; great blue herons, tricolored herons, great egrets, and little blue herons were observed to be disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern United States. Klein (1993), in studying waterbird response to human disturbance, found that as intensity of disturbance increased, avoidance response by the birds increased and that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived in the late fall, than later in winter. She also found gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et. al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction, and other reproductory functions of song (Arrese 1987). Disturbance, which leads to reduced singing activity, would make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Travel routes can disturb wildlife outside the immediate trail corridor (Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where

"generalists" (American robins) were found near trails and "specialist" species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et. al 1998).

Disturbance can cause shifts in habitat use, abandonment of habitat, and increased energy demands on effected wildlife (Knight and Cole, 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Hammitt and Cole (1998) conclude that the frequent presence of humans in "wildland" areas can dramatically change the normal behavior of wildlife mostly through "unintentional harassment."

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young.

The Delaware Natural Heritage Program, Division of Fish & Wildlife and the Department of Natural Resources and Environmental Control prepared a document on the "The Effects of Recreation on Birds: A literature Review" which was completed in April of 1999. The following information is in reference to this document:

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States (Burger 1981; Burger 1986; Klein 1993; Burger et al. 1995; Klein et al. 1995; Rodgers & Smith 1995, 1997; Burger & Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbance from recreation activities always have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, 1986; Klein 1993; Burger et al. 1995; Klein et al. 1995; Rodgers & Smith 1997; Burger & Gochfeld 1998). The findings that were reported in these studies are summarized as follows in terms of visitor activity and avian response to disturbance.

> Presence: Birds avoided places where people were present and when visitor activity was high (Burger 1981; Klein et al. 1995; Burger & Gochfeld 1998).
>
> Distance: Disturbance increased with decreased distance between visitors and species (Burger 1986), though exact measurements were not reported.
>
> Approach Angle: Visitors directly approaching birds on foot caused more disturbance than visitors driving by in vehicles, stopping vehicles near birds, and stopping vehicles and getting out without approaching birds (Klein 1993). Direct approaches may also cause greater disturbance than tangential approaches to birds (Burger & Gochfeld 1981; Burger et al. 1995; Knight & Cole 1995a; Rodgers & Smith 1995, 1997).

Type and Speed of Activity: Joggers and landscapers caused birds to flush more than fishermen, clammers, sunbathers, and some pedestrians, possibly because the former groups move quickly (joggers) or create more noise (landscapers). The latter groups tend to move more slowly or stay in one place for longer periods, and thus birds likely perceive these activities as less threatening (Burger 1981, 1986; Burger et al. 1995; Knight and Cole 1995a). Alternatively, birds may tolerate passing by with unabated speed whereas if the activity stops or slacks birds may flush (Burger et al. 1995).

Noise: Noise caused by visitors resulted in increased levels of disturbance (Burger 1986; Klein 1993; Burger & Gochfeld 1998), though noise was not correlated with visitor group size (Burger & Gochfeld 1998).

In determining compatibility, the cumulative effects of all public use on trails are considered. Due to the limitations put on these activities and that historical records show low use, disturbance from wildlife observers, photographers and those partaking in environmental education and interpretation is not expected to greatly increase the disturbance to wildlife.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation planning process for the Iroquois National Wildlife Refuge, this compatibility determination will undergo a comment period of 30 days concurrent with the release of our draft CCP/EA

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBLITY:

- Bald eagle nesting zones will be closed to public access January 1 to August 1.
- Almost all non-staff environmental education and interpreative activities will be limited to the Headquarters area and/or designated nature trails to minimize habitat destruction or disturbance to wildlife during the nesting.
- Special Use Permit will be issued for non-staff environmental education and interpretation programs that the Refuge staff have determined to not be effective in designated nature trails areas and still in-line with minimal widlife disturbance.

JUSTIFICATION:

Wildlife observation and photography, environmental education, and interpretation are priority wildlife dependent uses for the National Wildlife Refuge System through which the public can develop an appreciation for fish and wildlife (Executive Order 12996, March 25, 1996 and The

National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57)).

The Service's policy is to provide expanded opportunities for these uses when compatible and consistent with sound fish and wildlife management and ensure that they receive enhanced attention during planning and management. Allowing wildlife observation, photography, environmental education and interpretation on Iroquois National Wildlife Refuge will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the Refuge was established as evidenced by the impact analysis that shows this use will not compromise our ability to achieve the goals and objectives set forth under the Iroquois NWR CCP. In fact, allowing these uses supports those goals and objectives and the Service's Mission.

CONSULATION WITH THE REFUGE SUPERVISOR:

The Refuge Supervisor was consulted on January 2010; changes were made as needed.

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 15 - year Reevaluation Date: _____

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COMPATIBILITY DETERMINATION

USE: Migratory Game Bird Hunting

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is migratory game bird hunting which includes waterfowl (geese, ducks and coots) and other migratory game birds (woodcock, snipe, and rail). Hunting is a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

(b) Where would the use be conducted?

All Migratory Game Bird Hunts:

Waterfowl:

Waterfowl hunting will be permitted in Cayuga, Mohawk and Oneida Pools and Sutton's Marsh. Hunting will be from designated stand markers or on a "free-roam" type system. The number of available hunting permits will be limited for both stand and free-roam hunting systems.

Youth Hunt:

The Refuge hosts a Young Waterfowler's Program for junior hunters between 12-17 years of age. This includes an orientation program, held at the Refuge office, and a youth only waterfowl hunt. Youth waterfowl hunting will be permitted in the same areas of the Refuge open to the regular waterfowl hunt. The number of participants in this program will be limited.

Other migratory game birds:

The hunting of other migratory birds will be permitted on Refuge areas east of Sour Springs Road only.

(c) When would the use be conducted?

All Migratory Game Bird Hunts:

Hunting will be conducted during the New York State waterfowl and other migratory bird hunting seasons, in accordance with federal and state regulations. No hunting occurs on the Refuge before October 1, regardless of the start of the state seasons. All hunting hours will follow New York State regulations including; woodcock hunting from sunrise to sunset; snipe and rails ½ hour before sunrise to sunset. Refuge regulations on specific hunt seasons are as follows:

Waterfowl:

Waterfowl hunting will begin on the Refuge opening day and ends at the conclusion of the first split of the New York State waterfowl season or when regular deer season begins, which typically starts in mid-November, whichever comes first.

The exception to this will be that waterfowl hunting will continue in Cayuga Pool after the start of the regular (shotgun) deer season until the end of November, however we will not hunt Thanksgiving day. We will allow hunting on Tuesdays, Thursdays and Saturdays from ½ hour before legal sunrise until 12 PM. Check out will be at the Waterfowl Permit Station no later than 1 PM.

Youth Hunt:

The youth waterfowl hunt orientation will be held in late September or early October, before the youth waterfowl hunt. A youth waterfowl hunt will be during the New York State designated Youth Days, usually two weeks prior to the regular duck season. Hunting will occur from ½ hour before legal sunrise until 12 PM. Check out will be at the Waterfowl Permit Station no later than 1 PM.

Other migratory game birds:

Other migratory game bird hunting season is typically early October to early November. The Refuge will suspend other migratory game bird hunting once the waterfowl hunt season begins to balance the amount of Refuge acres open to migratory game bird hunting to 40% of the total Refuge area, this is required by the law under which the refuge was established. Therefore, other migratory game bird hunting will take place on the Refuge from early October to mid-late October, depending on the start of the waterfowl hunt season.

(d) How would the use be conducted?

We will continue to conduct the use according to state and federal regulations. Federal regulations in 50 CFR pertaining to the National Wildlife Refuge System Administration Act, as well as existing, specific Refuge regulations will apply. However, the Refuge Manager may, upon annual review of the hunting program, impose further restrictions on hunting, recommend that the Refuge be closed to hunting, or further liberalize hunting

regulations up to the limits of state regulations. We would restrict hunting if it becomes inconsistent with other, higher priority Refuge programs or endangers Refuge resources or public safety.

All Migratory Game Bird Hunts:

All persons hunting on the Refuge must first hold a valid state hunting license and must then obtain a Refuge hunting permit. One general Refuge hunting permit will be used for all Refuge hunt programs and will coincide with state hunting seasons. Hunters may then choose to apply for specific hunts and submit the required fees depending on their preferences. Permits must be applied for in person or via mail.

Individuals hunting on the Refuge are subject to the inspection of permits, licenses, hunting equipment, game bagged, boats, vehicles and their contents by federal or state officers.

Hunters may use only approved non-toxic shot for the shotgun hunting.

Unarmed hunters may scout areas that will be open to hunting before a particular season a week prior to the start of each individual season. Scouting will not be permitted throughout the season.

Dogs are allowed for hunting of migratory birds during designated seasons only. Dogs are prohibited during scouting.

Hunters with disabilities possessing, or who qualify for, a New York State disabled hunting license, Golden Access, or America the Beautiful Access Pass may qualify for special accommodations. We issue a non-ambulatory hunt permit which allows the use of two off-road parking sites for deer and small game. We also issue a non-ambulatory hunt permit for waterfowl hunting at a specified location. Contact the Refuge office for locations and more information. They must apply in person and show proof of permanent disability.

No hunting zones include, but are not limited to: the immediate areas around the Refuge office; around Refuge residences; the vicinity of the Iroquois Job Corps Center; Swallow Hollow, Kanyoo and Onondaga Nature Trails; and safety zones around private residences adjacent to the Refuge. Permission must be obtained from Refuge personnel to enter a "No Hunting Zone" or "Closed Area" for the purpose of tracking and/or retrieving legally taken game animals.

All hunters during any firearms deer seasons must wear in a conspicuous manner on head, chest and back a minimum of 400 square inches of solid-colored hunter orange clothing or material and must be visible from 360 degrees.

Vehicles are only allowed on established roads marked open for vehicular travel. Vehicles must be parked off the lane of travel and clear of gates.

Canoes and other non-motorized boats may only be used on Oak Orchard Creek, from Knowlesville Road to Route 63. You may launch boats from Route 63, Sour Springs Road and Knowlesville Road. Hunting from canoes and non-motorized boats is permitted per state law.

Temporary, portable tree stands and ground blinds are acceptable and must be removed daily. Hunters cannot use screw-in steps, nails, spikes, wire, or bolts as climbing or hanging devices or to attach a stand to a tree.

Prohibited Activities:

- Using illuminating devices, including automobile headlights, for the purpose of spotlighting game species.
- The distribution of bait, salt or any attractant, or hunting over a baited area.
- Under the influence or possession of alcoholic beverages while hunting.
- Possessing axes, hatchets, saws, nails, tacks, paint or flagging for the marking of trees and shrubs.
- Using nails wire, screws, or bolts to attach a stand to a tree.
- Commercial guiding on the Refuge.
- ATV's and snowmobiles are not allowed
- Camping, overnight parking, open fires and littering.

Waterfowl:

Waterfowl (geese, ducks and coots) may be hunted with shotguns only.

All waterfowl hunters are required to have taken and passed the New York State Waterfowl Identification Course.

There will be a $5.00 application fee per hunter per year for participating in the refuge waterfowl hunt program.

A pre-season lottery to select hunters for high volume hunt days will be conducted. The number of days selected for the pre-season lottery will be determined annually based on trend data, as well as what waterfowl hunting opens in the refuges region. Hunters will complete the Waterfowl Lottery Application and drop it off or send it via mail to Refuge office with a predetermined application fee prior to established deadline. We will not accept faxed or electronic application forms. Hunters will receive notification of selection and the date for which they were selected.

On waterfowl hunt days the Refuge will hold a daily drawing for hunt stands and "free roam" areas at the Waterfowl Permit Station on Route 77 at 5 AM. All hunters will be required to show their hunting license, valid duck stamp and Waterfowl Education Certification of Qualification card to enter the drawing. Hunters will then be handed a numbered disc. When their number is called, they may choose a hunt stand or "free roam" area spot. The Migratory Bird Hunt Report form will serve as the hunter's permit for the day. Up to 2 other hunter may accompany the permit holder. After all hunters that were preselected have chosen a stand or free roam area, if there are any remaining

hunting slots open a stand-by drawing will be conducted for any additional hunters present at the check station.

Hunting will occur in Cayuga, Mohawk and Oneida Pools and Sutton's Marsh. Hunting will be from designated stand markers (same as current management) or on a "free-roam" type system. The exact number of hunting slots available will be selected pre-season based on habitat conditions and current management actions taking place.

Hunters hunting from designated stand markers, must stay within 100 feet of their stand marker unless they are dispatching a crippled bird.

Non-motorized boats and canoes are permitted in the free roam areas as well as designated stand areas were it is deemed more appropriate to access via this method and not by foot. Hunting from canoes and non-motorized boats is permitted per state law.

Vegetation may not be removed or altered in any way.

No permanent structures are allowed.

Hunters may not possess more than 25 approved nontoxic shot shells in the field.

Non-Ambulatory Hunter Access: A blind will be constructed in the waterfowl hunting area. At the current time the refuge is proposing putting this blind in the Sutton's Marsh area. Reason for this is that the non-ambulatory hunter will be more in the mix of other hunters, this location already has a seasonal road access to it, and a great opportunity for providing a quality hunting experience. Until that time, the current blind location at Olsen's Marsh will be used.

Youth Hunt:
Youth that would like to participate in the youth waterfowl program must pre-register by completing a waterfowl lottery application form. To take part in the program, participants need their parent or guardian to sign on the Guardian Signature line. The application must be received by the deadline. The program is free but space is limited to 25 with preference give to first time participants; therefore pre-registration does not guarantee participation. If selected, participants must attend an orientation program held in late September or early October. The orientation covers: 1) waterfowl identification (optional for those who already have a Waterfowl Education Certificate of Qualification) and 2) hunting regulations, safety, equipment, a retriever demonstration and a trap shoot. Attendance is mandatory for everyone regardless of how many times you have been through the program.

Youth will be paired up with non-hunting guides who will coach as well as help call in birds if needed. A parent/guardian may arrange with the instructors to serve as a non-hunting guide on the hunt otherwise one will be assigned by the instructors. Guides must have a valid NY State hunting license, valid duck stamp and a Waterfowl Education Certificate of Qualification. The waterfowl youth hunt will take place during the New

York State waterfowl Youth Days, which is usually two weeks prior to the regular duck season. The procedures for the check station are the same as the regular waterfowl hunts (see above).

Parents that act as the hunting guide will be required to sit through the orientation as well.

Other migratory game birds:

Other migratory game birds (woodcock, snipe and rail) may be hunted with shotguns during designated state and Refuge seasons. The Refuge will suspend other migratory game bird hunting once the waterfowl hunt season begins to balance the amount of Refuge acres open to migratory game bird hunting to a maximum of 40% of the total Refuge area, as required by law. Therefore, other migratory game bird hunting will take place on the Refuge from early October to mid-late October, depending on the start of the waterfowl hunt season. The hunting of other migratory birds will be permitted on Refuge areas east of Sour Springs Road only.

(e) Why is the use being proposed?

Hunting is one of the priority uses outlined in the Refuge System Improvement Act of 1997. The Service supports and encourages priority uses when they are appropriate and compatible on National Wildlife Refuge lands. Hunting is used in some instances to manage wildlife populations. It is also a traditional form of wildlife-oriented recreation that many National Wildlife Refuges can accommodate.

AVAILABILITY OF RESOURCES

The following breakdown shows the estimated amount of funds needed to administer the program.

Annual costs to administer migratory bird hunting:

Identifier	Cost
Preparation of hunt areas, parking lots	$3000
Newsreleases, fact sheets brochures	$500
Lottery systems, check station	$2500
Signs	$500
Enforcement	$2500
Total Annual Cost	**$9000**

ANTICIPATED IMPACTS

The following anticipated impacts for hunting migratory birds on the Refuge, for more specific impacts including a cumulative impact analysis please refer to the EA for the Iroquois NWR CCP.

All Migratory Game Bird Hunts:

The U.S. Fish and Wildlife Service (USFWS) manages migratory birds on a flyway basis and States establish hunting regulations in each state based on flyway data and the regulations framework provided by the USFWS. Atlantic Flyway and the State of New York regulations apply to the migratory game bird hunting program at Iroquois Refuge. The Refuge hunting regulations, which are more restrictive than state and other federal regulations, limit hunt days and hunting hours, and include shot shell restrictions, etc. These Refuge-specific restrictions are in place to help provide a quality hunting experience for Refuge hunters. Hunting will reduce the number of birds in the flyway, within allowable limits, as determined by state and federal agencies. Hunting and the associated hunter activities likely would cause the direct disturbance of non-target birds, but only for the short term. There is no anticipated impact on endangered or threatened species on the Refuge.

Migratory game bird hunting is a very popular, longstanding public use on the Refuge. All areas of the Refuge are open to some form of hunting during hunting season except areas posted with safety zone or closed area signage. Although conflicts between user groups can arise, that does not appear to be a significant issue at the present levels of use. In the future, we may need to manage public use to minimize conflicts and insure public safety, should significant conflicts become evident. That may include public outreach or zoning to separate user groups. Conflicts between hunters can also occur. Competition among hunters for choice sites is keen, and can lead to unethical behavior. This may become more evident in the future when the Refuge opens impoundments to free-roam during the waterfowl hunting season.

Because the Refuge has been open to hunting since it was established, and hunting occurred in the area for many years before the creation of the Refuge, we expect no additional impacts. Some disturbance of non-target wildlife species and impacts on vegetation may occur. However, those impacts should be minimal, because migratory game bird hunting is regulated by the Refuge, occurs outside the breeding season and specific Refuge regulations prohibit the use of ATVs, off-road travel, permanent stands and blinds, camping and fires, which are most likely to significantly damage vegetation.

Waterfowl:

The temporary impacts of waterfowl hunting are mitigated by the presence of adjacent Refuge habitat where hunting does not occur, where birds can feed and rest undisturbed. Refuge regulations ensure that areas of inviolate sanctuary remain free of disturbance throughout the season. Additionally, waterfowl hunting occurs 3 days per week on the Refuge which gives the birds an opportunity to feed and rest undistributed on non-hunting days in the hunting locations.

The long term average of the number of waterfowl harvested per hunter per day since 1975 on the refuge is 1.4. This equates to a little over 1,000 birds being harvested per year on the Refuge. The waterfowl most often harvested by hunters on the Refuge are mallard, wigeon, green-wing teal, wood duck and Canada goose.

The activity of waterfowl hunters has little impact on other Refuge visitors, with the exception of those who wish to observe or photograph wildlife at the Cayuga overlook and areas along Feeder Road. Some users may be impacted by the presence and noise associated with waterfowl hunting on the entire western portion of the Refuge beginning at Route 63.

Other migratory game birds:

The temporary impacts of other migratory game bird hunting are mitigated by the presence of adjacent Refuge habitat where hunting does not occur and where birds can feed and rest undisturbed. Refuge regulations ensure that areas of inviolate sanctuary remain free of disturbance throughout the season. Additionally, other migratory game bird hunting will only occur on the Refuge for approximately 2-3 weeks which will give the birds an opportunity to feed and rest undistributed in designated hunting areas before and after the season.

Refuge harvest totals for other migratory game birds are low. This is a result of a low number of hunter visits for these species. Over the last 6 years, woodcock have been hunted an average of 15 visits per year, with a harvest of 3.8 birds per year. Although snipe and rail have been hunted on the Refuge in the last 6 years, none have been harvested.

The activity of hunting for other migratory game birds has little impact on other Refuge visitors, due to the fact that hunting for these species occurs east of Sour Springs road where there are no overlooks. Effects are minimal because of the minimal number of hunters targeting these species. Other Refuge users that may be impacted would be those walking on Onondaga and Swallow Hollow Trails that may hear the noise associated with hunting. Hunters must be at least 500 feet from Refuge trails.

PUBLIC REVIEW AND COMMENT

As part of the comprehensive conservation planning process for the Iroquois NWR, this compatibility determination will undergo extensive public review, including a comment period of 30 days following the release of the Draft CCP/EA.

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

We will manage the hunt program in accordance with federal and state regulations, and review it annually to ensure that wildlife and habitat management goals are achieved and that the program is providing a safe, high quality hunting experience for participants. Therefore, adherence to the regulations highlighted above for each hunting program will ensure compatibility with the purpose for which the Refuge was established.

JUSTIFICATION

Iroquois NWR is located in a rural area between Buffalo and Rochester, NY. Hunting is a traditional and well established activity on the Refuge. It does not conflict with other types of public uses that may occur on the Refuge. Hunting satisfies a recreational need, but hunting on National Wildlife Refuges is also an important, proactive management action that can prevent over population and the deterioration of habitat.

Hunting is a wildlife-dependent priority public use with minimal impact on Refuge resources. It is consistent with the purposes for which the Refuge was established, the Service policy on hunting, the National Wildlife Refuge system Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System.

We do not expect this use to materially interfere with or detract from the mission of the Refuge System nor diminish the purposes for which the Refuge was established. It will not cause an undue administrative burden. Annual adjustments can be made in the hunting program to ensure its continued compatibility.

CONSULATION WITH THE REFUGE SUPERVISOR:

The Refuge Supervisor was consulted on January 2010; changes were made as needed.

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 15 - year Reevaluation Date: _____

COMPATIBILITY DETERMINATION

USE: Big Game Hunting

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is big game hunting, which includes deer and spring turkey. Hunting is a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

(b) Where would the use be conducted?

All Big Game Hunts:

Deer:

Deer hunting will be permitted throughout the entire Refuge, except closed areas to protect facilities and structures, as well as buffers around refuge trail systems. Additionally, Cayuga Pool will be closed to facilitate waterfowl hunters.

Spring turkey:

The hunting of spring turkey will be permitted throughout the entire Refuge, except closed areas to protect facilities and structures, as well as buffers around refuge trail systems, bald eagle nesting areas, and emergent marsh habitat.

Youth Hunt:

The hunting of spring turkey will be permitted throughout the entire Refuge, except closed areas to protect facilities and structures, as well as buffers around refuge trail systems and bald eagle nesting areas.

(c) When would the use be conducted?

All Big Game Hunts:

Hunting will be conducted during state of New York big game hunting seasons, in accordance with federal and state regulations. In cooperation with the states, we may adjust hunt season dates and bag limits in the future as needed to achieve balanced wildlife population levels within habitat carrying capacities. No hunting occurs on the Refuge before October 1, regardless of the start of the state seasons. No night hunting is allowed on the Refuge. Refuge regulations on specific hunt seasons are as follows:

Deer:

Deer hunting will be permitted during the state of New York archery, shotgun, and muzzleloader seasons between October 1 and the last day of February. Typically bow-hunting is open from mid-October to mid-November and then again for a week in December (after the regular shotgun season closes). The regular shotgun season is typically mid-November to mid-December. Muzzleloader season is typically during the same time as the late bow-hunting season, one week in December. Hunting hours are sunrise to sunset.

Spring turkey:

Spring turkey hunting will be permitted the first two weeks of the season, which typically begins the beginning of May. Hunting hours are ½ hour before sunrise to noon.

Youth Hunt

The youth spring turkey hunt will be held during the New York State Youth Hunt Days which is usually the 3rd or 4th weekend in April. An orientation program for youth selected to hunt will be held at the Refuge prior to hunt days.

(d) How would the use be conducted?

We will continue to conduct the use according to state and federal regulations. Federal regulations in 50 CFR pertaining to the National Wildlife Refuge System Administration Act, as well as existing, Refuge specific regulations will apply. However, the Refuge Manager may, upon annual review of the hunting program, impose further restrictions on hunting, recommend that the Refuge be closed to hunting, or further liberalize hunting regulations up to the limits of state regulations. We would restrict hunting if it becomes inconsistent with other, higher priority Refuge programs or endangers Refuge resources or public safety.

All Big Game Hunts:

All persons hunting on the Refuge must first hold a valid state hunting license, and must then obtain a Refuge hunting permit. One general Refuge hunting permit will be used for all Refuge hunt programs and will coincide with state hunting seasons. Hunters may then choose to apply for hunts conducted through a lottery system and submit the appropriate fee/fees.

Individuals hunting on the Refuge are subject to the inspection of permits, licenses, hunting equipment, game bagged, boats, vehicles, and their contents by federal or state officers.

A $5.00 application fee will be collected for all pre-season lottery hunts, except youth programs.

Unarmed hunters may scout areas that will be open to hunting before a particular season a week prior to the start of each individual season.

Dogs are prohibited during scouting.

Hunters with disabilities possessing, or who qualify for, a New York State disabled hunting license, Golden Access, or America the Beautiful Access Pass may qualify for special accommodations. We issue a non-ambulatory hunt permit which allows the use of two off-road parking sites for deer and small game. We also issue a non-ambulatory hunt permit for waterfowl hunting at a specified location. They must apply in person and show proof of permanent disability.

No Hunting Zones include but are not limited to: the immediate areas around the Refuge office; around Refuge residences; the vicinity of the Iroquois Job Corps Center; Swallow Hollow, Kanyoo and Onondaga Nature Trails; and safety zones around private residences adjacent to the Refuge and within the Refuge. Permission must be obtained from Refuge personnel to enter a "No Hunting Zone" or "Closed Area" for the purpose of tracking and/or retrieving legally taken game animals.

All big game hunters must wear in a conspicuous manner on head, chest and back a minimum of 400 square inches of solid-colored hunter orange clothing or material and must be visible from 360 degrees during any firearms deer seasons.

Vehicles are only allowed on established roads marked open for vehicular travel. Vehicles must be parked off the lane of travel and clear of gates. ATV's and snowmobiles are not allowed.

Canoes and other non-motorized boats may only be used on Oak Orchard Creek, from Knowlesville Road to Route 63. You may launch canoes and other non-motorized boats from Route 63, Sour Springs Road, and Knowlesville Road. Hunting from canoes and non-motorized boats is permitted per state law.

Temporary, portable tree stands and ground blinds are acceptable and must be removed daily. Permanent tree stands and ground blinds are prohibited. Hunters cannot use screw-in steps, nails, spikes, wire, or bolts as climbing or hanging devices to attach a stand to a tree.

<u>Prohibited Activities:</u>

- Using illuminating devices, including automobile headlights, for the purpose of spotlighting game species.
- The distribution of bait, salt, or any attractant, or hunting over a baited area.
- Under the influence or possession of alcoholic beverages while hunting.
- Possessing axes, hatchets, saws, nails, tacks, paint or flagging for the marking of trees and shrubs.
- Commercial guiding on the Refuge.
- Camping, overnight parking, open fires, and littering.

Deer:

Deer may be hunted with shotguns, muzzleloaders, or archery equipment during designated state and Refuge seasons.

Shotgun-specific:

A pre-season lottery drawing will be used for days/dates where the Refuge receives high level of use. During the 2007 and 2008 hunt seasons, the Refuge has had between 400 and 450 individuals register for hunting on opening day. Quality of hunting experience as well as providing ample hunting room per hunter would be achieved by reducing the number of hunters on a given day.

Onondaga Trail will no longer be closed during the regular deer hunting season. All Refuge trails will have a 500 foot no hunting zone associated with them.

Scouting will only be permitted the week prior to the start of the hunting seasons.

A separate lottery system for non-ambulatory hunters will be created.

Spring turkey:

A pre-season lottery drawing will be conducted to select hunters for the 50 slots that are available for the refuge's spring turkey season.

All folks interested in the spring turkey hunt will have had to applied by close of business March 30th.

Only the first two weeks of spring turkey season will be hunted on the Refuge. The first week will be May 1 to May 7 and the second week will be May 8 to May 14.

The number of turkey permits will be 25 per week.

Scouting will be allowed from the day after the Spring Turkey Youth Hunt day to April 30th.

Hunters are required to turn in a harvest report.

Youth Hunt:
The youth spring turkey hunt will be held on the Saturday and Sunday of the New York State Youth Hunting weekend, which is usually the 3rd or 4th weekend in April. This hunt is for youth ages 12-15. Youth interested in participating in the program must complete a big game hunt application. Application deadlines will be March 15 each year. In order to partake in the program, a parent or guardian must sign on the Guardian Signature line. The program is free, but space is limited to 25 participants.

Those selected must attend an orientation program that will be conducted by the refuge and hopefully in cooperation with the local chapter of the National Wild Turkey Federation. The orientation will review hunter safety, turkey calling, equipment, ethics, and sportsmanship, as well as conservation and messages about the refuge system. After the orientation we will issue a Big Game Harvest Report to all participants.

All junior hunters must be accompanied by an adult both at the orientation and during the day of the hunt. Adult guides must have a valid New York State Hunting license but may not hunt.

(e) Why is the use being proposed?

Hunting is one of the priority uses outlined in the Refuge System Improvement Act of 1997. The Service supports and encourages priority uses when they are appropriate and compatible on national wildlife Refuge lands. Hunting is used in some instances to manage wildlife populations. It is also a traditional form of wildlife-oriented recreation that many National Wildlife Refuges can accommodate.

AVAILABILITY OF RESOURCES

The following breakdown shows the estimated amount of funds needed to administer the program.

Annual costs to administer big game hunting:

Identifier	Cost
News releases, publications, fact sheets	$1000
Lottery drawing, hunter notification	$1500
Signs	$500
Youth Orientations	$500
Total Annual Cost	**$3500**

* Refuge trails and roads are maintained for a variety of activities. Costs shown are a percentage of total costs for trail/road maintenance on the Refuge and are reflective of the percentage of trail/road use for this activity. Volunteers account for some maintenance hours and help to reduce overall cost of the program.

ANTICIPATED IMPACTS

The following anticipated impacts are expected, for more specific impacts including a cumulative impact analysis please refer to CCP/EA document.

All Big Game Hunts:

Big game hunting is a very popular, longstanding public use on the Refuge. All areas of the Refuge are open to some form of hunting during hunting season except safety zones and closed areas. Although conflicts between user groups can arise, that does not appear to be a significant issue at the present levels of use. In the future, we may need to manage public use to minimize conflicts and ensure public safety, should significant conflicts become evident. That may include public outreach or zoning to separate user groups.

Conflicts between hunters can occur. In some cases, competition among hunters for choice sites is keen, and has led to unethical behavior. Hunters may only use portable tree stands that must be removed on a daily basis. However, some stands are left in place illegally for prolonged periods or are nailed directly into trees.

Because the Refuge has been open to hunting since it was established and hunting occurred in the area for many years before the creation of the Refuge, we expect no additional impacts. Some disturbance of non-target wildlife species and impacts on vegetation may occur. However, those impacts should be minimal, because big game hunting is regulated by the Refuge, occurs outside the breeding season, and specific Refuge regulations prohibit the use of ATVs, off-road travel, permanent stands and blinds, camping, and fires, which are most likely to significantly damage vegetation.

Hunting and the associated hunter activity likely would cause the direct disturbance of non-target birds, but only for the short term. There is no anticipated impact on endangered or threatened species on the Refuge either.

Deer:

Since 2000, the total number of deer harvested on the Refuge is 1,795. This averages out to approximately 200 deer harvested each season. The buck to doe ratio in the harvest is approximately 1:1. This ratio includes young of the year deer which are all taken with antlerless permits. On average 6 deer are harvested per day across the entire deer season. State deer density estimates for this region are approximately 30 per square mile and have shown little change in the last several years. Refuge staff believes that the Refuge deer population is similar to the overall western New York population, which is intensely managed by New York State.

While many hunters use the Refuge to hunt deer, more do so during the shotgun season than any other season. The heaviest usage is during the first full week of shotgun and on the weekends. In the last three years hunter visits have gone up from around 3,000 visits in 2006 to 4,500 in 2008. The increase in number in such a sort amount of time could be for many reasons. One in particular is that many hunters do not own their own land and are relying more on public lands to hunt.

The activity of deer hunters has some impact on other Refuge visitors. While the bow hunting season has little or no impact on the public, the shotgun and muzzleloader season may. Some users may be impacted by the presence and noise associated with shotgun and muzzleloader hunting which occurs on the entire Refuge. Visitors will be impacted by this as they walk on Refuge trails and visit Refuge overlooks, or avoid the Refuge completely for concerns of safety.

Deer hunting helps to keep deer populations within the carrying capacity of the habitat, thus reducing excessive damage to vegetation caused by over-browsing and maintaining understory habitat for other species. There may be temporary impacts on other species of wildlife during deer season. However, in the case of migratory waterfowl, deer hunters will cause little disturbance to them in the marshes where the birds feed and rest since most deer hunting takes place in upland habitats. Additionally, shotgun deer hunting will only occur on the Refuge for approximately 3 weeks which will give the birds an opportunity to feed and rest undistributed in those areas before and after the season.

Spring turkey:

Between 1986 and 2008, 103 turkeys were harvested on the Refuge, three of which were harvested during the youth hunt. Since 1994, the Refuge has given out 50 permits per season. Prior to 1994, a great number of permits were given out annually. This number fluctuated, depending on the year. The average success rate since 1994 is 14.6%. We did not see a decrease in the success rate once the number of permits was decreased to 50. However, with the Refuge spring hunting season being shortened in the future, there many be a decrease in the success rate.

The impacts of turkey hunting to other species of wildlife on the Refuge will be minimal. While spring turkey season is during the spring migration, we believe that by reducing the amount of time hunters are afield, we will lessen the impact to migratory birds and those that breed on the Refuge. Resident wildlife impacts will also be low due to the same reasons stated above.

Turkey hunting has little impact on other Refuge visitors, due to the fact that hunting only occurs for a two week period, relatively few permits are allocated, and hunting takes place from ½ before sunrise to noon when the Refuge does not have other activities going on except in designated closed areas like interpretive trails. Refuge users that may be impacted would be those walking Refuge trails and those visiting overlooks. They may hear the noise associated with hunting. Hunters must hunt at least 500 feet from Refuge trails.

PUBLIC REVIEW AND COMMENT

As part of the comprehensive conservation planning process for the Iroquois NWR, this compatibility determination will undergo extensive public review, including a comment period of 30 days following the release of the Draft CCP/EA.

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

We will manage the hunt program in accordance with federal and state regulations and review it annually to ensure that wildlife and habitat management goals are achieved and that the program is providing a safe, high quality hunting experience for participants. Therefore, adherence to the regulations highlighted above for each hunting program will ensure compatibility with the purpose for which the Refuge was established. Eagle nesting zones will be closed to hunting activities from January 1 to August 1.

JUSTIFICATION

Iroquois NWR is located in a rural area between Buffalo and Rochester, NY. Hunting is a traditional and well established activity on the Refuge. It does not conflict with other types of public uses that may occur on the Refuge. Hunting satisfies a recreational need, but hunting on National Wildlife Refuges is also an important, proactive management action that can prevent over population and the deterioration of habitat.

Hunting is a wildlife-dependent priority public use with minimal impact on Refuge resources. It is consistent with the purposes for which the Refuge was established, the Service policy on hunting, the National Wildlife Refuge system Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System.

We do not expect this use to materially interfere with or detract from the mission of the Refuge System nor diminish the purposes for which the refuge was established. It will not cause an undue administrative burden. Annual adjustments can be made in the hunting program to ensure its continued compatibility.

CONSULATION WITH THE REFUGE SUPERVISOR:

The Refuge Supervisor was consulted on January 2010; changes were made as needed.

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 15 - year Reevaluation Date: _____

COMPATIBILITY DETERMINATION

USE: Upland Game Hunting

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is upland game hunting which includes ringneck pheasant, ruffed grouse, cottontail rabbit, gray squirrel, coyote, raccoon, skunk, opossum and fox. Hunting is a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

(b) Where would the use be conducted?

Upland game hunting will be permitted throughout the entire Refuge, with the exception of closed areas to protect refuge facilities, maintain buffers around nature trails and overlooks, and the Iroquois Job Corps Center.

Weapons may not be discharged within, into or across a "No Hunting Zone" or "Closed Area"; or from on or across any Refuge road or designated foot trail. All Refuge trails are open to foot traffic throughout the entire year. No trails will be closed during the hunting season including Onondaga Trail. Hunting from within 500 feet of any hiking trail or from within 500 feet of any resident or Refuge building is prohibited. Hunting along Oak Orchard Creek can occur via a non-motorized boat along Oak Orchard Creek from Knowlesville Road to Route 63.

(c) When would the use be conducted?

Hunting will be conducted during New York State upland game hunting seasons, in accordance with federal and state regulations. No hunting occurs on the Refuge before

October 1, regardless of the start of the state seasons. Hunting concludes on the Refuge on the last day of February.

Cottontail rabbit, gray squirrel, coyote and ruffed grouse hunting is typically open from October 1 to the last day of February. Hunting for raccoon, skunk, opossum, and fox is usually open from late October to mid- February. Pheasant hunting is typically mid-October to mid-November.

No night hunting is allowed on the Refuge. All upland game hunting hours are sunrise to sunset.

(d) How would the use be conducted?

The Refuge will allow upland game - ringneck pheasant, ruffed grouse, cottontail rabbit, gray squirrel, coyote, raccoon, skunk, opossum, and fox - to be hunted with shotguns during designated state and Refuge seasons.

We will continue to conduct the use according to state and federal regulations. Federal regulations in 50 CFR pertaining to the National Wildlife Refuge System Administration Act, as well as existing, specific Refuge regulations will apply. Changes from the existing hunt program are being proposed. However, the Refuge Manager may, upon annual review of the hunting program, impose further restrictions on hunting, recommend that the Refuge be closed to hunting, or further liberalize hunting regulations within the limits of state law. We would restrict hunting if it becomes inconsistent with other, higher priority Refuge programs or endangers refuge resources or public safety.

All persons hunting on the Refuge must first hold a valid state hunting license, and must then obtain a Refuge hunting permit. One general Refuge hunting permit will be used for all Refuge hunt programs and will coincide with state hunting seasons. Hunters may then choose to apply for different hunts that are conducted under a lottery system and submit the required fees depending on their preferences. Application must be submitted to the refuge office.

Individuals hunting on the Refuge are subject to the inspection of permits, licenses, hunting equipment, game bagged, boats, vehicles, and their contents by federal or state officers.

Hunters may use only approved non-toxic shot for the shotgun hunting of all species.

Unarmed hunters may scout areas that will be open to hunting before a particular season a week prior to the start of each individual season. Scouting will not be permitted throughout the season.

Dogs are allowed for hunting of migratory game birds, cottontail rabbits and ruffed grouse during designated seasons only. Dogs are prohibited during scouting.

Hunters with disabilities possessing, or who qualify for, a New York State disabled hunting license, Golden Access or America the Beautiful Access Pass may qualify for special

accommodations. We issue a non-ambulatory hunt permit which allows the use of two off-road parking sites for deer and upland game. You must apply in person and show proof of permanent disability.

No hunting zones include but are not limited to: the immediate areas around the Refuge office; around Refuge residences; the vicinity of the Iroquois Job Corps Center; Swallow Hollow, Kanyoo and Onondaga Nature Trails; and safety zones around private residences adjacent to and within the Refuge. Permission must be obtained from Refuge personnel to enter a "No Hunting Zone" or "Closed Area" for the purpose of tracking and/or retrieving legally taken game animals.

All hunters during any firearms deer seasons must wear in a conspicuous manner on head, chest and back a minimum of 400 square inches of solid-colored hunter orange clothing or material and must be visible from 360 degrees.

Vehicles are only allowed on established roads marked open for vehicular travel. Vehicles must be parked off the lane of travel and clear of gates. ATV's and snowmobiles are not allowed.

Canoes and other non-motorized boats may only be used on Oak Orchard Creek, from Knowlesville Road to Route 63. You may launch boats from Route 63, Sour Springs Road and Knowlesville Road. Hunting from canoes and non-motorized boats is permitted per state law.

Temporary, portable tree stands and ground blinds are acceptable and must be removed daily.

Prohibited Activities:

- Using illuminating devices, including automobile headlights, for the purpose of spotlighting game species.
- The distribution of bait or hunting over a baited area, salt or any attractant.
- Under the influence or possession of alcoholic beverages while hunting.
- Possessing axes, hatchets, saws, nails, tacks, paint or flagging for the marking of trees and shrubs.
- Using nails wire, screws, or bolts to attach a stand to a tree.
- Commercial guiding on the Refuge.
- Camping, overnight parking, open fires and littering.

(e) Why is the use being proposed?

Hunting is one of the priority uses outlined in the Refuge System Improvement Act of 1997. The Service supports and encourages priority uses when they are appropriate and compatible on National Wildlife Refuge lands. Hunting is used in some instances to manage wildlife populations. It is also a traditional form of wildlife-oriented recreation that many National Wildlife Refuges can accommodate.

AVAILABILITY OF RESOURCES
The following breakdown shows the estimated amount of funds needed to administer the program.

Annual costs to administer upland game hunting:

Identifier	Cost
Maintain Roads, trails	$350
Maintain kiosks, signs	$500
Fact Sheets, Brochures, reports	$1000
Total Annual Cost	**$1850**

* Refuge trails and roads are maintained for a variety of activities. Costs shown are a percentage of total costs for trail/road maintenance on the Refuge and are reflective of the percentage of trail/road use for this activity. Volunteers account for some maintenance hours and help to reduce overall cost of the program.

ANTICIPATED IMPACTS
The following anticipated impacts are included in the Comprehensive Conservation Plan \Environmental Assessment for Iroquois NWR. For more specific impacts including a cumulative impact analysis please refer to that document.

Hunting is a very popular, longstanding public use on the Refuge, although upland game hunting is the not as popular as others. All areas of the Refuge are open to some form of hunting during hunting season except safety zones and closed areas. Although conflicts between user groups can arise, that does not appear to be a significant issue at the present levels of use. In the future, we may need to manage public use to minimize conflicts and insure public safety, should significant conflicts become evident. That may include public outreach or zoning to separate user groups. Conflicts between hunters can also occur. Competition among hunters for choice sites is keen, and can lead to unethical behavior. This may become more evident in the future when the Refuge opens impoundments to free roam during the waterfowl hunting season.

Because the Refuge has been open to hunting since it was established and hunting occurred in the area for many years before the creation of the Refuge, we expect no additional impacts. Some disturbance of non-target wildlife species and impacts on vegetation may occur. However, those impacts should be minimal, because migratory game bird hunting is regulated by the Refuge, occurs outside the breeding season, and specific Refuge regulations prohibit the use of ATVs, off-road travel, permanent stands and blinds, camping and fires, which are most likely to significantly damage vegetation.

Refuge harvest averages for the past 6 years (2003-2009) for upland small game are as follows. Cottontail rabbits were hunted on average 127 times per season with approximately 40 harvested. Ruffed grouse were hunted on average 33 times per season with approximately 2 birds harvested. Squirrels are hunted on the Refuge approximately 110 times a season with 34 harvested on average. Pheasant hunting occurred on average 24 times a season with an average of 1.5 birds

harvested. Only one fox was harvested in the last 6 years as hunters hunted for them on average 34 times per season. Similarly, only one coyote was harvested in the last 6 years as hunters hunted for them on average 29 times per season. Most upland game hunters are hunting multiple species each time they hunt therefore the number of times a hunter is actually on the Refuge hunting during the season is lower than the numbers above suggest.

The activity of upland game hunters has little impact on other Refuge visitors, with the exception of those who wish to observe or photograph wildlife at some of the overlooks and areas along Feeder Road. Some users may be impacted by the presence and noise associated with upland game hunting on the entire Refuge. Hunting and the associated hunter activity likely would cause the direct disturbance of non-target birds, but only for the short term. There is no anticipated impact on endangered or threatened species on the Refuge either.

PUBLIC REVIEW AND COMMENT

As part of the comprehensive conservation planning process for the Iroquois NWR, this compatibility determination will undergo extensive public review, including a comment period of 30 days following the release of the Draft CCP/EA.

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

We will manage the hunt program in accordance with federal and state regulations, and review it annually to ensure that wildlife and habitat management goals are achieved and that the program is providing a safe, high quality hunting experience for participants. Therefore, adherence to the regulations highlighted above for each hunting program will ensure compatibility with the purpose for which the Refuge was established. Eagle nesting zones will be closed to hunting after January 1.

JUSTIFICATION

Iroquois NWR is located in a rural area between Buffalo and Rochester, NY. Hunting is a traditional and well established activity on the Refuge. It does not conflict with other types of public uses that may occur on the Refuge. Hunting satisfies a recreational need, but hunting on National Wildlife Refuges is also an important, proactive management action that can prevent over population and the deterioration of habitat.

Hunting is a wildlife-dependent priority public use with minimal impact on refuge resources. It is consistent with the purposes for which the Refuge was established, the Service policy on hunting, the National Wildlife Refuge System Improvement Act of 1997, and the broad management objectives of the National Wildlife Refuge System.

We do not expect this use to materially interfere with or detract from the mission of the Refuge System nor diminish the purposes for which the Refuge was established. It will not cause an undue administrative burden. Annual adjustments can be made in the hunting program to ensure its continued compatibility.

CONSULATION WITH THE REFUGE SUPERVISOR:

The Refuge Supervisor was consulted on January 2010; changes were made as needed.

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 15 - year Reevaluation Date: _____

COMPATIBILITY DETERMINATION

USE: Sport Fishing

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is fishing, a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

(b) Where would the use be conducted?

The use would be conducted at Ringneck Marsh and along Oak Orchard Creek.

Fishing at Ringneck Marsh would occur along Sour Springs Road and along the dike, north of the water control structure on the western side of the marsh.

Fishing along Oak Orchard Creek can occur from any of the three road intersections (Knowlesville Road, Sour Springs Road and Route 63) and via canoe or a non-motorized boat along Oak Orchard Creek from Knowlesville Road to Route 63. Anglers fishing from the road intersections must stay on stream banks within 100 feet of the road / bridge intersections.

(c) When would the use be conducted?

Fishing on the Refuge would be conducted during the hours and in the seasons specified in the fishing regulations of the State of New York. Therefore fishing would be permitted year around at designated areas. Ice fishing on Ringneck Marsh is typically from the beginning of December to the end of February, depending on ice conditions. On the first Saturday in June the Refuge holds a youth fishing derby at Ringneck Marsh.

(d) How would the use be conducted?

Fishing would be conducted under the State of New York fishing regulations for open water fishing and ice fishing, with some additional restrictions to protect fish, wildlife and habitat, and reduce potential conflicts among public uses.

Per New York State fishing regulations, frogging is a form of fishing. The Refuge would permit frogging for bullfrogs only in accordance with state fishing regulation.

A valid State of New York fishing license would be required to fish on the Refuge in accordance with state regulations.

At the discretion of the Refuge Manager, we may close some areas seasonally, temporarily, or permanently to fishing, if wildlife or habitat impacts or user conflicts become an issue. In cooperation with state fisheries biologists, we may manipulate the fisheries or habitat to promote or improve the fishery resource, if warranted. That may include changing fishing regulations (season dates, creel limits, and methods of take), directly manipulating the fisheries (by controlling exotic species or stocking), adjusting water levels, introducing or removing fish barriers, manipulating in-stream or streambank habitat.

Prohibited Activities:

- The use of bows or spears to take fish, even though permitted by state regulations.
- Snagging, foul hooking or snatching fish.
- Collection of bait fish.
- Unauthorized introductions of both non-native and native fish can also significantly disrupt aquatic ecosystems and destroy natural fisheries. No fish of any species may be introduced onto the Refuge. That includes unused baitfish and eggs.
- The use of lead sinkers.
- Littering and discarding tackle and line.

(e) Why is the use being proposed?

The use is being proposed to accommodate one of the priority public uses of the Refuge System. We have the opportunity to provide public fishing in a manner and location that will offer high quality, wildlife-dependent recreation and maintain the level of current fish and wildlife values.

AVAILABILITY OF RESOURCES

The following shows the estimated amount of funds needed to administer the program.

Annual cost for sport fishing

Identifier	Cost
Fact sheets, brochures	$500
Dike mowing	$500

Total Annual Cost	**$1000**

ANTICIPATED IMPACTS OF USE

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Accidental or deliberate introductions of non-native fish that may negatively affect native fish, wildlife, or vegetation: Adding a Refuge law enforcement officer will help supplement state enforcement.

Accidental introduction of invasive plants, pathogens, or exotic invertebrates, attached to non-motorized boats: Some invasive aquatic plants do exist on the Refuge. However, we have not carried out extensive surveys of aquatic invasive plants. We can mitigate their impacts by continuing education, outreach, and initiating an intensive monitoring program.

Negative effects on eagles, osprey, waterfowl, and other wildlife from lost fishing gear (e.g., from ingesting lead sinkers, hooks, lures, and litter or becoming entangled in fishing line or hooks): Lost fishing tackle may harm waterfowl, eagles, and other birds externally by catching and tearing skin. Fishing line may also become wrapped around body parts and hinder movement (legs, wings), impair feeding (bills), or cause a constriction with subsequent reduction of blood flow and tissue damage. An object above or below the water surface may snag entangled animals, from which they are unable to escape.

Birds may also ingest sinkers, hooks, floats, lures, and fishing line. Ingested tackle may damage or penetrate the mouth or other parts of the digestive tract, resulting in impaired function or death. Lead tackle is particularly toxic for wildlife. New York prohibits the sale and use of lead sinkers weighing one half ounce or less. The Refuge will continue to provide education and outreach on the hazards of lead sinkers and discarded fishing tackle. A new Refuge Officer will help in that public outreach.

Disturbance of wildlife (particularly breeding and brood-rearing waterfowl, eagles, ospreys, and wading birds): Fishing seasons in New York coincide in part with spring-early summer nesting and brood-rearing periods for many species of aquatic dependent birds. Anglers and other non-motorized boaters may disturb nesting birds by approaching too close to nests, causing nesting birds to flush. Flushing may expose eggs to predators or cooling, resulting in egg mortality. We will close Refuge areas, as needed, to fishing and boating around sensitive nest sites. We will also continue public outreach and the placement of warning signs.

Bank and trail erosion from human activity (boat launches, foot traffic), which may increase aquatic sediment loads of streams and rivers or alter riparian or lakeshore habitat or vegetation in ways harmful to fish or other wildlife: Non-motorized boat access will be restricted to designated areas only. Those areas will be ‘hardened’ to contain impacts in a small area. We will monitor launch sites, and may modify, restore, or close them if conditions warrant. Wetlands guard much of the Refuge shoreline, making it extremely difficult to access for fishing. All new trail and access construction will follow best management practices. Therefore, at current levels of use, we do not expect trail erosion to increase because of foot traffic related to fishing.

Vegetation disturbance associated with improving boat launch and fishing access sites: Because fishing will occur from non-motorized boats, we expect no erosion from bank fishing or trampling of vegetation.

PUBLIC REVIEW AND COMMENT

As part of the comprehensive conservation planning process for the Iroquois National Wildlife Refuge, this compatibility determination will undergo a comment period of 30 days concurrent with the release of our draft CCP/EA.

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

We will manage the fishing program in accordance with federal and state regulations, and review it annually to ensure that wildlife and habitat management goals are achieved and that the program is providing a safe, high quality fishing experience for participants. We based this on our stipulations listed below.

- We will review the fishing program annually to ensure that it contributes to Refuge objectives in managing a quality fishery and protecting habitats. That may include surveys of anglers, fish, and habitats.
- We will prohibit lead sinkers and other lead tackle to prevent their ingestion by wildlife and possible lead poisoning.
- We will permit non-motorized boat launching only in designated areas to prevent the erosion and degradation of wetlands or water quality and ensure public safety.
- We will allow access to Ringneck Marsh dike via foot access only.
- We will close wildlife nesting and brood-rearing areas as needed, to all public use, to prevent the disturbance of wildlife.
- We will increase public outreach and education to minimize conflicts among user groups, help control aquatic invasive plants and lead in the environment, reduce the introduction of nonnative fish species, and minimize the disturbance of wildlife and habitat.

JUSTIFICATION

Fishing is one of the six priority public uses of the Refuge System, and has been determined to be a compatible activity on many refuges nationwide. The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate those six uses. We do not expect this use to materially interfere with or detract from the mission of the Refuge System or diminish the purposes for which the Refuge was established. It will not pose significant adverse effects on refuge resources, nor interfere with public use of the Refuge, nor cause an undue administrative burden. We can make annual adjustments in the fishing program to ensure its continued compatibility.

CONSULATION WITH THE REFUGE SUPERVISOR:

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 10 - year Reevaluation Date: _____

BIBLIOGRAPHY

New York State Fishing Regulation Guide, 2009, Department of Environmental Conservation.

Finding of Appropriateness of a Refuge Use (603 FW 1, Exhibit 1)

Refuge Name: Iroquois National Wildlife Refuge_____

Use: Walking and Hiking
This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ___ No ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate__X___**

Refuge Manager: _____ Date: _____

If found to be Not Appropriate, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found Not Appropriate outside the CCP process, the refuge supervisor must sign concurrence.
If found to be Appropriate, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Iroquois National Wildlife Refuge

Use: Walking and Hiking

Narrative

Trail activities consisting of walking and hiking will be used to facilitate priority public uses on the Iroquois National Wildlife Refuge. Priority public uses of the National Wildlife Refuge System as defined by statute regulation are hunting, fishing, wildlife observation and photography, environmental education, and interpretation. 16 U.S.C. § 668ee (2); 50 C.F.R. § 25.12. Currently all priority public uses are permitted on the Iroquois NWR.

Foot travel may increase root exposure and trampling effects, however it is anticipated that under the current use the incidence of these problems will be minor. Routes for pedestrian travel consist of roads and trails. The roads have hardened surfaces or are existing trails that have been used for many years. Routes do not have any known occurrences of rare plant species on their surface that would be impacted by this use. It is anticipated that some soil erosion could occur as a result of continuing pedestrian access on designated routes.

Wildlife species using habitat on or directly adjacent to the designated pedestrian routes will likely be affected. These disturbances are likely to be short term and infrequent based on the current level of use. Sedimentation impacts will likely be minor as a result of foot travel. Long-term impacts may include some wildlife species avoiding designated trails as a result of this use over time. These impacts are not likely to significantly affect wildlife populations along these routes based on current use.

Finding of Appropriateness of a Refuge Use (603 FW 1, Exhibit 1)

Refuge Name: Iroquois National Wildlife Refuge

Use: Jogging and Bicycling
This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ___ No ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate__X___**

Refuge Manager: _____ Date: _____

If found to be Not Appropriate, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found Not Appropriate outside the CCP process, the refuge supervisor must sign concurrence.
If found to be Appropriate, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Iroquois National Wildlife Refuge

Use: Jogging and Bicycling

Narrative

Trail activities consisting of jogging and bicycling will be used to facilitate priority public uses on the Iroquois National Wildlife Refuge. Priority public uses of the National Wildlife Refuge System as defined by statute regulation are hunting, fishing, wildlife observation and photography, environmental education, and interpretation. 16 U.S.C. § 668ee (2); 50 C.F.R. § 25.12. Currently all priority public uses are permitted on Iroquois NWR.

Jogging and bicycling are not priority public uses; however they facilitate priority public uses on the Refuge. Although jogging and bicycling are classified as a non-wildlife activity, most use the Refuge for the "wildlands" experience it provides. Jogging and bicycling generally occur between March and September. Some bicyclist stop at the visitor contact station to obtain Refuge or wildlife viewing information. Visual observations indicate that total use is extremely light, but exact numbers are currently not available. Some hunters use bicycles to access hunting spots along Feeder Road.

It is anticipated that some soil erosion could occur as a result of jogging and bicycling access on designated routes. There are also temporal disturbances to wildlife species using habitat, on or directly adjacent to, the routes as well. These disturbances are likely to be short term and infrequent based on current levels of use. Therefore the disturbance from joggers and bicyclists is not expected to greatly increase the disturbance to wildlife or the Refuge's habitats.

Finding of Appropriateness of a Refuge Use (603 FW 1, Exhibit 1)

Refuge Name: Iroquois National Wildlife Refuge

Use: Cross Country Skiing and Snowshoeing
This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ___ No ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate__X___**

Refuge Manager: _____ Date: _____

If found to be Not Appropriate, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found Not Appropriate outside the CCP process, the refuge supervisor must sign concurrence.
If found to be Appropriate, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Iroquois National Wildlife Refuge

Use: Cross Country Skiing and Snowshoeing

Narrative

Trail activities consisting of cross-country skiing, and snowshoeing will be used to facilitate priority public uses on the Iroquois National Wildlife Refuge. Priority public uses of the National Wildlife Refuge System as defined by statute regulation are hunting, fishing, wildlife observation and photography, environmental education, and interpretation. 16 U.S.C. § 668ee (2); 50 C.F.R. § 25.12. Currently all priority public uses are permitted on Iroquois NWR.

There are temporal disturbances to wildlife species using habitat, on or directly adjacent to, the designated cross country skiing and snowshoeing routes. These disturbances are likely to be short term and infrequent based on current levels of use. Due to the limitations put on these activities, the seasonal timing, and that historical record show low use, disturbance from skiers and snowshoers is not expected to greatly increase the disturbance to wildlife or the Refuge's habitats.

Finding of Appropriateness of a Refuge Use (603 FW 1, Exhibit 1)

Refuge Name: Iroquois National Wildlife Refuge_____

Use: Haying
This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ___ No ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate__X___**

Refuge Manager: _____ Date: _____

If found to be Not Appropriate, the refuge supervisor does not need to sign concurrence if the use is a new use.
If an existing use is found Not Appropriate outside the CCP process, the refuge supervisor must sign concurrence.
If found to be Appropriate, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Iroquois National Wildlife Refuge

Use: Haying

Narrative

The Refuge was established to provide habitat for migratory birds. Currently, the Refuge supports healthy populations of several grassland nesting birds, including Savannah sparrow, bobolink, and eastern meadowlark and smaller populations of sedge wren, Henslow's sparrow, grasshopper sparrow, and upland sandpiper. Additionally several duck species including mallard, black duck, gadwall, northern shoveler, blue-winged teal, green-winged teal, American wigeon, and northern pintail use Refuge grasslands for nesting. During migration and winter several other species use Refuge grasslands as resting and feeding areas.

Grasslands must periodically be rejuvenated to maintain their optimum vigor. Haying will be conducted after the nesting season and very little impact to populations is expected. Haying is useful in controlling woody vegetation and broad-leaf forbs, thus maintaining the grassland habitat. Haying of Refuge grasslands will have short-term disturbance from equipment during the haying operations. It is plausible that late- or re-nesting birds may be injured or killed from haying equipment. However, this impact is mitigated by the delaying of haying operations until July 15 or later. Some species may be displaced after the mowing while others will colonize recently mowed fields.

Finding of Appropriateness of a Refuge Use (603 FW 1, Exhibit 1)

Refuge Name: Iroquois National Wildlife Refuge

Use: Forest Management
This exhibit is not required for wildlife-dependent recreational uses, forms of take regulated by the State, or uses already described in a refuge CCP or step-down management plan approved after October 9, 1997.

Decision criteria:	YES	NO
(a) Do we have jurisdiction over the use?	X	
(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?	X	
(c) Is the use consistent with applicable Executive orders and Department and Service policies?	X	
(d) Is the use consistent with public safety?	X	
(e) Is the use consistent with goals and objectives in an approved management plan or other document?	X	
(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?	X	
(g) Is the use manageable within available budget and staff?	X	
(h) Will this be manageable in the future within existing resources?	X	
(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?	X	
(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality (see section 1.6D. for description), compatible, wildlife-dependent recreation into the future?	X	

Where we do not have jurisdiction over the use ("no" to (a)), there is no need to evaluate it further as we cannot control the use. Uses that are illegal, inconsistent with existing policy, or unsafe ("no" to (b), (c), or (d)) may not be found appropriate. If the answer is "no" to any of the other questions above, we will generally not allow the use.

If indicated, the refuge manager has consulted with State fish and wildlife agencies. Yes ___ No ___

When the refuge manager finds the use appropriate based on sound professional judgment, the refuge manager must justify the use in writing on an attached sheet and obtain the refuge supervisor's concurrence.

Based on an overall assessment of these factors, my summary conclusion is that the proposed use is:

Not Appropriate_____ **Appropriate__X___**

Refuge Manager: _____ Date: _____

If found to be Not Appropriate, the refuge supervisor does not need to sign concurrence if the use is a new use.

If an existing use is found Not Appropriate outside the CCP process, the refuge supervisor must sign concurrence.
If found to be Appropriate, the refuge supervisor must sign concurrence:

Refuge Supervisor: _____ Date: _____

A compatibility determination is required before the use may be allowed.

Justification for a Finding of Appropriateness of a Refuge Use

Refuge Name: Iroquois National Wildlife Refuge

Use: Forest Management

Narrative

The primary objective of forest management will be to enhance and maintain habitat for our priority resources of concern and associated communities over the long-term. Upland forest habitat on the Refuge now lacks the optimal structure, composition, and patch size those species require. Forest management can improve and accelerate the development of appropriate structures and forest composition. Without active management, the development of appropriate habitat may take longer or fail to happen at all, depending on site characteristics, prior management history, and the frequency of natural disturbances. Forest management can also create and maintain the appropriate forest structure and age or size class distribution on the landscape into the future, so that adequate habitat is always available for species of concern. Because the refuge lacks the funding, personnel, or equipment to carry out forest management safely, commercial timber harvest and silvicultural treatments are the only reasonable alternative for accomplishing the work.

COMPATIBILITY DETERMINATION

USE: Walking and Hiking

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?
The uses are walking and hiking. These uses are not priority public uses.

(b) Where would the use be conducted?
These activities would be conducted on refuge nature trails, including Swallow Hollow, Kanyoo and Onondaga. Feeder Road would also be open to these activities.

(c) When would the use be conducted?
The trails would be used daily from sunrise to sunset, year round. Trails will be open during the hunting seasons. A safety zone of 500 feet is in effect in which no hunting will take place around Refuge trails. However, visitors should still proceed with caution while using the trails during the hunting season.

(d) How would the use be conducted?
The uses are self-regulating with signs indicating appropriate routes of travel. Refuge staff will remove fallen trees and limbs to provide safe conditions that could become hazardous for visitors. The trail surfaces are maintained each year by applying gravel where needed, repairing boardwalks and handrails, and so on. Dogs are allowed on all designated trails while on a leash of 10 ft. or shorter in length and under the control of their owner.

(e) Why is this use being proposed?
Walking and hiking are not priority public uses; however they facilitate priority public uses on the Refuge. Although walking and hiking are classified as non-wildlife activities, most

visitors use the Refuge for the "wildlands" experience it provides. Walking and hiking usually occur on designated trails through most of the year. Many walkers and hikers stop at the visitor contact station to obtain Refuge or wildlife viewing information.

AVAILABILITY OF RESOURCES:

The Refuge has a trail system in place to support public uses and these trails are being maintained. Allowing walking and hiking on these trails will not increase the maintenance or operational needs. Feeder Road is the main service road used by Refuge employees and also provides access to the Refuge for other public uses, thus maintenance of this facility is on-going and no additional needs would be required. The following breakdown shows the estimated amount of funds needed to administer the program.

Staff Time to Administer the Program

Identifier	Cost
Trail/Road Maintenance	$500
Fact Sheets/publications	$150
Total Annual Cost	**$750**

* Refuge trails and roads are maintained for a variety of activities. Costs shown are a percentage of total costs for trail/road maintenance on the Refuge and are reflective of the percentage of trail/road use for this activity. Volunteers account for some maintenance hours and help to reduce overall cost of the program.

ANTICIPATED IMPACTS OF THE USE:

Hiking and walking, as well as other forms of trail use, have the potential to impact shorebird, waterfowl, and other migratory bird populations feeding and resting near the trails during certain times of the year.

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeal et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Studying the effects of human visitation on waterbirds at J.N. "Ding" Darling NWR, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Ardeids were quite tolerant of people but were disturbed as they took terrestrial prey; great blue herons, tricolored herons, great egrets, and little blue herons were observed to be disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and

intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern U.S. Klein (1993) in a studying waterbird response to human disturbance found that as intensity of disturbance increased, avoidance response by the birds increased and found that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived, in the late fall, than later in winter. She also found that gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et. al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction and other reproductory functions of song (Arrese 1987). Disturbance, which leads to reduced singing activity, would make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Travel routes can disturb wildlife outside the immediate trail corridor (Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where "generalists" (American robins) were found near trails and "specialist" species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et. al 1998).

Disturbance can cause shifts in habitat use, abandonment of habitat and increase energy demands on affected wildlife (Knight and Cole, 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Hammitt and Cole (1998) conclude that the frequent presence of humans in "wildland" areas can dramatically change the normal behavior of wildlife mostly through "unintentional harassment."

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young.

The Delaware Natural Heritage Program, Division of Fish & Wildlife and the Department of Natural Resources and Environmental Control prepared a document on the "The Effects of Recreation on Birds: A literature Review" which was completed in April of 1999. The following information was reference from this document:

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States (Burger 1981; Burger 1986; Klein 1993; Burger et al. 1995; Klein et al. 1995; Rodgers & Smith 1995, 1997; Burger & Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbance from recreation activities always have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, 1986; Klein 1993; Burger et al. 1995; Klein et al. 1995; Rodgers & Smith 1997; Burger & Gochfeld 1998). The findings that were reported in these studies are summarized as follows in terms of visitor activity and avian response to disturbance.

Presence: Birds avoided places where people were present and when visitor activity was high (Burger 1981; Klein et al. 1995; Burger & Gochfeld 1998).

Distance: Disturbance increased with decreased distance between visitors and species (Burger 1986), though exact measurements were not reported.

Approach Angle: Visitors directly approaching birds on foot caused more disturbance than visitors driving by in vehicles, stopping vehicles near birds, and stopping vehicles and getting out without approaching birds (Klein 1993). Direct approaches may also cause greater disturbance than tangential approaches to birds (Burger & Gochfeld 1981; Burger et al. 1995; Knight & Cole 1995a; Rodgers & Smith 1995, 1997).

Type and Speed of Activity: Joggers and landscapers caused birds to flush more than fishermen, clammers, sunbathers, and some pedestrians, possibly because the former groups move quickly (joggers) or create more noise (landscapers). The latter groups tend to move more slowly or stay in one place for longer periods, and thus birds likely perceive these activities as less threatening (Burger 1981, 1986; Burger et al. 1995; Knight and Cole 1995a). Alternatively, birds may tolerate passing by with unabated speed whereas if the activity stops or slacks birds may flush (Burger et al. 1995).

Noise: Noise caused by visitors resulted in increased levels of disturbance (Burger 1986; Klein 1993; Burger & Gochfeld 1998), though noise was not correlated with visitor group size (Burger & Gochfeld 1998).

In determining compatibility, the cumulative effects of all public use on trails are considered. Due to the limitations put on these activities and that historical record show low use, disturbance from walkers and hikers is not expected to greatly increase the disturbance to wildlife.

PULBIC REVIEW AND COMMENT:

As part of the comprehensive conservation planning process for the Iroquois National Wildlife Refuge, this compatibility determination will undergo a comment period of 30 days concurrent with the release of our draft CCP/EA.

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBLITY:

- Dogs need to be on a leash 10 feet long or shorter and in the immediate control of their master.

JUSTIFICATION:

The Service and the National Wildlife Refuge System maintain the goal of providing opportunities to view wildlife. Allowing the use of already estblished trail system by persons engaging in walking and hiking will provide visitors the chance to view wildlife, and hence promotes public appreciation of conservation wildlife and habitats. Walking and hiking are not priority public uses; however they facilitate priority public uses on the Refuge. This use would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose for which the Refuge was established.

CONSULATION WITH THE REFUGE SUPERVISOR:

The Refuge Supervisor was consulted on January 2010; changes were made as needed.

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 10 - year Reevaluation Date: _____

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COMPATIBILITY DETERMINATION

USE: Jogging and Bicycling

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?
The uses are jogging and bicycling. Jogging and bicycling are not priority public uses.

(b) Where would the use be conducted?
Jogging would be allowed on designated Refuge trails including Swallow Hollow, Kanyoo and Onondaga Trails and Feeder Road. Bicycling would be allowed on Feeder Road only.

(c) When would the use be conducted?
The activities would be allowed year-round from sunrise to sunset.

(d) How would the use be conducted?
The uses are self-regulating with signs indicating appropriate routes of travel. During the entire year, persons engaged in bicycling will only use the Feeder Road to bike and will only use existing public roads and Refuge parking areas to access the Feeder Road. Refuge staff will remove fallen trees and limbs so to provide safe conditions that could become hazardous for visitors. The trail surfaces are maintained each year by applying gravel where needed, repairing boardwalks and handrails, and so on. Dogs are allowed on the trails while on a leash of 10 ft. or shorter in length and under the control of their master.

(e) Why is this use being proposed?

Jogging and bicycling are not priority public uses; however they facilitate priority public uses on the Refuge. Although jogging and bicycling are classified as a non-wildlife activity, most use the Refuge for the "wildlands" experience it provides. Jogging and bicycling generally occur between March and September. Some bicyclist stop at the visitor contact station to obtain Refuge or wildlife viewing information. Visual observations indicate that total use is extremely light, but exact numbers are currently not available.

AVAILABILITIY OF RESOURCES:

The Refuge has a maintained trail system in place to support priority public uses. Allowing jogging on these trails will not increase the maintenance or operational needs. Feeder Road is the main service road used by Refuge employees and also provides access to the Refuge for other public uses, thus maintenance of this facility is on-going and no additional needs would be required.

The following breakdown shows the estimated amount of funds needed to administer the program.

Staff Time to Administer the Program

Identifier	Cost
Trail/Road Maintenance*	$240
Compliance Checks	$100
Total Annual Cost	**$340**

* Refuge trails and roads are maintained for a variety of activities. Costs shown are a percentage of total costs for trail/road maintenance on the Refuge and are reflective of the percentage of trail/road use for this activity. Volunteers account for some maintenance hours and help to reduce overall cost of the program.

ANTICIPATED IMPACTS OF THE USE:

Jogging and bicycle use, as well as other forms of trail use, have the potential to impact shorebird, waterfowl, and other migratory bird populations feeding and resting near the trails during certain times of the year.

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant 1991, Kahl 1991, Klein 1993), use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeal et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Studying the effects of human visitation on waterbirds at J.N. "Ding" Darling NWR, Klein (1989) found resident waterbirds to be less sensitive to

disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Ardeids were quite tolerant of people but were disturbed as they took terrestrial prey; great blue herons, tricolored herons, great egrets, and little blue herons were observed to be disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern U.S. Klein (1993) in a studying waterbird response to human disturbance found that as intensity of disturbance increased, avoidance response by the birds increased and found that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived, in the late fall, than later in winter. She also found that gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

For songbirds, Gutzwiller et. al. (1994) found that singing behavior of some species was altered by low levels of human intrusion. Some studies have found that some bird species habituate to repeated intrusion; frequently disturbed individuals of some species have been found to vocalize more aggressively, have higher body masses, or tend to remain in place longer (Cairns and McLaren 1980). Disturbance may affect the reproductive fitness of males by hampering territory defense, male attraction and other reproductory functions of song (Arrese 1987). Disturbance, which leads to reduced singing activity, would make males rely more heavily on physical deterrents in defending territories which are time and energy consuming (Ewald and Carpenter 1978).

Travel routes can disturb wildlife outside the immediate trail corridor (Miller et al. 2001). Miller et al. (1998) found bird abundance and nesting activities (including nest success) increased as distance from a recreational trail increased in both grassland and forested habitats. Bird communities in this study were apparently affected by the presence of recreational trails, where "generalists" (American robins) were found near trails and "specialist" species (i.e. grasshopper sparrows) were found farther from trails. Nest predation was also found to be greater near trails (Miller et. al 1998).

Disturbance can cause shifts in habitat use, abandonment of habitat and increase energy demands on affected wildlife (Knight and Cole, 1991). Flight in response to disturbance can lower nesting productivity and cause disease and death. Hammitt and Cole (1998) conclude that the frequent presence of humans in "wildland" areas can dramatically change the normal behavior of wildlife mostly through "unintentional harassment."

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young.

The Delaware Natural Heritage Program, Division of Fish & Wildlife and the Department of Natural Resources and Environmental Control prepared a document on the "The Effects of Recreation on Birds: A literature Review" which was completed in April of 1999. The following information was reference from this document:

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States (Burger 1981; Burger 1986; Klein 1993; Burger et al. 1995; Klein et al. 1995; Rodgers & Smith 1995, 1997; Burger & Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbance from recreation activities always have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, 1986; Klein 1993; Burger et al. 1995; Klein et al. 1995; Rodgers & Smith 1997; Burger & Gochfeld 1998). The findings that were reported in these studies are summarized as follows in terms of visitor activity and avian response to disturbance.

Presence: Birds avoided places where people were present and when visitor activity was high (Burger 1981; Klein et al. 1995; Burger & Gochfeld 1998).

Distance: Disturbance increased with decreased distance between visitors and species (Burger 1986), though exact measurements were not reported.

Approach Angle: Visitors directly approaching birds on foot caused more disturbance than visitors driving by in vehicles, stopping vehicles near birds, and stopping vehicles and getting out without approaching birds (Klein 1993). Direct approaches may also cause greater disturbance than tangential approaches to birds (Burger & Gochfeld 1981; Burger et al. 1995; Knight & Cole 1995a; Rodgers & Smith 1995, 1997).

Type and Speed of Activity: Joggers and landscapers caused birds to flush more than fishermen, clammers, sunbathers, and some pedestrians, possibly because the former groups move quickly (joggers) or create more noise (landscapers). The latter groups tend to move more slowly or stay in one place for longer periods, and thus birds likely perceive these activities as less threatening (Burger 1981, 1986; Burger et al. 1995; Knight and Cole 1995a). Alternatively, birds may tolerate passing by with unabated speed whereas if the activity stops or slacks birds may flush (Burger et al. 1995).

Noise: Noise caused by visitors resulted in increased levels of disturbance (Burger 1986; Klein 1993; Burger & Gochfeld 1998), though noise was not correlated with visitor group size (Burger & Gochfeld 1998).

In determining compatibility, the cumulative effects of all public use on trails are considered. Due to the limitations put on these activities, and that historical records show low use, disturbance from joggers and bicyclists is not expected to increase disturbance to wildlife.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation planning process for the Iroquois National Wildlife Refuge, this compatibility determination will undergo a comment period of 30 days concurrent with the release of our draft CCP/EA.

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IN NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Activities will be restricted to desginated trails and roads.
- Activities will be allowed from sunrise to sunset.
- Mountain bikes, as well as all bikes, will be restricted to Feeder Road. Mountain biking, in the sense of "off-trail" riding, running single-tracks, will not be allowed.
- The refuge will monitor and restrict future activity if, at any time, wildlife disturbance becomes a significant problem.

JUSTIFICATION:

Jogging and bicycling should continue to be permitted but not encouraged on the Refuge. Most visitors jog and bike on Feeder Road which is open for a variety of public use activities and is the main service road used by Refuge staff for management functions. Visual observations indicate that total use is extremely low and no significant wildlife impacts have been identified on the Refuge as a result of these activities. Jogging and bicycling are not priority public uses; however they facilitate priority public uses on the Refuge. These uses would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose for which the Refuge was established.

CONSULTATION WITH REFUGE SUPERVISOR:

The Refuge Supervisor was consulted on January 2010; changes were made as needed.

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 10 - year Reevaluation Date: _____

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COMPATIBILITY DETERMINATION

USE: Cross-country Skiing and Snowshoeing

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?
The use is cross-country skiing and snowshoeing. These two uses are not priority public uses.

(b) Where would the use be conducted?
Cross-country skiing and snowshoeing would be permitted on Kanyoo and Onondaga Nature Trails as well as Mohawk Ski Trail, a 7.5 mile loop around Mohawk Pool. The Mohawk Ski Trail closes every year on March 1.

(c) When would the use be conducted?
The trails would be used daily from sunrise to sunset. Cross-country skiing and snowshoeing would be allowed when adequate snow is present in the fall through the end February. Trails would be open to the use during the hunting seasons. A safety zone of 500 feet is in effect in which no hunting will take place around Refuge trails except the Mohawk Ski Trail. However, visitors should still proceed with caution while using the trails during the hunting season.

(d) How would the use be conducted?
The uses are self-regulating with signs indicating appropriate routes of travel. The trails are not groomed, so skiers will be required to cut their own trail when there is new fallen snow. Refuge staff will remove fallen trees and limbs so to provide safe conditions that could become hazardous for visitors. The trail surfaces are maintained each year by applying gravel where needed, repairing boardwalks and handrails, and so on. Dogs are allowed on all

designated trails while on a leash of 10 ft. or shorter in length and under the control of their master.

(e) Why is this use being proposed?

Cross-country skiing and snowshoeing are not priority public uses; however they facilitate priority public uses on the Refuge. Although cross-country skiing and snowshoeing are classified as non-wildlife dependent activities, most visitors use the Refuge for the "wildlands" experience it provides. These activities allow visitors to access the Refuge during the winter time and partake in wildlife observations of winter residents. Additionally, many skiers and snowshoers stop at the visitor contact station to obtain Refuge or wildlife viewing information. General observations indicate that total use is extremely light, but exact numbers are currently not available.

AVAILABILITY OF RESOURCES:

The Refuge has a trail system in place to support priority public uses, and these trails are already being maintained for these purposes. Allowing cross-country skiing and snowshoeing on these trails will not increase the maintenance or operational needs. Refuge staff and volunteers maintain signs designating the location of trails including the Mohawk Ski Trail, but this time is minimal and can be completed with current Refuge funding.

The following breakdown shows the estimated amount of funds needed to administer the program.

Annual costs for skiing and snowshoeing

Identifier	Cost
Trail/Road Maintenance	$240
Signage, publications	$240
Total Annual Cost	**$480**

* Refuge trails and roads are maintained for a variety of activities. Costs shown are a percentage of total costs for trail/road maintenance on the Refuge and are reflective of the percentage of trail/road use for this activity. Volunteers account for some maintenance hours and help to reduce overall cost of the program.

ANTICPATED IMPACTS OF THE USE:

Cross-country skiing and snowshoeing, as well as other forms of trail use have the potential to impact shorebird, waterfowl and other migratory bird populations feeding and resting near the trails during certain times of the year.

Human disturbance to migratory birds has been documented in many studies in different locations. Conflicts arise when migratory birds and humans are present in the same areas (Boyle and Samson 1985). Response of wildlife to human activities includes: departure from site (Owen 1973, Burger 1981, Kaiser and Fritzell 1984, Korschen et al 1985, Henson and Grant 1991, Kahl

1991, Klein 1993), use of sub-optimal habitat (Erwin 1980, Williams and Forbes 1980), altered behavior (Burger 1981, Korschen et al. 1985, Morton et al. 1989, Ward and Stehn 1989, Havera et al. 1992, Klein 1993), and increase in energy expenditure (Morton et al. 1989, Belanger and Bedard 1990). McNeal et al. (1992) found that many waterfowl species avoid disturbance by feeding at night instead of during the day. Studying the effects of human visitation on waterbirds at J.N. "Ding" Darling NWR, Klein (1989) found resident waterbirds to be less sensitive to disturbance than migrants; she also found that sensitivity varied according to species and individuals within species. Ardeids were quite tolerant of people but were disturbed as they took terrestrial prey; great blue herons, tricolored herons, great egrets, and little blue herons were observed to be disturbed to the point of flight more than other birds. Kushlan (1978) found that the need of these birds to move frequently while feeding may disrupt interspecific and intraspecific relationships. In addition, Batten (1977) and Burger (1981) found that wading birds were extremely sensitive to disturbance in the northeastern U.S. Klein (1993) in a studying waterbird response to human disturbance found that as intensity of disturbance increased, avoidance response by the birds increased and found that out-of-vehicle activity to be more disruptive than vehicular traffic; Freddy et al. (1986) and Vaske (1983) also found the latter to be true. In regards to waterfowl, Klein (1989) found migratory dabbling ducks to be the most sensitive to disturbance and migrant ducks to be more sensitive when they first arrived, in the late fall, than later in winter. She also found that gulls and sandpipers to be apparently insensitive to human disturbance, with Burger (1981) finding the same to be true for various gull species.

Seasonal sensitivities can compound the effect of disturbance on wildlife. Examples include regularly flushing birds during nesting or causing mammals to flee during winter months, thereby consuming large amounts of stored fat reserves. Hammitt and Cole (1998) note that females with young (such as white-tailed deer) are more likely to flee from a disturbance than those without young.

The Delaware Natural Heritage Program, Division of Fish & Wildlife and the Department of Natural Resources and Environmental Control prepared a document on the “The Effects of Recreation on Birds: A literature Review” which was completed in April of 1999. The following information was reference from this document:

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States (Burger 1981; Burger 1986; Klein 1993; Burger et al. 1995; Klein et al. 1995; Rodgers & Smith 1995, 1997; Burger & Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbance from recreation activities always have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, 1986; Klein 1993; Burger et al. 1995; Klein et al. 1995; Rodgers & Smith 1997; Burger & Gochfeld 1998). The findings that were reported in these studies are summarized as follows in terms of visitor activity and avian response to disturbance.

> Presence: Birds avoided places where people were present and when visitor activity was high (Burger 1981; Klein et al. 1995; Burger & Gochfeld 1998).

Distance: Disturbance increased with decreased distance between visitors and (Burger 1986), though exact measurements were not reported.

Approach Angle: Visitors directly approaching birds on foot caused more disturbance than visitors driving by in vehicles, stopping vehicles near birds, and stopping vehicles and getting out without approaching birds (Klein 1993). Direct approaches may also cause greater disturbance than tangential approaches to birds (Burger & Gochfeld 1981; Burger et al. 1995; Knight & Cole 1995a; Rodgers & Smith 1995, 1997).

Type and Speed of Activity: Joggers and landscapers caused birds to flush more than fishermen, clammers, sunbathers, and some pedestrians, possibly because the former groups move quickly (joggers) or create more noise (landscapers). The latter groups tend to move more slowly or stay in one place for longer periods, and thus birds likely perceive these activities as less threatening (Burger 1981, 1986; Burger et al. 1995; Knight and Cole 1995a). Alternatively, birds may tolerate passing by with unabated speed whereas if the activity stops or slacks birds may flush (Burger et al. 1995).

Noise: Noise caused by visitors resulted in increased levels of disturbance (Burger 1986; Klein 1993; Burger & Gochfeld 1998), though noise was not correlated with visitor group size (Burger & Gochfeld 1998).

In determining compatibility, the cumulative effects of all public use on trails are considered. Due to the limitations put on these activities, the seasonal timing, and that historical record show low use, disturbance from skiers and snowshoers is not expected to greatly increase the disturbance to wildlife.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation planning process for the Iroquois National Wildlife Refuge, this compatibility determination will undergo a comment period of 30 days concurrent with the release of our draft CCP/EA.

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATBILITY:

- Eagle nesting zones will be closed off for access starting January 1.

JUSTIFICATION:

The Service and the National Wildlife Refuge System maintain the goal of providing opportunities to view wildlife. Allowing the use of already estblished trail system by persons engaging in walking and hiking will provide visitors the chance to view wildlife, and hence promotes public appreciation of conservation wildlife and habitats. Cross-country skiing and snowshoeing are not priority public uses; however they facilitate priority public uses on the Refuge. Skiing and snowshoeing is often used by Refuge visitors to enjoy the solitude of the Refuge surrondings as well as view winter wildlife. Additionally, many skiers and snowshoers stop at the visitor contact station to obtain Refuge or wildlife viewing information. This use would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose for which the Refuge was established.

Consultation with Refuge Supervisor:

The Refuge Supervisor was consulted on January 2010; changes were made as needed.

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 10 - year Reevaluation Date:

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COMPATIBILITY DETERMINATION

USE: Haying – Economic Use

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

….for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

This use permits the harvest and removal of hay from designated Refuge grasslands by private parties through the issue of a Special Use Permit. Hay on the Refuge consists of native and naturalized grasslands originally planted and currently maintained to provide habitat for migratory birds and resident wildlife. Haying on the Refuge is strictly a tool used to maintain the Refuge grasslands in an early successional condition and no attempt is made to improve the hay crop (e.g., fertilizing, planting additional hay species) for the cooperators. The use is an existing use and over the last several years, one to three individuals have annually harvested hay on up to 400 acres. Pursuant to Refuge regulations at 50 C.F.R. 29.1, the use is considered an economic use, since the hay has a value as feed for farmer's livestock or as a crop. As such, we must determine if haying by private parties is compatible with and contributes to the Refuge purposes or the mission of the NWRS. The use assists in maintaining grasslands for migratory birds and other wildlife as a component of the grassland management program. Periodic management of grasslands is essential to maintaining them in a grass dominated state and to providing the best possible habitat for grassland dependent wildlife. Haying is not identified as a priority public use in the National Wildlife Refuge System Improvement Act of 1997.

(b) Where would the use be conducted?

The use is conducted in various Refuge grassland management units. Each year the need for a specific unit to be hayed is dependent on the biological needs of maintaining established grasslands or assisting in restoring additional grasslands. See attached map for potential haying locations.

(c) When would the use be conducted?

Haying is permitted in designated grassland units after July 15 to insure that nearly all grassland birds have completed nesting for the year. All haying must be completed by September 15. All hay and equipment is removed by October 1 to insure that Refuge habitat is not damaged by rutting of soil due to wet conditions normally associated with autumn in this area.

(d) How would the use be conducted?

The Refuge staff annually evaluates the grassland units to determine the biological need for management and the means (e.g., prescribed fire, mowing). Local individuals will be notified if and when units are available for haying via news releases and contact with previous individuals who have hayed. In accordance with 5 RM 17 of the Refuge manual, units will be awarded through a competitive bid system. Each haying unit is treated as a separate bid and potential permitees are allowed to bid on as many units as they choose. There is a minimum bid of $50.00 per bidder to ensure that the administrative costs of conducting the bidding process are covered. After the bidding deadline, bids are opened and the unit is awarded to the highest bidder. The successful bidders will supply all necessary equipment to harvest and remove the hay.

Over the past three years, cooperators have cut hay on 301 acres and paid a total of $2,005 to do so. This is an average of $6.66/acre to cut hay on the Refuge. Since cooperators are required to cut the entire unit that they bid on, Refuge grasses are not ideal hay species, and Refuge grasslands often contain a large amount of broad-leaf forbs which make poor quality hay, cooperators often have to cut and leave a portion of the grass because it isn't of high enough quality to use as hay. On average, approximately 10% of each hay unit is cut by cooperators and not bailed for hay. This adds up to a total of approximately 30 acres of grassland cut by cooperators and not used as hay over the last three years. The custom rate for brush hogging in this area is approximately $50.00/acre. It would have cost the Refuge approximately $1,500 to cut this same 30 acres. Adding this cost into the cost/acre increases the total to $11.65/acre as a rental rate to cut hay on the Refuge over the past three years.

The average cost for renting an acre of hayland in western New York is generally between $25 and $100/acre (Cornell Cooperative Extension, pers. comm.). This cost assumes a higher quality of hay than what is cut on the Refuge and it also assumes multiple cuttings (usually three) of hay each year. Our cooperators are only able to get one cutting of generally poor quality hay off the Refuge. Renting hayland similar to what is available on the Refuge would likely cost farmers approximately $15/acre (Genesee County Soil and Water Conservation District, pers. comm.), however a haying program with restrictions similar to our haying program is unusual on private land and therefore makes identification of comparable costs difficult. Using the best information available, the fees estimated through the current bidding system for haying privileges on the Refuge appear to be commensurate with what is available on private property in the area.

(e) Why is this use being proposed?

The Refuge was established to provide habitat for migratory birds. Currently, the Refuge supports healthy populations of several grassland nesting birds, including Savannah sparrow, bobolink, and eastern meadowlark and smaller populations of sedge wren, Henslow's sparrow, grasshopper sparrow, and upland sandpiper. Additionally several duck species including mallard, black duck, gadwall, northern shoveler, blue-winged teal, green-winged teal, American wigeon, and northern pintail use Refuge grasslands for nesting. During migration and winter several other species use Refuge grasslands as resting and feeding areas.

As these grasslands succeed into shrublands, and then forestlands, the amount of available habitat for grassland nesting species declines. Haying is beneficial in maintaining Refuge grasslands in their intended state. Without periodic treatment by mowing, burning, or chemicals, Refuge grasslands quickly revert to brush and forests. Haying can be used in lieu of Refuge staff treating the grasslands, thus saving the Refuge thousands of dollars while still accomplishing mission related goals. The hay crop has value to the farmer as forage for his livestock or as a cash crop.

Historically most of the Northeast was forested, except for a period following European settlement when much of the region was cleared for agriculture and subsequently grasslands and fields became abundant. In pre-settlement times, permanent, large openings were uncommon. Scattered openings occurred along large river floodplains, around beaver flowages, in coastal heathlands, and in other areas of regular disturbance. Large grasslands are now in decline and the region has reforested closer to pre-settlement proportions.

Populations of grassland birds are declining as grassland habitats and other agricultural conditions diminish. Norment (2002) notes that despite the relatively recent (last 200 years) rise and fall of grassland habitats and associated birds in New England, the region may still be important for these species given their continental decline and habitat loss in the core of their ranges in the Midwest.

AVAILABILITY OF RESOURCES:

During calendar year 2009, there were two Special Use Permits issued for haying Refuge lands. Time spent reviewing, issuing, and overseeing permit holders will be minimal for Refuge staff, and therefore resources are available under current staffing and budgets. Overall, it has cost the Refuge approximately $40 per acre to treat grasslands via mowing; the annual grassland management program can easily save thousands of dollars by not having to mow the acres that can be hayed.

Annual costs of haying

Identifier	Cost
Surveys, data analysis, recommendations, reporting	$1,000
Permitee compliance	$250
Permitting, news release, general information	$250
Total Annual Cost	**$1,500**

ANTICIPATED IMPACT OF THE USE:

Grasslands must periodically be rejuvenated to maintain their optimum vigor. Haying will be conducted after the nesting season and very little impact to populations is expected. Haying is useful in controlling woody vegetation and broad-leaf forbs, thus maintaining the grassland habitat. Haying of Refuge grasslands will have short-term disturbance from equipment during the haying operations. It is plausible that late- or re-nesting birds may be injured or killed from haying equipment. However, this impact is mitigated by the delaying of haying operations until July 15 or later. Some species may be displaced after the mowing while others will colonize recently mowed fields. Species such as bobolink, red-winged black bird, dickcissel, eastern meadowlark, and Henslow's sparrow abandon fields mowed during breeding season (Sample and Mossman, 1997). Sample and Mossman, 1997, also reported that many grassland bird species do well in habitats that are mowed either annually or every few years during the late summer or fall time frame. Hekert et al.1996, found that it was important to rotate or change management of a given tract in order to keep residual material available for species that require it. In the Midwest, sedge wrens did not use hay fields after mowing, but preferred unmown fields that were dense and lush (Skinner 1975, Sample 1989, Frawley and Best 1991). Disturbance via vehicles used for auto tour routes or road traffic is much more documented than disturbance due to machinery for management purposes. Several articles stated that vehicles can cause disturbance to vegetation cover and height, reduce diversity, change community compositions, compact soils, and reduce avian diversity.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation planning process for the Iroquois National Wildlife Refuge, this compatibility determination will undergo a comment period of 30 days concurrent with the release of our draft CCP/EA

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

- Haying will not commence before July 15.
- Only units that are in need of being mowed to maintain Refuge grasslands will be considered for haying.
- All vegetation within the designated unit must be cut. Permittee will have the option to leave cut hay that has excessive weeds or woody vegetation.
- All hay and equipment must be removed from the Refuge by October 1.

JUSTIFICATION:

Refuge grasslands must be periodically treated to maintain their grassland character and hence their value as grassland habitat for migratory and nesting birds, as well as other wildlife. Each acre hayed by a neighboring farmer is an acre that Refuge staff do not have to treat by mowing, burning, or chemicals and still receive the same benefit. Haying contributes to the mission of the National Wildlife Refuge System and the purpose of the Refuge by permitting management of Refuge grasslands at minimal cost to the Refuge.

CONSULATION WITH THE REFUGE SUPERVISOR:

The Refuge Supervisor was consulted on January 2010; changes were made as needed.

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 10 - year Reevaluation Date: _____

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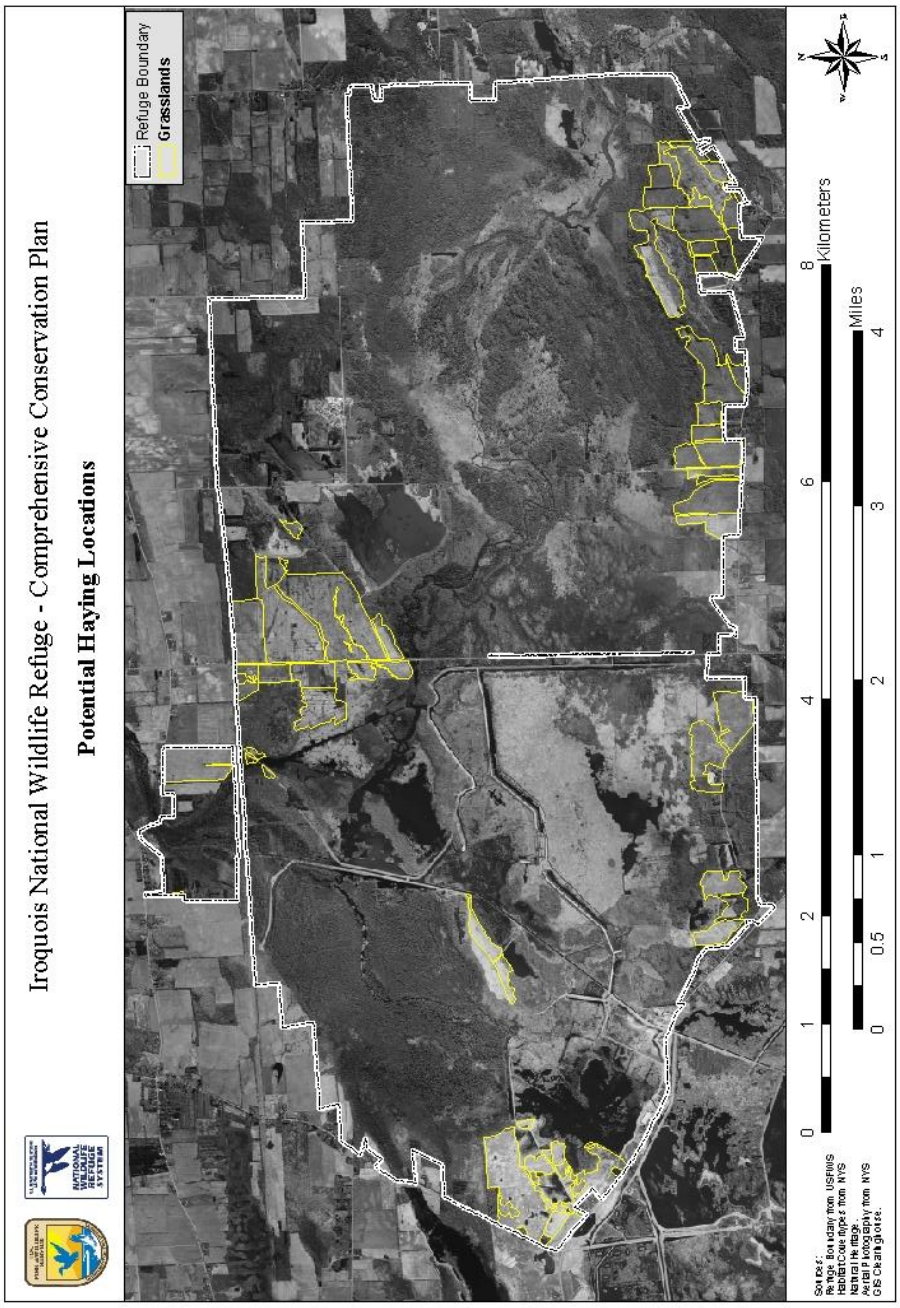

Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Potential Haying Locations
Refuge Boundary
Grasslands
Kilometers
Miles
0
1
2
4
6
8
0
0.5
1
2
3
4

COMPATIBILITY DETERMINATION

USE: Commercial Forest Management

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

. …for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is commercial forest management. The use is not a priority public use of the National Wildlife Refuge System, under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

Commercial forest management will be performed for the primary purpose of improving wildlife habitat and ensuring that Iroquois National Wildlife Refuge (Refuge) has a diversity of forest habitat types, age classes and canopy stratifications. The specific types of harvest that will be performed include improvement cuts (thinnings, release cuttings), regeneration cuts (seed tree, selection, shelterwood and clear cuts) and salvage cuts performed as a result of storm, insect or disease damage or outbreads. Commercial harvesting is preferred over using Refuge resources to harvest timber because the Refuge does not own the equipment necessary to perform the tasks properly without causing significant negative impacts to the sites. Additionally, the Refuge does not have the manpower to either run equipment or remove trees using chainsaws.

(b) Where would the use be conducted?

Commercial forest management will only occur in the Refuge's upland forests and conifer plantations excluding forested islands that are completely surrounded by marsh and/or open water, the Oak Orchard National Natural Landmark and the Milford Posson Research Natural Area (Map 1). The Refuge's wetland forests are rarely dry enough, outside of the breeding season of forest dwelling species, for any commercial forest management to take place. Any

commercial harvesting that takes place on the Refuge must follow the best forest and wildlife management practices recommended by the State of New York (New York State DEC. 2007. New York State Forestry Best Management Practices for Water Quality, BMP Field Guide).

(c) When would the use be conducted?

Commercial forest management may occur at different times of the year at different locations, depending on individual site characteristics, stand conditions, and other resource concerns. All commercial forest management will occur at times designed to minimize unwanted impacts on resources, e.g., erosion, soil compaction, or the disturbance of wildlife, while maximizing the desired silvicultural results, such as seed germination and natural tree regeneration. To achieve specific silvicultural goals, most of the harvesting will occur in late summer through winter, as appropriate. A comprehensive forest inventory will evaluate forest habitat and wildlife species of concern and determine the best timing and method before harvesting. We will not harvest timber during the primary breeding and nesting season for forest dwelling migratory birds, and for bald eagles if nests are within or directly adjacent to the harvest area.

(d) How would the use be conducted?

Although the Refuge completed a forest management plan in 1990 and has descriptions of each compartment's vegetation type, we will need additional details regarding the Refuge forests before implementation of a forest management program. A comprehensive forest inventory will help design appropriate silvicultural prescriptions to meet the objectives of our Comprehensive Conservation Plan (CCP) and Habitat Management Plan (HMP). Variables to be inventoried include, but are not limited to basal area, trees per acres, age, species composition, canopy closure, understory composition, and volume of forest product in the whole stand.

Before any harvest occurs, stands to be harvested in that particular year will be delineated so that local timber harvesting companies can visit the harvest sites prior to bidding. A news release on the proposed harvest will be issued to local papers and packets of materials related to the harvest will be mailed to known timber harvesters. Companies may perform their own inventories and subsequently submit sealed bids for the forest products expected to be harvested when harvest includes complete removal. In the case of selection harvests, individual trees will be marked for harvesting and inventory information will be specified to interested bidders.

A special use permit will be issued to the chosen contractor. The inventory data will be provided in the special use permit along with a statement of work including all of the particulars and stipulations which must be adhered to (Appendix 1). Selected timber harvesters must provide proof of insurance prior to issuance of a Special Use Permit. The Refuge Manager may also select individual harvesters based on an evaluation of their equipment, availability, and past performance. Commercial timber harvest on the Refuge may yield products including, pulpwood, firewood, saw timber, veneer, biomass or chips. After the harvest, the contractor must supply the Refuge with all reports obtained from the mill documenting all products removed from the Refuge.

(e) Why is the use being proposed?

The primary objective of commercial forest management will be to enhance and maintain habitat for our species of concern and associated habitat communities (Table 1). Forest management can improve and accelerate the development of appropriate structures and forest composition. Without active management, the development of appropriate habitat may take longer or fail to happen at all, depending on site characteristics, prior management history, and the frequency of natural disturbances. Forest management can also create and maintain the appropriate forest structure and age or size class distribution on the landscape into the future, so that adequate habitat is always available for species of concern. Because the Refuge lacks the funding, personnel, or equipment to carry out forest management safely and efficiently, commercial forest management and silvicultural treatments are the only reasonable alternative for accomplishing the work.

Table 1 Priority Resources of Concern, Habitat Structure, and Other Benefiting Species for Forest Habitats on Iroquois NWR

Habitat Type	Focal Species	Habitat Structure	Other Benefiting Species
Forested Wetlands	Wood duck	Nest cavities in mature, living (sometimes dead) trees, greater than 18 inches d.b.h. within 1.2 miles of water; broken limbs for perching.	Prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker, bats, river otter
	Cerulean warbler	More often in riparian or bottomland hardwood forest but also on dry slopes and ridgetops. Requires large tracts of mature forest (> 500 acres) with sparse understories and closed or semiclosed canopies; stays in the canopy (DeGraaf and Yamasaki 2001, Rosenberg et al. 2000).	
Upland Forest	Wood thrush	Nests in interior and edge of mature, deciduous or mixed forests, particularly damp woodlands near swamps or water. Primary habitat features include trees taller than 53 feet, a shrub-subcanopy layer, shade, moist soil, and leaf litter (DeGraaf and Yamasaki 2001).	Rose-breasted grosbeak, scarlet tanager
	Black-billed cuckoo	Young deciduous and mixed forest or shrubland with a dense understory of shrubs and vines. May be susceptible to habitat fragmentation and avoid forest patches less than 10 acres (DeGraaf and Yamasaki 2001, Hughes 2001).	

	Cerulean warbler	More often in riparian or bottomland hardwood forest but also on dry slopes and ridgetops. Requires large tracts of mature forest (> 500 acres) with sparse understories and closed or semiclosed canopies; stays in the canopy (DeGraaf and Yamasaki 2001, Rosenberg et al. 2000).	
	American woodcock	During the breeding season woodcock use several habitat conditions in close proximity to one another: forest openings, ~1/2 acre or more in size, as singing grounds; shrubby areas, particularly alders and dense young hardwoods on moist soils as feeding/daytime cover; young to mid-aged forest (15-30 years old) as brood and nesting habitat; and clearings of 2-3 acres as roost sites during migration (Keppie and Whiting 1994, Sepik et al. 1981).	
Early Successional Forest and Shrublands	Field sparrow	Breeds in old fields in early stages of succession with scattered woody vegetation such as lightly overgrown pastures, abandoned hayfields, powerline corridors, woodland edges (DeGraaf and Yamasaki 2001).	Brown thrasher, song sparrow, willow flycatcher, black-billed cuckoo, American woodcock
	Blue-winged warbler	A mix of vegetation including dense herbaceous growth, shrubs, and young forest (<20 feet tall); often near wetland edges or damp areas but also in dry uplands (Gill et al. 2001).	
	Golden-winged warbler	Patches of herbs, shrubs, and scattered trees, plus a forested edge; shrubby fields as well as in marshes and bogs with a forest edge (Confer 1992). Most golden-wing territories have less than 60% herbaceous growth and less than 10% forest cover. Most territories include patches of shrub that are over 10 feet (3 meters) tall and unmowed or ungrazed herbaceous growth (Cornell Lab Golden-winged Atlas Project).	

Rationale

Although once dominated by a mix of oak-hickory, northern hardwood, and hemlock-northern hardwood forests, the upland areas around the Refuge are now dominated by agricultural land interspersed with wetlands and remnant forest stands. Thus, the Refuge offers some of the best remaining blocks of both upland and wetland forest in this region. Currently, the mature forest habitats on the Refuge are not actively managed. Although in small patch sizes, the upland forests are relatively intact with a diversity of canopy tree species and some midstory and understory plant associates and light impact from invasive species. These forests support Bird Conservation Region (BCR) 13 priority bird species including wood thrush and cerulean warbler (highest), and black-billed cuckoo (high). These three species are also birds of management concern for the USFWS in the northeast region and are noted as species of greatest conservation need in the New York Wildlife Action Plan.

Over 4,800 acres of the Refuge is covered by forest (44%). The Refuge forests can be generally categorized as upland (1,520 acres), wetland (3,297 acres) and conifer plantation (202 acres). Species composition of the upland forests vary across the Refuge with mixed hardwood stands predominated by elm, maple, aspen, and upland species such as oak and beech. Most conifers occur in plantations and include white pine, white spruce, Norway spruce, Scotch pine, red pine and Douglas fir. Several eastern hemlock stands are found in

small pockets. The majority of the wetland forested stands are mature and under to well-stocked. Most of these forested stands are palustrine and are inaccessible to forest management equipment due to the excessively wet soils.

Large pockets of forested habitats are unique to the present day landscape of the Ontario Lake Plain. Landuse or landcover data for northwestern New York were developed by the USGS as part of the Geographic Information Retrieval Analysis System (GIRAS) during the 1970's. Of the entire area displayed (1,469,706 acres), 1.6% of the land cover (23,709 acres) is forested wetlands and 6% (8,417 acres) is upland forest. Sizes of these forested areas vary, but the largest pocket of forested wetlands, 20% of the total forested wetland cover, is within the Refuge boundary.

In the early 1800's, there were many attempts to drain the "Alabama Swamps", the historic local name for the area that is now the Refuge. These endeavors to develop the land for agriculture proved to be too expensive and were ultimately abandoned. However, most of the virgin timber was removed as a result of these drainage projects and the area has been cut over numerous times since then for sawtimber, pulp and firewood products.

During the 1960's and 1970's, logging was conducted on the Refuge for both production of wood products and firewood. Pulpwood and sawlog size cottonwood and soft maple (red and silver) were selectively cut on large acreages and clear cut on small acreages for hardwood pulp and pallet construction. Habitat degradation due to cutting outside specified areas and lack of staff time to monitor these areas brought an end to cutting activities in 1978. The timber harvesting practices of the past had also altered species composition, forest age class, and structure.

During the last 30 years, there has been no management within the forested areas on the Refuge. This is a result of a weak local market for many forest products and lack of Refuge staff. The Refuge lacks the equipment and personnel to carry out timber harvesting. Therefore, commercial forest management is the most economical, safe method of achieving many of our proposed forest management objectives. Our approaches to silviculture will differ among different habitat types (upland forests and conifer plantations), but will stay within the inherent capability of those sites to grow certain species (e.g., soil properties, moisture regimes, elevation, aspect, etc). The use of accepted silvicultural practices will perpetuate quality wildlife habitats. Strategies for the different habitats are described in Appendix 2.

AVAILABILITY OF RESOURCES

In the absence of a refuge forester, the refuge biologist and wildlife refuge specialist will coordinate and run the commercial forest management program at the Refuge. The Refuge may contract the services of a private consulting forester or use other Service personnel or our partners as well if needed. The sales of timber will fund the fees for consultation.

A portion of the funds generated by the sale of timber on the Refuge will go into the revenue sharing fund. We will use another portion to continue the forest management program and such activities as additional stand inventories, timber marking, pre-commercial thinning, and related roadwork. When appropriate and applicable, we may include tasks such as road rehabilitation in the contract as products and include them as part of the bid. That would alleviate any additional management costs associated with this specific activity. However, it would not eliminate most of the preliminary preparation.

We expect all harvesting to be performed near, or from, existing roads. Because we would not construct any new facilities or improvements on Refuge property for this use, we expect no significant construction costs associated with it. The refuge biologist and wildlife refuge specialist will assume the management of contract development and administration, monitoring, and resource database.

We expect the required costs in the following list for the Refuge to administer the proposed forest management practices each year. The timber sales revenue that returns to the Refuge should cover any additional costs.

Estimated Annual Cost of a Forest Management Program

Identifier	Cost
Forest Inventory and Monitoring*	$5,000
Wildlife Inventory and Monitoring	$2,500
Marking Timber	$2,500
Management Administration**	$2,500
Data Entry and Analysis	$1,000
Total Annual Cost	**$13,500**

*A complete forest inventory will be completed before any management takes place. Forest monitoring will take on a 5-year cycle as permanent vegetation plots are in place.
**The administration of a commercial forest management program will include preparation of information packets, preparation of permits, processing payments, layout of harvest areas, compliance checks and program evaluation.

ANTICIPATED IMPACTS OF USE

In case of the unregulated harvest of timber, the following impacts could occur.

Soils
The maintenance of roads and landings and the operation of heavy equipment could compact soil, cause rutting, and result in increased erosion. To mitigate those potential impacts and minimize erosion from timber harvesting on the Refuge, the Refuge will follow the best management practices recommended by the State of New York (NYS DEC 2007). Harvesting will occur primarily in upland forests and conifer planations, at seasons appropriate for minimizing the effects of compaction and erosion (Map 1).

Aquatic Resources
Unregulated timber harvest and use of heavy equipment near streams, rivers, or ponds can result in increased run-off, sedimentation, and reduced shading of streams, with concomitant increases in aquatic temperatures. Downed wood in streams may initially increase and then decrease to levels below that of streams in unharvested areas. Those factors may have detrimental effects on stream organisms, including fish, invertebrates, and amphibians. Poorly planned timber harvests and road construction can alter surface and groundwater hydrology and water storage capability. The effects of multiple harvests in a watershed can accumulate over time.

Maintaining forested buffers around streams and other aquatic resources of concern will minimize impacts on water resources and water quality. Road construction, skid trail planning, harvest operation and stream crossings will follow best management practices advocated by the state of New York to minimize the alteration of hydrology and the impacts of siltation on water quality. Harvesting will use existing forest roads and no new roads will be constructed.

Wildlife and Vegetation
The construction of roads, creation of landings, and operation of heavy equipment can result in localized impacts and the damage or destruction of understory vegetation, including rare plants. Those practices may also damage the litter layer, coarse woody debris, snags, or cavity trees important for wildlife. They may alter the moisture regimes in soil and on the forest floor in ways that affect plants and animals such as forest floor amphibians and small mammals. Whole tree harvesting can result in a reduction of downed wood in the forest system. Skidding operations may cause residual damage to trees in the stand. Residual stand damage may result in the introduction of insects or disease into an otherwise healthy stand. Harvesting may also leave the remaining trees more susceptible to wind throw, alter plant and animal communities, facilitate the spread of invasive plants, disturb wildlife temporarily, or displace it over the long term.

We will mitigate most of those impacts by placing seasonal restrictions on harvesting to avoid disturbing wildlife or damaging trees or understory vegetation, the careful layout of skid trails, the use of mechanical harvesters and pre-harvest surveys of resources of concern. We will require timber contractors to leave tops, branches and other downed wood on site whenever possible.

Under Refuge management, the average forest age/size class and canopy closure would increase over the long term, although different age classes would be present on the landscape. The non-native conifer component of Refuge matrix forests would decrease as plantations are cut, but will be replaced by native eastern hemlock which will be planted whenever possible after plantations are harvested. Habitat connectivity would increase and the fragmentation of forest habitat would decrease.

Visitor Impacts
Logging may disturb refuge visitors, cause safety issues, or detract from visitors' esthetic experience. We will temporarily close areas of the Refuge undergoing active logging. Because

the amount acres that will be harvested on a yearly basis will be a very small proportion of the Refuge, impacts on the public should be minimal.

PUBLIC REVIEW AND COMMENT

As part of the comprehensive conservation planning process for the Refuge, this compatibility determination will undergo extensive public review, including a comment period of 45 days following the release of the Draft CCP/EA.

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY

Our management philosophy is to create a commercial forest management program that improves Refuge wildlife habitats.

To protect Refuge resources of concern, we will follow the best management practices for harvests and wildlife habitat recommended by the State of New York (NYS DEC 2007).

When the State recommends a range of best management strategies and buffer distances, we will implement the most conservative of those recommendations. The Refuge may exceed state recommendations in some cases, for specific resource protection objectives.

Snags, live cavity trees, and large coarse woody debris will be retained, as appropriate, to Refuge objectives. At the discretion of the Refuge Manager, the creation of snags, live cavity trees, or coarse woody debris, or the removal of individual trees or groups of trees may occur in any area of the Refuge, for specific wildlife management or safety purposes.

We will review the forest management program annually in our Annual Habitat Work Plan to ensure that the program contributes to Refuge objectives for wildlife and habitat.

Before harvests, resource surveys will ensure that resources of concern have been identified and impacts minimized or eliminated.

Harvesting will occur at times that are seasonally appropriate for the site and silvicultural objectives and likely to minimize impacts on wildlife: e.g., outside eagle or heron nesting seasons.

We will discourage whole tree harvesting and encourage contractors to leave tops, branches, and other woody debris on site.

No commercial harvesting will occur in forested wetlands delineated on Map 1.

We will use adaptive management in assessing and modifying silvicultural prescriptions to achieve wildlife habitat objectives.

Management actions will ensure the future growth of the forest and sustainable productivity consistent with ecological conditions.

Features in the implementation of the habitat management plan will ensure the application of new scientific, social, and economic information to improve silvicultural and management practices and enhance environmental and financial performance.

JUSTIFICATION

We have determined this use to be compatible, provided the stipulations necessary to ensure its compatibility are implemented. The commercial forest management program will contribute to the following goads of the Refuge System's Strategic Plan: 1. Provide Healthy Fish, Wildlife and Plant Populations, 3. Maintain Productive Habitats, and 5. Provide Quality Environments. Therefore, it is the determination of the Service that commercial forest management, at the discretion of the Refuge Manager, is a compatible use of the Refuge.

Commercial forest management will contribute to the purposes for which the Refuge was established and the mission of the Refuge System, and facilitate the ability of the Refuge to meet its wildlife management objectives. The use will not pose significant adverse effects on Refuge resources, interfere with the public use of the Refuge, or cause an undue administrative burden. We may adjust the habitat management program on the Refuge annually to insure its continued compatibility.

CONSULATION WITH THE REFUGE SUPERVISOR:

Signature: Refuge Manager: _____
(Signature/Date)

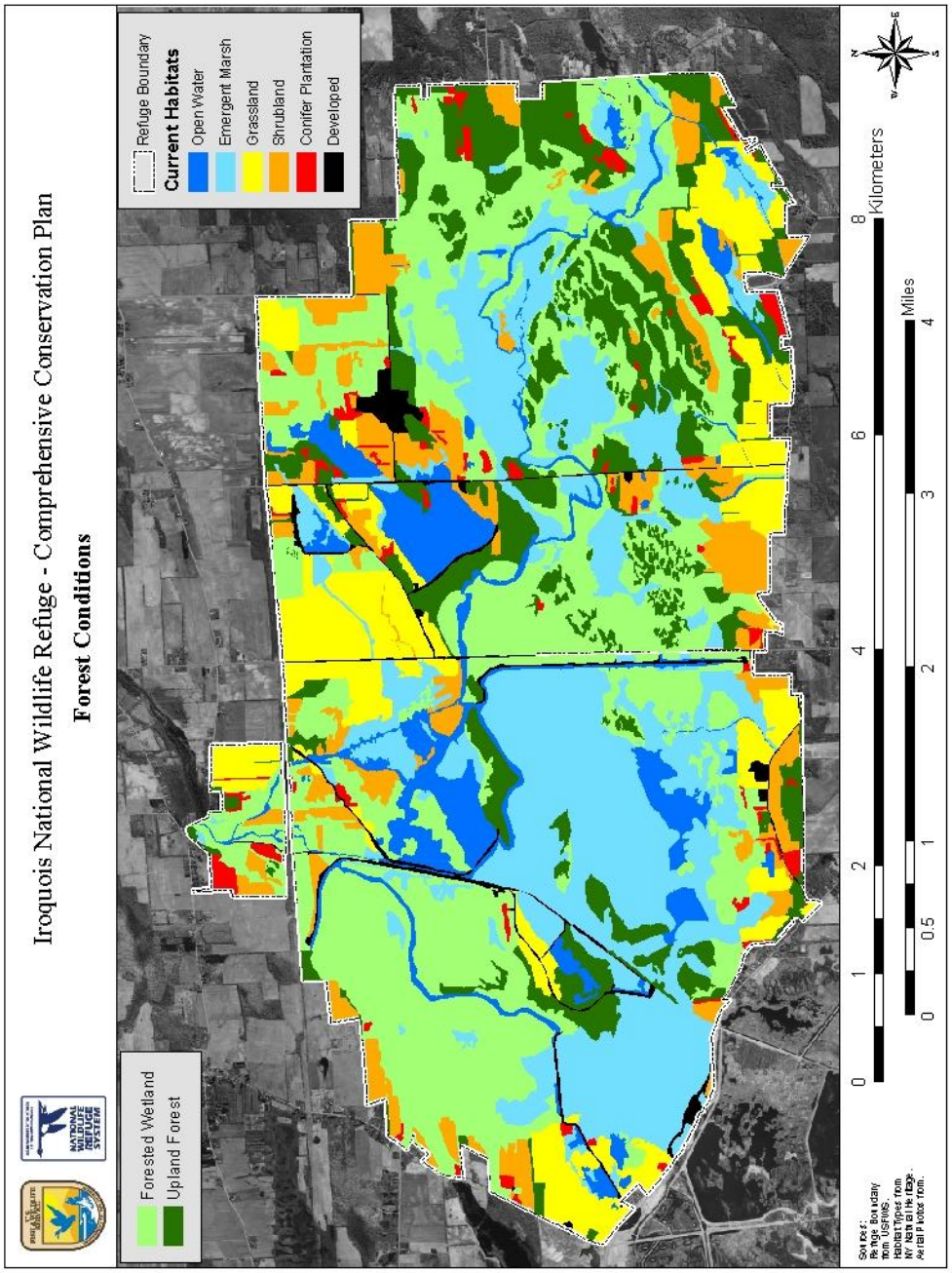
Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 10 - year Reevaluation Date: _____

BIBLIOGRAPHY

New York State DEC. 2007. New York State Forestry Best Management Practices for Water Quality, BMP Field Guide.

NY State DEC Timber Harvesting Guidelines http://www.dec.ny.gov/lands/5240.html


Iroquois National Wildlife Refuge - Comprehensive Conservation Plan
Forest Conditions
Refuge Boundary
Current Habitats
Open Water
Emergent Marsh
Grassland
Shrubland
Conifer Plantation
Developed
Forested Wetland
Upland Forest
Kilometers
Miles
Source:
Refuge Boundary from USFWS.
Habitat Types from NY Natural Heritage.
Aerial Photos from.

APPENDIX 1

(for Forest Management Compatibility Determination)

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Iroquois National Wildlife Refuge
1101 Casey Road
Basom, NY 14013
(585)948-5445

SPECIAL USE CONDITIONS
COMMERCIAL FOREST MANAGEMENT AGREEMENT
IROQUOIS NATIONAL WILDLIFE REFUGE
February 2010

I. Property Location/Access/Boundaries

The Iroquois National Wildlife Refuge (Refuge), a unit of the National Wildlife Refuge System under the jurisdiction of the U.S. Department of the Interior, Fish and Wildlife Service, grants the permittee permission to enter Refuge lands, together with workers and equipment upon terms and conditions of this Permit, to harvest forest products. Permittee agrees to cut and remove the forest products and to pay the Refuge according to the terms and conditions in this agreement.

A. Unit Locations and Descriptions

Cutting Units subject to this permit are located on the Iroquois National Wildlife Refuge, within the Town of Alabama in Genesee County, NY and the Town of Shelby in Orleans County, NY. Maps and/or sketches and descriptions of each cutting unit are appended to the Special Use Permit.

B. Boundaries

The boundaries of each individual cutting unit have been marked with pink "Harvest Unit Boundary" flagging; corners of each unit are designated by three pink "Harvest Unit Boundary" flags tied to a tree.

C. Access

Access to each cutting unit will be by the most direct route across existing interior Refuge roads. On Units where skid trails have been marked, permittees must use these trails. Permittees will be responsible for plowing and maintaining roads so they are passable by conventional four-wheel drive vehicle in winter (two-wheel drive in spring after snow and ice is gone) during the period of the harvest operation. Access routes must be approved by Refuge Manager or designee, prior to commencing the harvest operation.

On roads/trails open to vehicles, the permittee must leave a travel lane suitable for passage by. Roads should be plowed in a manner so as not to leave large piles of snow or ice which may block or pose a hazard for vehicles.

If it is necessary to access harvest units through Refuge gates, the permittee must provide a lock which will be placed in the chain by refuge personnel. When the permittee has completed the timber harvest, they will notify the refuge to secure the gate before their lock is removed. Refuge gates must remain closed at all times, but may be left un-locked when timber harvest operations are taking place. The exception to this will be the gate at the entrance to Feeder Road which is open during the hunting season.

All vehicles and equipment will be operated in a safe and careful manner. Refuge personnel and Refuge visitors may also be using Refuge roads and trails during the harvest operation.

II. Term

Permittee may begin harvesting only after issuance of the Special Use Permit, and meeting with the Refuge Manager and designated agent to discuss access routes, skid trail and yard locations. All required documentation must be submitted for review by the Refuge Manager prior to issuance of the Special Use Permit.

All harvesting must be completed by March 1, 2010, and all wood and equipment removed from the Refuge by 4:00 P.M. on March 31, 2010, unless the Special Use Permit is terminated, as elsewhere provided in this document, or the Permit is extended at the agreement of both parties in writing. Any equipment left on Refuge Lands after March 31, 2010 will be considered abandoned property in accordance with 50 CFR and may be removed by the Refuge at the owner's expense.

III. Description of Timber to be Cut and Removed

Permittees must cut all live woody vegetation with a diameter at breast height (dbh) over 2 inches within the designated blocks when the prescription is complete removal. During a selective harvest, permittees must cut all trees marked for removal.

The following **may not** be cut in complete removal areas: apple trees, oak trees, any trees with obvious wildlife value (such as dead stubs with woodpecker holes or cavities), and any trees which are marked with paint and/or "**Do Not Cut**" flagging. A buffer of trees will be maintained around marked trees to prevent damage during harvest operations. The buffer may be taken after the remainder of the block has been cut, and there is no chance of damage to marked trees.

IV. Status of Parties

A. Designated Agent

For the purposes of oversight of the permittee's compliance with the conditions of this Permit the Refuge Wildlife Biologist and the Wildlife Refuge Specialist will be deemed the designated agents.

The designated agents will have the authority to review and approve forestry activities on Refuge lands during the term of the Special Use Permit. The permittee agrees to consult with

the designated agents and abide by their determinations and instructions during all stages of the harvest operation.

B. Permittee Responsibilities and Warranties

Permittee warrants and represents that he or she does have, and will employ and utilize the equipment and personnel necessary to perform the harvesting contemplated under this Permit in a timely manner. Permittee will be solely responsible for the acquisition, maintenance, replacement and repair of equipment, and for the selection, training, supervision, control, direction, compensation, work rules, discipline and termination of his or her employees or subcontractors. Permittee warrants and represents that all of his or her employees will perform in accordance with the requirements of these special conditions when assigned to the work to be performed hereunder. Permittee will equip and train his or her employees and subcontractors adequately to perform the required services in a safe, timely and lawful manner.

Permittee will conduct business in a manner to be at all times in full compliance with all requirements of Federal, State, and local law, including applicable common law, statutes and requirements, and including but not limited to the requirements of the Federal Fair Labor Standards Act, all federal and State labor and employment laws, federal immigration laws, the worker's compensation laws, federal and State equal employment laws, the Internal Revenue Code and State tax laws and regulations, the unemployment insurance laws, the federal Occupational Safety and Health act of 1970, as amended, and its regulations, state laws pertaining to occupational safety and health, New York Worker's Compensation Act and New York Employment Security Law, state laws and regulations pertaining to wood harvesting, and any other laws or governmental rules and regulations pertaining to the services to be provided hereunder.

V. Forestry Practices

The following are minimum forestry practices applicable to all forestry special use permits. The permittees will, at their sole cost and expense, harvest wood products from the designated cutting areas, during the terms of the Special Use Permit, in accordance with the accepted principles of professional forestry, the NY State DEC Best Management Practices and the following conditions.

A. Scaling

All wood products harvested and removed from the refuge will be measured in standard cords, board feet, tons, or pounds in accordance with the Wood Measurement Rules.

All weights will be green or wet weights.

Scaling will be done only by State licensed scalers.

Payment for all forest products removed from the Refuge will be made monthly by check or money order. All payments must be accompanied by a summary sheet, detailing amounts of

each product for which payment is being made, legible scale slips, measurement tally sheets, or the like.

All payments will be based on the most current Schedule of stumpage prices.

The first payment will be due 30 calendar days from the date harvesting begins. Subsequent payments will be due each 30-calendar days thereafter.

B. Utilization Requirements

1. Harvesting will proceed in an orderly manner to ensure cutting of all trees designated for harvest. When harvest is to be completed by clearcutting, all trees greater than 2 inches d.b.h. must be cut, with the following exceptions:

A. Apples, oaks, wildlife trees (standing snags (dead or hollow live) 10 inches or greater d.b.h.), trees marked with "**Timber Harvest Boundary**" flagging, and trees marked with paint and/or "**Do Not Cut**" flagging may not be cut.

B. Any saplings (trees 4 inches d.b.h. or smaller) within 30 feet of a timber harvest boundary need not be cut unless otherwise directed by refuge biologist.

C. Any non-merchantable trees of any size within 30 feet of a wildlife tree (standing snags (dead or hollow live) 10 inches or greater d.b.h.) need not be cut unless otherwise directed by refuge biologist.

2. During a selective harvest, permittees must cut all trees marked for removal and only those marked.

3. Stump heights shall not exceed six (6) inches, except where obvious obstacles, problems with terrain, swell of roots, or similar hindrances do not permit such a low cut. Snow shall be removed as necessary to comply with this requirement.

4. Outside of areas designated for clear cutting and log landings, insofar as ground conditions permit, trees shall not be skidded against residual trees or trees marked to be left uncut.

5. Travel and skidding across previously harvested areas will be kept to a minimum. Routes across these areas must be approved by the refuge's designated agent.

C. Condition of Roads and Facilities

Permittee agrees, at his or her expense, to construct roads and/or skidder trails in accordance with the appropriate rules of the State of New York Land Use Regulation Commission and/or Department of Environmental Conservation BMP, and any applicable municipal ordinances.

Harvesting activities may be restricted during wet conditions to avoid excessive damage to roads or clear-cut areas. Permittees will be notified in person or by phone when this determination is made.

Permittee agrees to maintain and leave existing interior Refuge roads, fences, gates, signs, and any other government property or facilities in the same or better condition than when harvesting began. All damaged property or facilities must be repaired, replaced, or restored, at the permittee's expense, per the designated agent's specifications.

The size of landings shall not exceed that necessary for safe and efficient skidding and loading operations. Wherever possible, landings should be established within the harvest blocks. The designated agent must approve the location and size of all landings prior to the beginning of harvest operations.

It is the responsibility of the permittee to abide by weight restrictions which may be placed on certain local or State roadways.

D. Slash

Permittee is responsible for ensuring that no slash remains within twenty-five (25) feet of adjoining private property, national natural landmark or research natural area boundary lines, railroad rights-of-way, and electric power or telephone lines.

Slash and debris (tops, limbs, logs) resulting from the harvest operation may not be left in piles on the landings, or within the harvest blocks. This material should be skidded back onto the harvest unit and evenly distributed across the unit.

E. Litter/Pollution Avoidance

Permittee shall not discard or otherwise dispose of litter on Refuge or private property, into waters of the Refuge or State or on ice of such waters, or upon any adjacent highway or public way, and shall be responsible for off-site disposal of garbage and refuse generated by forest operations in a lawful manner. Litter includes all waste materials, including bottles, cans, machine parts and equipment, tires, junk, paper, garbage and similar refuse. Wastes of the primary processes of forest product harvesting, such as sawdust and slash are not considered litter.

Permittees shall not service skidders, trucks, or other equipment at locations where pollution of the waters of the Refuge and/or State of New York is likely to occur. Any oil, grease, hydraulic fluid, or other materials that leak from the permittee's equipment must be immediately cleaned up using appropriate oil-absorbing pads or towels. Equipment should be maintained to the extent that there are no leaks of contaminants. Any leaks or spills must be reported to the Refuge immediately.

F. Firearms and Alcoholic Beverages

The use or possession of all firearms, weapons, and alcoholic beverages on the Refuge is prohibited at all times, except that the possession of firearms for hunting during an open season in an area open to hunting is permitted, subject to Refuge regulations and State law.

G. Fire Suppression

Permittee shall comply with all forest fire suppression laws of the State of New York.

Each piece of equipment on the harvest site must be equipped with a 5 pound or larger type BC fire extinguisher.

H. General Compliance with Forestry, Land Use, and Environmental Laws
Permittee shall comply with all laws, ordinances, and regulations of the municipality where the harvest unit is located, the Towns of Alabama and Shelby, the State New York, and of the United States, relating to timber cutting; removal and disposal of slash, debris and litter; construction of roads, trails and landings; protection of streams, rivers and other waters of the Refuge and State of New York; soil erosion; and all other laws regulations and ordinances pertaining to forest product harvest operations and their effect on the environment and land use, including but not limited to the applicable standards of the Land Use Regulation Commission and rules. Best management practices as published in NY State Department of Conservation Best Management Practices for Water Quality, BMP Field Guide (2007) and NY State DEC Timber Harvesting Guidelines http://www.dec.ny.gov/lands/5240.html will be implemented.

Permittee warrants that the Refuge Manager or his designee will be immediately notified on any occasion that a potential violation of the laws governing the harvest operation has occurred.

VI. Default/Enforcement of Obligations

Upon the occurrence of any event of default by Permittee, the Refuge Manager or his designee may, at any time thereafter, do any or all of the following:

A. For good cause, to halt the Permittee's harvest operations and terminate the Special Use Permit, if in the opinion of the Refuge Manager or his designee, the Permittee is breaching the terms and conditions of the Permit.

B. Enter into the harvest unit and take possession of all forest products remaining on the unit.

C. Grant other permits to third parties to complete the harvesting specified in the Permit in the event of termination of the Permit or for unexcused harvesting stumpage by permittee.

D. Take corrective action as the Refuge Manager or his designee deems necessary to abate erosion or damage to the harvest area, and to remove slash, litter and abandoned property of the Permittee, at the Permittee's cost.

E. Enjoin any activity of the Permittee in default of the conditions of the Special Use Permit, and/or seek any other judicial or administrative remedy available to the Refuge Manager at law or in equity.

Permittees must contact the designated agent 14 days prior to the anticipated completion of harvest operations to arrange for an inspection. Upon the termination

or completion of the Special Use Permit, the Refuge's designated agent shall examine the harvest unit and access roads, gates, and other facilities, and report to the Permittee any failure on their part to comply with the conditions, terms, and specifications of the Special Use Permit Conditions.

VII. Insurance

Permittee shall provide and maintain, during the term of the harvest operation, insurance as follows:

A. Worker's Compensation and Employer's Liability Insurance

1. Permittee shall obtain and maintain during the term of the harvest operation, Worker's Compensation Insurance covering all its employees and any others performing work under this Special Use Permit, with coverage set forth in New York Statutes, and Employer's Liability Insurance covering all such persons; **or**

2. The permittee shall supply a signed statement to the Refuge Manager that he or she is an independent contractor. As an independent contractor he will not hire any employees to assist in the wood harvesting without first providing the required certificate of insurance to the landowner. The Refuge Manager will obtain a declaration of independent status of the permittee from the Worker's Compensation Board.

B. Public Liability and Property Damage Insurance

The Permittee shall take out and maintain during the term of the Special Use Permit, Public Liability and Property Damage Insurance to protect against claims for damages for bodily injury, including personal injury to or destruction of property which may arise from operations performed under this Special Use Permit. The minimum amounts of such insurance shall be as follows:

Bodily Injury Liability	$100,000 each person $500,000 each occurrence

Property Damage Liability $100,000 each occurrence

Permittees will be required to submit proof that they meet insurance requirements prior to issuance of the Special Use Permit.

VIII. Assignment

Permittee may not assign the Special Use Permit to another party.

IX. Modification of Agreement/Special Use Permit

The Special Use Permit and this listing of conditions may only be amended by a written statement which must be signed by the Permittee and the Refuge Manager or designated agent. Failure to comply with any conditions of the Special Use Permit may result in revocation of the permit and the loss of the privilege to engage in commercial forest management on the Refuge in the future.

APPENDIX 2

(for Forest Management Compatibility Determination)

Potential Strategies for Commercial Forest Management

Strategies for Northern Hardwood Habitat Type (including hemlock areas)

- Maintain natural community characteristics of northern hardwoods by single-tree or group selection cutting;
- The size of each management unit, its silvicultural prescription and rotation age will determine size of each treatment action and the cutting interval.
- Maintain nut producing oaks and beech.
- Retain snags, cavity trees (4 of each >15 inch dbh) and downed woody debris.

Without Hemlock:

- single tree selection to maintain mature forest (consistent with natural disturbance patterns) and maintain a >60% overstory canopy closure;
- group selection to maintain mature forest while encouraging mid-tolerant species and creating small patches of early successional (up to 2 acres);

With Hemlock:

- single tree and group selection to maintain mature forest (consistent with natural disturbance patterns) and regenerate hemlock (0.1 acre or less);
- retain individual trees and groups of hemlock within northern hardwoods to provide important food and cover.

Strategies for Oak-Hickory Habitat Type

- Maintain natural community characteristics of northern hardwoods by single-tree or group selection cutting;
- The size of each management unit, its silvicultural prescription and rotation age will determine size of each treatment action and the cutting interval.
- Maintain nut producing oaks and beech.
- Retain snags, cavity trees (4 of each >15 inch dbh) and downed woody debris.

Strategies for Early Successional Areas

- In early successional areas (to be determined in HMP), use accepted silvicultural practices to create openings, understory development and early successional habitat for American woodcock, field sparrows, and golden-winged warblers.
- We will use group selection, clearcuts or patch cuts of up to 5 acres in size. We may also maintain some larger, roosting fields. Cutting cycles will be approximately 8 to 10 years on a 40-year rotation.
- We may permanently maintain some large openings (through grassland management), primarily by mowing and brush clearing using mechanized equipment for species like American woodcock, adjacent to early successional areas.
- We will perpetuate aspen-birch communities in early successional management areas, when possible.

Strategies for Conifer Plantations

- Eliminate all conifer plantations by:
    - clearcutting – removal of all trees in plantation;

  - shelterwood cut – removing part of stand to allow natural regeneration and then coming back to remove the remaining stand at a later date and/or
  - gridling - .determine best girdling regime to reduce introduction of invasive species.
- Regenerate to native forest communities by:
  - natural regeneration and/or
  - seedling planting.

Potential Strategies for Forested Wetland Management (Non-Commercial)

Strategies for Forested Wetlands (including Oak Orchard NNL and Milford Posson RNA)
Improve habitat structure through stand improvement operations for focal species. We will favor mast producing species during stand improvements, although it is not our intent to eliminate all other hardwood types.

- No commercial harvesting will take place any cutting will be done and trees left in place.
- Regenerate this habitat type through accepted silvicultural practices. Methods will include using:
  - single tree or group selection;
  - treatments timed to optimize the ability of the site to regenerate softwood;
- The size of each management unit, its silvicultural prescription and rotation age will determine the size of each treatment and the cutting interval.

COMPATIBILITY DETERMINATION

USE: Furbearer Management – Economic Use

REFUGE NAME: Iroquois National Wildlife Refuge

DATE ESTABLISHED: May 19, 1958

ESTABLISHING AUTHORITY: Migratory Bird Conservation Act (16 U.S.C. 715d)

PURPOSE(S) FOR WHICH ESTABLISHED:

…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds… 16 U.S.C. ¤ 715d (Migratory Bird Conservation Act)

MISSION OF THE NATIONAL WILDLIFE REFUGE SYSTEM:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) What is the use? Is the use a priority public use?

The use is furbearer management. Furbearer management through trapping is an existing economic use of a Refuge's natural resource. Pursuant to Refuge regulations at 50 C.F.R. 29.1, since this is considered to have economic value, because the fur can be sold, we must determine if furbearer removal by private parties is compatible with and contributes to the Refuge purposes or the mission of the NWRS. Trapping is used on the Refuge in order to keep populations of furbearers in check, thus protecting Refuge structures (dikes and water control structures), and to decrease predation on nesting migratory birds. The trapping program is described in the Annual Trapping Plan. Over the last 10 seasons, an average of 23 marsh trapping permits and 24 upland trapping permits were issued. Reports indicate that every year some trappers who receive permits do not actually trap. The average actual number of trappers in the field each year is probably about 25 total for both marsh and upland trapping. Although a wildlife activity, it is not a priority public use.

(b) Where would the use be conducted?

Trapping would be permitted in most areas of the Refuge. Occasionally, marsh trapping is not permitted in certain areas to allow muskrat populations to increase to help create more desirable wetland conditions. Additionally, marsh trapping in some wetlands is occasionally restricted to certain areas (e.g., along dikes) to lower muskrat populations in an attempt to reduce damage to Refuge infrastructure. A description of authorized trapping areas is provided to trappers with their trapping permit. Occasionally, certain areas will be closed due to construction activities or biological need to allow furbearer populations (primarily muskrats) to increase.

Trapping will not be permitted in the waterfowl hunt area during the Refuge's waterfowl season, designated nature trail, or administrative areas like refuge office, refuge quarters, Iroquois Job Corps Center, to reduce the potential for conflicts.

(c) When would the use be conducted?

Trapping would be conducted under New York State regulations, typically in the fall and winter. This corresponds with the period when pelts of furbearers are prime and when the use will not affect nesting migratory birds. Trapping for upland species including raccoon, fox, skunk, opossum, coyote, and weasel is from late October through mid-February, trapping for muskrats and mink is from late-November through mid-February, and trapping for beavers is from mid-December through mid-January. These are general season periods and may change as New York State regulations change. Additionally, marsh trapping, in areas where waterfowl hunting occurs, does not open until after the Refuge waterfowl hunt has completed.

(d) How would the use be conducted?

Trapping would be conducted via a permit that requires the trapper to follow State of New York regulations and Refuge specific regulations on closed areas, etc. Interested individuals would be issued a Refuge special use permit and we would issue a maximum of 50 trapping permits (25 marsh and 25 upland). Any furbearer species that can be legally harvested under New York State regulations can be trapped on the Refuge unless special Refuge regulations are in effect. The Refuge Manager reserves the authority to regulate the numbers of furbearers taken in any zone or throughout the season and to enact specific Refuge trapping regulations. Anyone holding a marsh trapping permit is restricted to using no more than 25 traps on the Refuge at any time.

Anyone issued a trapping permit is required to submit a monthly trapping report. The information on this report includes the number of days that the trapper trapped and the species and number of animals harvested. As well as any non-target animals that might have been caught. At the conclusion of the trapping season the information from all trappers is collated and included in the Refuge's Annual Trapping Program. If the trapper fails to return trapping reports, we will not issue them a permit for the next year.

Furbearer populations and/or habitat conditions will be assessed yearly so that recommendations for the next year's trapping regulations can be determined. This is especially critical for muskrat populations because of the damage they can cause to Refuge infrastructure and their need to help manage the marshes. In some years the Refuge may not allow trapping, if for example muskrat populations show a significant decrease.

Refuge specific regulations include, but are not limited to:

1. Permittee must personally tend his/her traps unless otherwise authorized by the Refuge Manager.

2. A maximum of 25 traps may be used by each permitee.

3. All traps must have a tag affixed that shows the permitee's name and address.

4. Permittee must submit a Monthly Report to the Refuge, even if no animals were taken that month. Failure to do so will result in loss of trapping privileges the following year.

5. All trap location markers (flagging, etc) must be removed within five (5) days of completion of trapping.

6. Dead muskrats found in the marsh should be promptly turned in to the Refuge Headquarters for analysis by the State for possible disease.

7. Unmotorized boats are permitted on Oak Orchard Creek only, between Knowlesville Rd. and Route 63.

8. No dogs are allowed.

9. Permit must be in trapper's possession.

10. Incidental take of non-target species needs to be reported to the refuge manager within one (1) day of capture.

11. Traps are required to be a minimum of 10 feet from the edge of public trails, service roads, top edge of dikes or any cut path (i.e., paths to waterfowl hunt stands, etc.) where people may be walking or staff may be driving.

12. No water sets are permitted by upland trappers.

(e) Why is this use being proposed?

Furbearer management will be conducted first and foremost as a tool to maintain habitat and keep the predator prey balance. The implementation of a regulated furbearer management program on the Refuge also affords a potential mechanism to collect survey and monitoring information, or contribute to research on furbearer (and other wildlife) occurrence, activity, movement, population status, and ecology. By maintaining a trained and experienced group of trappers, the Service can utilize their skills and local knowledge to perform or assist with valuable management or research functions. Trappers that participate in the Refuge program would provide assistance with the implementation of structured management objectives, such as alleviation or reduction of wildlife damage conflicts, negative species interactions, and habitat modifications. Refuge trappers typically have a stake in proper habitat and wildlife conservation, and protection of the ecological integrity of the Refuge so that their activity can continue. Accordingly, they are valuable assets to the Refuge Manager in terms of providing on-site reports concerning the fundamental status of habitat, wildlife, and Refuge conditions.

Removal of harvestable furbearers will have a beneficial effect by protecting Refuge infrastructure – dikes, water control structure – from damage, thus ensuring management capabilities over wetlands. It will also help the Refuge to achieve the objectives outlined in the Annual Habitat Work Plan.

Decreasing predators will decrease the potential for predation on nesting migratory birds. In addition, reducing predator densities can reduce the spread of some density dependent diseases such as distemper, parvo, and rabies.

Furbearer management is not a priority public use; however it facilitates priority public uses on the Refuge as well as contributing to the purpose of the Refuge by regulating the populations of species to ensure quality habitat conditions and maintain mission critical infrastructure.

AVAILABILITY OF RESOURCES:

During calendar years 2008 and 2009, there were 28 (17 upland and 11 marsh) and 25 (14 upland and 11 marsh) trapping permits issued, respectively. Time spent reviewing, issuing, and overseeing permit holders will be minimal for Refuge staff, and therefore resources are available under current staffing and budgets. Additionally, maintaining adequate levels of furbearers on an annual basis will help ensure major failures in Refuge infrastructure do not occur, thus reducing large expenditures of funds to repair infrastructure.

The following breakdown shows the estimated funds needed to administer the program.

Annual Costs of furbearer management

Identifier	Cost
Trail/Road Maintenance*	$720
Surveys, data analysis, recommendations, reporting	$1,580
Trapper Compliance	$1,000
Permitting, news release, fact sheets	$1,000
Total Annual Cost	**$4,300**

* Refuge trails and roads are maintained for a variety of activities. Costs shown are a percentage of total costs for trail/road maintenance on the Refuge and are reflective of the percentage of trail/road use for this activity. Volunteers account for some maintenance hours and help to reduce overall cost of the program.

ANTICIPATED IMPACTS OF USE:

The impacts of furbearer management on the purposes of the refuge and the mission of the Refuge System can be either direct or indirect, and may have negative, neutral or positive impacts on Refuge resources.

Migratory birds: Indirect impacts may include displacing migratory birds from their resting areas on the Refuge during migration. Migratory birds would not be impacted during the pair bonding/nesting season because trapping would not occur during this time period. Reductions in the populations of nest predators, such as raccoon, have positive impacts on

nesting birds. The degree to which predator management benefits migratory bird production can vary widely depending on the timing of the removal of predators, the size of the habitat block, habitat isolation, and adjacent land use.

Wetlands and wetland plants: Removing plant eating species, such as beaver and muskrat, can have a positive and negative impact on Refuge resources. These species dig bank dens into Refuge dikes and embankments. These dens and holes must be filled to prevent the compromise of the dikes. The costs to repair the damage to these structures can be reduced by managing beaver and muskrat populations at levels through a furbearer management program.

Muskrats can enhance habitats in many ways. The house and dens that muskrats build are from aquatic vegetation. This removal creates openings for fish, waterfowl and other migratory birds. These benefits minimize the need to commit Refuge resources to achieve quality habitat conditions. However, over population of muskrats can devoid a marsh of needed perennial vegetation, like cattail, if populations are left unchecked.

Furbearers: Impacts to furbearers from a furbearer management program are obvious. Trapping would remove individuals. The anticipated direct impacts of trapping on furbearers would be a reduction of the furbearer populations in those areas with harvestable furbearers. Their removal would maintain furbearer populations at levels compatible with the habitat and with Refuge objectives, minimize furbearer damage to facilities and wildlife habitat, minimize competition with or interaction among wildlife populations and species that conflict with Refuge objectives, and minimize threats of disease to wildlife and humans.

Several studies have examined the effects of recreationists on birds using shallow-water habitats adjacent to trails and roads through wildlife refuges and coastal habitats in the eastern United States (Burger 1981; Burger 1986; Klein 1993; Burger et al. 1995; Klein et al. 1995; Rodgers & Smith 1995, 1997; Burger & Gochfeld 1998). Overall, the existing research clearly demonstrates that disturbance from recreation activities always have at least temporary effects on the behavior and movement of birds within a habitat or localized area (Burger 1981, 1986; Klein 1993; Burger et al.1995; Klein et al. 1995; Rodgers & Smith 1997; Burger & Gochfeld 1998). The findings that were reported in these studies are summarized as follows in terms of visitor activity and avian response to disturbance.

Presence: Birds avoided places where people were present and when visitor activity was high (Burger 1981; Klein et al. 1995; Burger & Gochfeld 1998).

Distance: Disturbance increased with decreased distance between visitors and birds (Burger 1986), though exact measurements were not reported.

Approach Angle: Visitors directly approaching birds on foot caused more disturbance than visitors driving by in vehicles, stopping vehicles near birds, and stopping vehicles and getting out without approaching birds (Klein 1993). Direct approaches may also cause greater disturbance than tangential approaches to birds (Burger & Gochfeld 1981; Burger et al. 1995; Knight & Cole 1995a; Rodgers & Smith 1995, 1997).

Type and Speed of Activity: Joggers and landscapers caused birds to flush more than fishermen, clammers, sunbathers, and some pedestrians, possibly because the former groups move quickly (joggers) or create more noise (landscapers). The latter groups tend to move more slowly or stay in one place for longer periods, and thus birds likely perceive these activities as less threatening (Burger 1981, 1986; Burger et al. 1995; Knight and Cole 1995a). Alternatively, birds may tolerate passing by with unabated speed whereas if the activity stops or slacks birds may flush (Burger et al. 1995).

Noise: Noise caused by visitors resulted in increased levels of disturbance (Burger 1986; Klein 1993; Burger & Gochfeld 1998), though noise was not correlated with visitor group size (Burger & Gochfeld 1998).

In determining compatibility, the cumulative effects of all public uses are considered. Due to the limitations put on these activities, as well as the season of use, disturbance from trappers is not expected to significantly increase the disturbance to wildlife. Trappers are afield during a period of the year when nearly all wildlife breeding activity has ceased. Additionally, much of the marsh trapping activity occurs when Refuge wetlands are iced over and very few wildlife are using the area.

PUBLIC REVIEW AND COMMENT:

As part of the comprehensive conservation planning process for the Iroquois National Wildlife Refuge, this compatibility determination will undergo a comment period of 30 days concurrent with the release of our draft CCP/EA

DETERMINATION (check one below):

THIS USE IS COMPATIBLE _X_

THIS USE IS NOT COMPATIBLE ___

STIPULATIONS NECESSARY TO ENSURE COMPATIBILTY:

- New York State trapping seasons, methods, and other regulations are strictly adhered to.
- Trapping seasons will be monitored to ensure that the majority of the trapping efforts are conducted outside of peak migratory bird movement through the Refuge.
- Eagle nesting zones will be closed to trapping after January 1.
- Timing of trapping authorization will be issued to ensure no interference with priority public uses.
- Trappers must report harvested animals monthly, thus if it appears there is excessive harvest on a species, Refuge trapping can be closed down early to keep harvest levels in line with current furbearer population.
- Traps are checked daily.
- Every effort is made to prevent the capture of non-target species.

JUSTIFICATION:

Maintaining furbearer populations at levels that are conducive to management of the Refuge's habitat for waterfowl, other migratory birds, and endangered species assist in benefitting the mission of the Refuge and the National Wildlife Refuge System. An adequate muskrat population allows for effective management of Refuge marshes to create/maintain a hemi-marsh conditon. However, excessive numbers could mean that Refuge infrastructure can be compromised because of burrowing into dike systems. Keeping furbearer predators in check will assist in keeping depredation of migratory bird nests, eggs, etc to a minimum. Additionally, trapping on the Refuge is a cost-effective way of helping to maintian furbearer and migratory bird populations.

Furbearer management is not a priority public use; however it facilitates priority public uses on the Refuge as well as helping to contribute to the purpose of the Refuge. This use would not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose for which the Refuge was established.

CONSULATION WITH THE REFUGE SUPERVISOR:

The Refuge Supervisor was consulted on January 2010; changes were made as needed.

Signature: Refuge Manager: _____
(Signature/Date)

Concurrence: Regional Chief: _____
(Signature/Date)

Mandatory 10 - year Reevaluation Date: _____

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Appendix C

USFWS

American Woodcock

Species of Regional Conservation Concern

- Process to Determine Priority Resources of Concern
- Priority Resources of Concern for Iroquois NWR
- Habitat Requirements for Selected Species of Conservation Concern
- New York Natural Heritage Report on Rare Animals, Rare Plants, and Significant Ecological Communities

Process to Determine Priority Resources of Concern

In collaboration with other Refuges in the Bird Conservation Region 13 (Lower Great Lakes/St. Lawrence Plain) we developed a matrix of resources of concern for the region. To determine the resources of concern that would guide the management priorities at each Refuge we examined a multitude of guiding documents and other information sources. These documents, plans, or policies typically identify focal species, species groups, or habitats. These sources fall into three categories:

- Legal Mandates
- U.S. Fish and Wildlife Service Trust Species
- Biological Integrity, Diversity, and Environmental Health Policy ("Integrity Policy")

Legal Mandates

See Chapter 1 of CCP.

U.S. Fish and Wildlife Service Trust Species

Although the Refuge purposes are the first obligation, managing for trust species is also a priority for the Refuge. Trust species are further defined as follows:

Migratory Birds: A list of all the species of migratory birds protected by the Migratory Bird Treaty Act (16 U.S.C. 703–711) and subject to the regulations on migratory birds are contained in subchapter B of title 50 CFR § 10.13. The Migratory Birds Program also maintains subsets of this list that provide priorities at the national, regional, and ecoregional (bird conservation region) scales.

The primary sources of information that the Refuge used to identify potential migratory birds species of concern included:

- Bird Conservation Region (BCR) 13
- Continental and Regional Plans for landbirds, waterfowl, shorebirds, and marshbirds
    - Rocky Mountain Bird Observatory Species Assessment Database
    - USFWS Birds of Conservation Concern
    - Federal Threatened and Endangered species
    - Status and Trend Information from Refuge bird surveys and other surveys
    - Important Bird Area criteria

Interjurisdictional Fish: those "*…populations that two or more States, nations, or Native American tribal governments manage because of their geographic distribution or migratory patterns (710 FW 1.5H).*" Examples include anadromous species of salmon and free-roaming species endemic to large river systems, such as paddlefish and sturgeon (FWS Director's Order No. 132, Section 6[c]). A standard set of information resources is not currently available for fish. However, we used the best available information from the USFWS Regional Fisheries Office.

***Marine Mammals*:** The Marine Mammal Protection Act of 1972 (16 U.S.C. 13611407) prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. Iroquois NWR is not within a marine environment.

Threatened and Endangered Species: The Endangered Species Act (16 U.S.C. §§ 1531-1544, December 28, 1973, as amended 1976-1982, 1984 and 1988) states in Sec. 8A.(a) that "*The Secretary of the Interior (hereinafter in this section referred to as the "Secretary") is designated as the Management Authority and the Scientific Authority for purposes of the Convention and the respective functions of each such*

Authority shall be carried out through the United States Fish and Wildlife Service." The Act also requires all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act.

To identify Federal threatened or endangered species of relevance to Iroquois NWR we reviewed:

- Federal Threatened and Endangered Species List
- Recovery Plans for Federal-listed species in our region

Biological Integrity, Diversity, and Environmental Health

The 1997 National Wildlife Refuge System Improvement Act states that in administering the System the Service shall *"… ensure that the biological integrity, diversity, and environmental health of the System are maintained…"* (601 FW 3; also known as the "Integrity Policy"). The USFWS (2003) defines these terms as:

Biological Diversity	The variety of life and its processes, including the variety of living organisms, the genetic differences between them, and the communities and ecosystems in which they occur.
Biological Integrity	Biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms, and communities.
Environmental Health	Composition, structure, and functioning of soil, water, air, and other abiotic features comparable with historic conditions, including the natural abiotic processes that shape the environment.

Where possible management on the Refuge restores or mimics natural ecosystem processes or functions and thereby maintains biological diversity, integrity, and environmental health. Given the continually changing environmental conditions and landscape patterns of the past and present (e.g., rapid development, climate change, sea level rise), relying on natural processes is not always feasible nor always the best management strategy for conserving wildlife resources. Uncertainty about the future requires that the Refuge manage within a natural range of variability rather than emulating an arbitrary point in time. This maintains mechanisms that allow species, genetic strains, and natural communities to evolve with changing conditions, rather than necessarily trying to maintain stability.

As stated by Meretsky et al. (2006), the Integrity Policy directs Refuges to assess their importance across landscape scales and to "forge solutions to problems arising outside Refuge boundaries." Some of these regional land use problems include habitat fragmentation/lack of connectivity, high levels of contaminants, and incompatible development or recreational activities.

To assess the historical condition, site capability, current regional landscape conditions, and biological diversity and environmental health data pertinent to Iroquois NWR we used the following resources:

- Maps and associated data on site capability
    - Soils, topography, and hydrology
    - History of natural disturbance patterns
- Map of current landscape condition showing conserved lands network, connectivity, land use patterns, and management/ownership trends surrounding the Refuge
- Map of existing vegetation on the Refuge, including distribution and abundance of invasive species
    - Regional/Global Environmental Trends

  - Climate Change
  - Air and water quality
- New York Natural Heritage Program information on rare plants and animals and significant ecological communities
- New York State Comprehensive Wildlife Conservation Strategy
- Status and trend Information from Refuge biological surveys and other studies

Table C-1 is a comprehensive list of resources of concern for Iroquois NWR based on the information compiled and analyzed in this section as described under legal mandates, trust species, and integrity policy.

Table C-1 Iroquois NWR Species of Conservation Concern

Species*	Seasons on Refuge[1]	Federal T&E[2]	New York T&E[3]	NY Comprehensive Wildlife Conservation Strategy Pritotities[4]	USFWS Birds of Management Concern[5]	BCR 13[6]	Partners in Flight[7]	Shorebird Plan-Atlantic Flyway[8]	Waterbird Plan[9]	Waterfowl Plan[10]
WATERBIRDS										
American bittern	B, M-U		SC	X		H			H	
Black-crowned night heron	B, M-O			X		M			H	
Black tern	B, M-C		E	X		M			H	
Common tern	M-O		T	X	X	H			H	
Great egret				X					L	
King rail	M-R		T	X		H	IB		HI	
Least bittern	B, M-U		T	X		M			M	
Pied-billed grebe	B, M-C		T	X		M			M	
Virginia rail	B, M-U					M			L	
WATERFOWL										
American black duck	B-O, M			X	X	HH	IB			H (H)
Blue-winged teal	B, M-C					M				MH (ML)
Canada goose Atl/SJBP	M-A			X	X	HH				(H)
Canvasback	M-O			X	X	H				
Common goldeneye	M-O					HH				
Common merganser	M-U					M				L (L)
Greater scaup	M-O			X	X	H				(H)
Greater snow goose	M-O					M				
Green-winged teal	B, M									ML (ML)
Hooded merganser	B, M									H (L)
Lesser scaup	M-U			X	X	HH				(H)
Long-tailed duck	M-O			X		HH				
Mallard	B, M-C			X	X	M				H (M)

Species*	Seasons on Refuge[1]	Federal T&E[2]	New York T&E[3]	NY Comprehensive Wildlife Conservation Strategy Pritotities[4]	USFWS Birds of Management Concern[5]	BCR 13[6]	Partners in Flight[7]	Shorebird Plan-Atlantic Flyway[8]	Waterbird Plan[9]	Waterfowl Plan[10]
Northern pintail	B, M-C			X	X	H				M (M)
Redhead	B, M-O					M				
Ruddy duck	B, M-O			X						
Tundra swan	M-C					H				(H)
Wood duck	B, M-C			X	X	H				H (H)
SHOREBIRDS										
American golden plover	M-R			X	X	H		3		
American woodcock	B, M			X	X	H	IA	4		
Black-bellied plover	M-R			X		M		3		
Dunlin	M-U			X		M		3		
Greater yellowlegs	M-C			X		M		4		
Hudsonian godwit	M-R			X	X	M		3		
Least sandpiper	M-U					M		3		
Pectoral sandpiper	M-O					M		2		
Sanderling	M-?			X		M		3		
Semipalmated sandpiper	M-C			X		M		3		
Short-billed dowitcher	M-O			X	X	H		4		
Solitary sandpiper	M-O					H		3		
Upland sandpiper	B, M		SC	X		M	IB			
Wilson's snipe	B, M-C					M		3		
LANDBIRDS										
Bald eagle	B, M		T	X	X					
Baltimore oriole	B, M					M	IIA			
Black-billed cuckoo	B, M			X	X	H	IIA			
Blue-winged warbler	B, M			X		H	IB			
Bobolink	B, M			X		M	IIA			
Brown thrasher	B, M			X		H				
Canada warbler	?			X	X	M	IB			
Cerulean warbler	B, M		SC	X	X	HH	IB			
Chimney swift	B, M					M				
Common nighthawk	B, M		SC	X						
Cooper's hawk	B, M		SC	X						
Eastern meadowlark	B, M			X		M				
Field sparrow	B, M					H	IIA			
Golden-winged warbler	B, M		SC	X	X	HH	IB			
Grasshopper sparrow	B, M		SC	X		M	IIC			
Henslow's sparrow	B, M		T	X	X	HH	IB			

Species*	Seasons on Refuge[1]	Federal T&E[2]	New York T&E[3]	NY Comprehensive Wildlife Conservation Strategy Pritotities[4]	USFWS Birds of Management Concern[5]	BCR 13[6]	Partners in Flight[7]	Shorebird Plan-Atlantic Flyway[8]	Waterbird Plan[9]	Waterfowl Plan[10]
Horned lark	M		SC	X						
Long-eared owl	W			X						
Northern flicker	B, M					M				
Northern goshawk	M		SC	X						
Northern harrier	B, M		T	X	X	M				
Osprey	B, M		SC	X						
Peregrine falcon	M-R		E	X	X					
Prothonotary warbler	B, M			X		M	IB			
Red-headed woodpecker	B, M		SC	X	X	M	IB			
Red-shouldered hawk	B, M		SC	X						
Rose-breasted grosbeak	B, M					M	IIB			
Rusty blackbird	M-U			X		M				
Scarlet tanager	B, M			X		M	IIA			
Sedge wren	B, M		T	X	X		IIC			
Sharp-shinned hawk	B, M		SC	X						
Short-eared owl	M, W-O		E	X	X	M	IB			
Song sparrow	B, M					M				
Vesper sparrow	B, M-O		SC	X			VI			
Whip-poor-will	B, M		SC	X	X					
Willow flycatcher	B, M			X		M	IA			
Wood thrush	B, M			X	X	HH	IA			
Yellow-breasted chat	B, M		SC	X						
MAMMALS										
Eastern red bat	X			X						
Eastern small-footed bat	?			X						
Hoary bat	X			X						
River otter	X			X						
Silver-haired bat	X			X						
AMPHIBIANS										
Blue-spotted salamander	X		SC	X						
Jefferson salamander	X		SC	X						
Western chorus frog	X			X						

Species*	Seasons on Refuge[1]	Federal T&E[2]	New York T&E[3]	NY Comprehensive Wildlife Conservation Strategy Pritotities[4]	USFWS Birds of Management Concern[5]	BCR 13[6]	Partners in Flight[7]	Shorebird Plan-Atlantic Flyway[8]	Waterbird Plan[9]	Waterfowl Plan[10]
REPTILES										
Black rat snake	X			X						
Eastern massasuaga	?	C	E	X						
Eastern box turtle	X		SC	X						
Smooth green snake	X			X						
Snapping turtle	X			X						
Spotted turtle	X		SC	X						
Wood turtle	X		SC	X						

KEY

[1]Seasons on the Refuge: B=Breeding, W=Wintering, M=Migration, A=Abundant, C=Common, O=Occasional, U=Uncommon, R=Rare, X=Resident

[2]Federal T&E = Federal Endangered Species List: T=Threatened, E=Endangered, C=Candidate, L=Least Concern

[3]State T&E= State of New York Threatened and Endangered Species List: T=Threatened, E=Endangered, SC=Special Concern.

[4]New York State Comprehensive Wildlife Conservation Strategy. X=Species of greatest conservation need

[5]U.S. Fish and Wildlife Service Birds of Management Concern for Region 5 (Northeast) 21 September 2005

[6] BCR 13 = Bird Conservation Region 13: Lower Great Lakes/St. Lawrence Plain. HH=Highest Priority, H=High Priority, M=Medium Priority (Hartley 2007)

[7] Partners in Flight Landbird Priorities for the Lower Great Lakes Plain (Dettmers and Rosenberg 2003). IA=High continental concern and high regional responsibility; IB=High continental concern and low regional responsibility; IIA=High regional concern; IIB=high regional responsibility; IIC=High regional threats

[8]Upper Mississippi Valley/Great Lakes Regional Shorebird Conservation Plan (Szalay et al. 2000) Revised 26 January 2009. 5=highly imperiled species; 4=species of high concern; 3=species of moderate concern; 2=species of low concern

[9]Upper Mississippi Valley/Great Lakes Watershed Conservation Plan. Priorities: HI=Highly Imperiled; H=High; M=Moderate; L=Low; NR=Not at Risk; TD=To be Determined

[10]North American Waterfowl Management Plan: Atlantic Coast Joint Venture Waterfowl Implementation Plan Revision, June 2005 Priorities: H=High; MH=Moderately High; M=Moderate; ML=Moderately Low; L=Low. Example: H(H) = Breeding (Non-Breeding).

Priority Resources of Concern for Iroquois NWR

The comprehensive list of resources of concern (Table C-1) contains a large number of species with a broad array of habitat needs. The Refuge needs to prioritize these species and their associated habitats to determine what the Refuge is best suited to focus on in its management strategies. To guide us in prioritizing this list, we considered the following concepts:

- Achieving Refuge purposes and managing for trust resources as well as biological diversity, integrity, and environmental health can be addressed, in part, through the habitat requirements of "focal species" or species that may represent guilds that are highly associated with important attributes or conditions within habitat types. The use of focal species is particularly valuable when addressing USFWS trust species such as migratory birds.

- The Bird Conservation Region (BCR) plans are increasing their effectiveness at ranking and prioritizing those migratory birds most in need of management of conservation focus. Although all species that make it to a ranked BCR priority list are in need of conservation attention, we selected focal species that were ranked High or Moderate in Continental concern with a High to Moderate BCR Responsibility (See www.abcbirds.org/nabci for BCR rules used to rank birds).

- Habitat conditions on or surrounding the Refuge may limit the Refuge's capability to support or manage for a potential species of concern. The following site-specific factors were evaluated:
    - Patch size requirements
    - Habitat connectivity
    - Compatibility of surrounding land uses
    - Environmental conditions: soils, hydrology, disturbance patterns, contaminants, predation, invasive species
    - Specific life history needs

- The likelihood that a potential species of concern would have a positive reaction to management strategies.

- The ability to rely on natural processes to maintain habitat conditions within a natural range of variability suitable to the focal species.

- The ability to use adaptive management (flexibility and responsiveness of the Refuge and the habitats) in the face of changing environmental conditions (e.g., climate change).

High and Moderate Priority Habitat Types

Refuge management is most often focused on restoring, managing, or maintaining habitats or certain habitat conditions to benefit a suite of focal species or a suite of plants and animals associated with a particular habitat. Iroquois NWR identified the high and moderate priority habitats on the Refuge based on information just described (e.g., site capability, historic condition, current vegetation, BCR 13 priorities). As part of this process we identified any limiting factors that affect the Refuge's ability to maintain these habitats (Table C-2).

Table C-2 High and Moderate Priority Habitats on Iroquois NWR

High Priority Habitat Types	Reason for Selecting as High Priority	Limiting Factors for Maintaining this Habitat
Freshwater Impoundments: emergent marsh – open water	Refuge has 4,000 acres of this habitat within 15 manageable impoundments; More than 100,000 geese and 20,000 other waterfowl use these areas annually; American and least bitterns, black tern, pied-billed grebe, Virginia rail, priority species in BCR 13 nest here; foraging area for nesting bald eagles; foraging areas for migrating shorebirds	Requires water level manipulation; controlling dense monotypic stands of cattails; affected by rainfall events; requires maintenance of dikes and water control structures; inflow of water and undesirable species from canal system
Stream and associated emergent marsh (un-impounded)	Some of the waterbirds and waterfowl that use the impoundments also use these natural emergent marshes; important part of the original Oak Orchard Creek riverine ecosystem	Sedimentation, contaminants, other runoff, degradation of water quality from surrounding land uses
Bottomland hardwood forest	Supports native forest community and associated species including wood duck, cerulean warbler, priorities within BCR 13	Lack of regeneration of tree species due to extended flooding. Invasive species, fragmentation
Moderate Priority Habitat Types	**Reason for Selecting as a Moderate Priority**	**Limiting Factors for Maintaining this Habitat**
Vernal pools	Supports obligate wetland species – blue-spotted and Jefferson salamanders	Restricted locations; rainfall events; fragmentation from upland; contaminants
Grasslands	Supports several BCR 13 priority bird species	Requires intensive management to maintain in grassland condition; size of fields determines presence of breeding birds; invasive species
Shrublands	Supports several BCR 13 priority bird species	Requires periodic management to maintain in shrub condition; succession, invasive species
Upland Forest	Supports several BCR 13 priority bird species	Fragmentation, invasive species

Based on the habitat types identified on the Refuge as described in Table C-2, we then developed a table of the priority species of concern with their associated habitat types (Table C-3). This table also describes the habitat structure required by each priority or **"focal species"** and identifies other species that would benefit from the same or similar habitat conditions.

Table C-3 Priority Resources of Concern, Habitat Structure, and Other Benefiting Species on Iroquois NWR

Habitat Type	Focal Species	Habitat Structure	Other Benefiting Species
Freshwater Emergent Wetlands	American bittern	Tall, dense emergent vegetation, such as cattail, burreed, and bulrush, with water depth < 4 in. and a vegetation - open water ratio of 70:30. Inhabits wetlands <2.5 to 62.5 acres, but are more abundant in larger wetlands. Feeds on insects, amphibians, small fish and mammals, crayfish in vegetation fringes and shorelines (Gibbs et al. 1992, Lor 2000).	Sora, black-crowned night heron, king rail, common tern
	Virginia rail	Freshwater wetlands with dense, emergent vegetation especially cattails and sedges; relatively shallow water 10 to 14 inches or less); typically more vegetation to open water (70:30) and more abundant in larger wetlands (>25 acres) (Conway 1995, Lor 2000).	
	Black tern	Nest semi-colonially in large, shallow, emergent wetlands >50 acres and feed their young both insects and fish. Nests built of sticks and reeds on floating mats of dead vegetation or small mud flats. Flooding and predation on eggs and chicks, not habitat availability, may be the limiting factor (McCollough et al. 2003).	
	Least bittern	Freshwater wetlands with tall, dense emergent vegetation, such as cattail, burreed and bulrush, interspersed with clumps of woody vegetation and open water with water depth > 18 in. and a vegetation/open water ratio of 50:50. Inhabits wetlands <24 acres. Feeds on small fish and insects in tall dense stands of emergent plants along deep, open water (Gibbs et al. 1992, Lor 2000).	
	Pied-billed grebe	Freshwater wetlands greater than 12.5 acres, with emergent vegetation separated by channels or patches of deep, open water (>17 in deep) and a 50:50 vegetation - open water ratio. Nest site is a floating platform among tall emergents and near deep, open water (Muller and Storer 1999, Lor 2000).	
	American black duck	Shallow, emergent wetlands of reeds, sedges, pondweed, floating-leaved plants, that are rich in invertebrates (Longcore et al. 2000).	Canvasback, greater yellowlegs
	Blue-winged teal	Shallow, emergent marsh rich in invertebrates; more abundant in marshes with 50:50 vegetation to open water ratio; nests in grassy or herbaceous vegetation within 500 feet of wetland (Rohwer et al. 2002).	

	Mallard	Shallow water <16 inches allowing feeding on bottom by tipping up (DeGraaf and Yamasaki 2001). Pairs, females, and broods use ephemeral, seasonal, and semipermanent ponds and marshes; little consistency in which wetland type selected and often used in proportion to availability. Usual nest site is in uplands close to water, typically < 500 ft. During migration responds opportunistically to availability of shallow wetlands such as marshes, small ponds, flooded basins, flooded alluvial plains, and flooded agricultural fields (Drilling et al. 2002).	
Freshwater Emergent Wetlands	Northern pintail	Typically nests in open country with shallow, seasonal, or intermittent wetlands and low vegetation. Nest usually in stubble fields, in a dry portion of a large marsh, or in lightly grazed pastures; rarely at the edge or over water; generally avoids extensively wooded or brushy areas (Austin and Miller 1995, DeGraaf and Yamasaki 2001).	Other waterfowl
	Atlantic – Southern James Bay Canada Goose	Almost exclusively herbivorous, foods they eat are governed primarily by (1) seasonal variation in nutritional requirements and (2) seasonal variation in the quality and quantity of food, as modified by availability of specific foods. Depend primarily on grasses, sedges, or other green monocots, and berries or seeds, including agricultural grains depending on availability (Mowbray et al. 2002).	
	Least sandpiper	Typically forages higher up on upper edge of mudflats and in openings of marsh vegetation, farther from water's edge than other sandpipers (Cooper 1994). At Montezuma, spring migrants peak in late May; fall migrants peak in mid-July (adults) and late Aug/early Sept (juveniles) (ebird.org)	Other shorebirds
	Pectoral sandpiper	Prefers grassy terrain, mudflats with short grass or weedy vegetation, along margins of ponds or pools, or recently flooded grasslands, including pastures and agricultural fields, also grassy uplands (Holmes and Pitelka 1998). At Montezuma, a small number come through in late April, fall migration peak in late Aug/early Sept.	
	Semipalmated sandpiper	During migration feed in areas of shallow freshwater and little vegetation, muddy intertidal zones, or along edges of lakes, usually on soft silt/clay mudflats or at junction of short-grass marsh and tidal flats (Gratto-Trevor 1992). At Montezuma, migrates through in late May/early June and again from Aug-Oct (ebird.org)	
	Solitary sandpiper	Migrates primarily through freshwater habitats; a shorebird of forested ponds; during migration generally around enclosed wet or muddy habitats, e.g., inland lakes and ponds (Moskoff 1995). At Montezuma, migrates through in May and again from July-Aug (ebird.org).	
	Wilson’s snipe	Breeds in sedge bogs, fens, willow (Salix spp.) and alder (Alnus spp.) swamps, and marshy edges of ponds, rivers, and brooks. Requires soft organic soil rich in food organisms just below surface, with clumps of vegetation offering both cover and good view of approaching predators. Avoids marshes with tall, dense vegetation (cattails, reeds, etc.) (Mueller 2005). At Montezuma, migrates through in April and again from Aug-Oct (ebird.org)	

	Bald eagle	Nests atop large, older trees (often the largest tree) near large lakes, rivers, and reservoirs that support abundant fish populations, although are opportunistic feeders; During the day perch on tall trees along the shore, usually away from human disturbance (Buehler 2000); Defend territories, that include active and alternate nests, from other eagles; nest sites typically have at least one perch with a clear view of the water where they forage; exhibit high nest site fidelity	Osprey
Bottomland hardwood forest	Wood duck	Nest cavities in mature, living (sometimes dead) trees, greater than 18 inches d.b.h. within 1.2 miles of water; broken limbs for perching.	Prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker, bats, river otter
	Cerulean warbler	More often in riparian or bottomland hardwood forest but also in dry slopes and ridgetops. Requires large tracts of mature forest (> 500 acres) with sparse understories and closed or semiclosed canopies; stays in the canopy (DeGraaf and Yamasaki 2001, Rosenberg et al. 2000).	
Grasslands	Bobolink	Fields with a mix of grasses and broad-leaved forbs at least 5 to 10 acres in size; more abundant in fields > 8 years old since last plowing and seeding, with high grass to legume ratio and high leaf litter, and larger fields (>70 acres) (Martin and Gavin 1995).	Eastern meadowlark, horned lark, sedge wren
	Grasshopper sparrow	Moderately open grasslands with patchy bare ground (Vickery 1996); Minimum 30 acre grassland, short bunch grasses (4-12 in) with minimal litter and grass cover, patches of bare ground, scattered tall forbs (1-8 in) for song perches; favors well-drained upland sites, absent from fields with >35% shrubs (Jones and Vickery 1997).	
	Henslow's sparrow	Relatively large fields consisting of tall, dense grass, a well-developed litter layer, standing dead vegetation, and sparse or no woody vegetation. Habitat also usually dominated by grasses and has scattered forbs for singing perches (Herkert et al. 2002). Breeds only in habitats that are a number of years post fire or disturbance. The habitat at a site may be optimal for the species for only a few years before it becomes too dense and the birds will abandon the site unless it is burned or mowed again (Audubon website).	
Shrublands	Field sparrow	Breeds in old fields in early stages of succession with scattered woody vegetation such as lightly overgrown pastures, abandoned hayfields, powerline corridors, woodland edges (DeGraaf and Yamasaki 2001).	Brown thrasher, song sparrow, willow flycatcher, black-billed cuckoo, American woodcock
	Blue-winged warbler	A mix of vegetation including dense herbaceous growth, shrubs, and young forest (<20 feet tall); often near wetland edges or damp areas but also in dry uplands (Gill et al. 2001).	
	Golden-winged warbler	Patches of herbs, shrubs, and scattered trees, plus a forested edge; shrubby fields as well as in marshes and bogs with a forest edge (Confer 1992). Most golden-wing territories have less than 60% herbaceous growth and less than 10% forest cover. Most territories include patches of shrub that are over 10 feet (3 meters) tall and unmowed or ungrazed herbaceous growth (Cornell Lab Golden-winged Atlas Project).	

Upland Forest	Wood thrush	Nests in interior and edge of mature, deciduous or mixed forests, particularly damp woodlands near swamps or water. Primary habitat features include trees taller than 53 feet, a shrub-subcanopy layer, shade, moist soil, and leaf litter (DeGraaf and Yamasaki 2001).	Rose-breasted grosbeak, scarlet tanager
	Black-billed cuckoo	Young deciduous and mixed forest or shrubland with a dense understory of shrubs and vines. May be susceptible to habitat fragmentation and avoid forest patches less than 10 acres (DeGraaf and Yamasaki 2001, Hughes 2001).	
	Cerulean warbler	More often in riparian or bottomland hardwood forest but also in dry slopes and ridgetops. Requires large tracts of mature forest (> 500 acres) with sparse understories and closed or semiclosed canopies; stays in the canopy (DeGraaf and Yamasaki 2001, Rosenberg et al. 2000).	
	American woodcock	During the breeding season woodcock use several habitat conditions in close proximity to one another: forest openings, ~1/2 acre or more in size, as singing grounds; shrubby areas, particularly alders and dense young hardwoods on moist soils as feeding/daytime cover; young to mid-aged forest (15-30 years old) as brood and nesting habitat; and clearings of 2-3 acres as roost sites during migration (Keppie and Whiting 1994, Sepik et al. 1981).	

Habitat Requirements for Selected Species of Conservation Concern

Freshwater Emergent Wetlands *High-Priority Habitat*

AMERICAN BITTERN *(Botaurus lentiginosus)*

(Poole 2005, Connecticut DEP 2009, USFWS 2009)

- **Associated Species:**
  - Sora, black-crowned night heron, king rail, common tern
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Migrate north to breed from mid-April to early May. Breed in most states in the northern half of the continental US, and provinces of southern Canada
  - Wintering: Southeastern and Gulf States as far south as Central America and Cuba
- **Habitat:**
  - Freshwater and saltwater wetlands, prefer freshwater wetlands with vegetation that provides protective cover and hosts a forage base of insects, small fish, amphibians, and small mammals.
  - Typically dominated by tall emergent or aquatic bed vegetation including wetland fringes, shorelines, bogs, swamps, and wet meadows.
- **Nesting:**
  - Females nest in wetland areas, usually on the ground or raised slightly on a platform of thick vegetation.
  - Nest is built with reeds, sedges, and similar plant material.
  - Will nest only on wetlands of 2.5 to 11 ha or larger
- **Food:**
  - Frogs, salamanders, crayfish, water scorpions, diving beetles, dragonflies, killifish, pickerel, suckers, small eels, garter and water snakes and occasionally voles
- **Potential Limiting Factors/Threats:**
  - Human disturbance interferes with foraging
  - Declines in water quality which changes vegetative composition and structure
  - Invasion by exotic species such as purple loosestrife or *Phragmites* which may reduce the abundance and diversity of species useful to bitterns and their prey
- **Management:**
  - Preservation of freshwater habitats, particularly large (>10 ha) shallow wetlands with dense growth of robust emergents
  - Develop standardized survey methodologies for monitoring population and habitat availability

VIRGINIA RAIL (*Rallus limicola)*

(Poole 2005)

- **Associated Species:**
  - Sora, black-crowned night heron, king rail, common tern
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**

  - Breeding: locally in North America from northern Washington across to the east coast, cutting through northern Ohio and Southern Pennsylvania, extending down to northern Virginia and across to Southeastern Texas and southern Arizona.
  - Wintering: predominantly along the East, West and Gulf coasts with large interior populations. From southwest British Columbia south through south Baja California and central Mexico.
- **Habitat:**
  - Freshwater marshes; occasionally inhabits salt marshes. Lives in dense emergent vegetation
  - Shallow water, emergent cover, and substrate with high invertebrate abundance
  - Needs standing water, moist-soil, or mudflats for foraging
- **Nesting:**
  - Nest usually placed above shallow water
  - Basket of loosely woven vegetation, often with a canopy
- **Food:**
  - Insects, insect larvae, other aquatic invertebrates, fish, frogs, small snakes, a variety of aquatic plants, and seeds of emergent plants.
- **Potential Limiting Factors/Threats:**
  - Spring temperatures may influence breeding and wintering distribution
  - Competition with other rails (Soras, King, and Clapper rails) may influence density and habitat breadth
  - Susceptive to toxic bioaccumulation
  - Nests are lost or deserted due to flooding in some areas
- **Management:**
  - Monitor Virginia Rail populations
  - Increase wetland cover of emergent perennial vegetation, while retaining 30-60% of the wetland in open water or mudflat to provide an optimal habitat

BLACK TERN *(Chlidonias niger)*
(Poole 2005, USFWS 2009a)

- **Associated Species:**
  - Sora, black-crowned night heron, king rail, common tern
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Northern United States through central Canada. Sparse on northeast and along southern edge of the breeding range.
  - Wintering: Mainly marine and marine coastal areas of Central America and northern South America, both Pacific and Caribbean.
- **Habitat:**
  - Shallow freshwater marshes with emergent vegetation, including prairie sloughs, margin lakes, occasionally river or island edges.
  - In the winter the habitat is largely marine with most birds found within 30 km of land and some up to 3,500 km offshore.
- **Nesting:**
  - Location has about 25-75% vegetation to open water. Nests are only 2-6 cm above the surface of the water, and shallow in depth. Located within approximately 2 m of open water
  - Build nests on a floating substrate of matted vegetation, often cattail or bullrush.

  - Woody debris such as posts, snags or floating logs are an important component of nesting habitat for perching, breeding and feeding young.
- **Food:**
  - Variety of aquatic insects, particularly dragonflies, damselflies, mayflies, and caddis flies, as well as small fishes and crustaceans
- **Potential Limiting Factors/Threats:**
  - Nests and young are readily lost to strong winds, rising water levels, or even to active foraging by waterfowl around a nest.
  - Drought conditions can expose nests to mammalian predation by raccoons, minks, and rats; avian predation includes raptors, bitterns, gulls, crows, and blackbirds.
  - Loss and degradation of wetlands for both breeding and migration stopover
- **Management:**
  - Target protection for large (>18.9 ha) wetlands within high-density wetland complexes.
  - Wetlands managed for waterfowl are attractive if flooding/drawdown regimes preserve appropriate emergent vegetation, nesting substrate, and stable water levels through the nesting season
  - Muskrat herbivory should be encouraged as a means to modify ratios of vegetation cover to open water, providing additional nesting substrate and foraging habitat.

LEAST BITTERN *(Ixobrychus exilis)*

(Poole 2005)

- **Associated Species:**
  - Sora, black-crowned night heron, king rail, common tern
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Southeastern Canada down through the United States and Mexico to Costa Rica.
  - Wintering: Along the Atlantic coastal plain from Maryland and Virginia south to Louisiana and Texas, with peak numbers in southern Florida along the Rio Grande valley, the lower Colorado River, and Baja California. Many also overwinter in the Greater Antilles and eastern and Central America
- **Habitat:**
  - Breeds in low-lying areas associated with large rivers, lakes and estuaries of the United States
  - Freshwater and brackish marshes with dense, tall growths or aquatic or semiaquatic vegetation interspersed with clumps of woody vegetation and open water.
  - Occasionally found in salt marshes and mangrove swamps
  - Are found in dense tall stands of cattail and sedgy bogs
  - Overwintering birds occur mainly in brackish and saline swamps and marshes
- **Nesting:**
  - Nest is placed roughly a foot above water, usually on the base of dried plants. Create a canopy by pulling tall marsh plants over and crimping them in place. Placed in dense, tall stands of vegetation.
- **Food:**
  - Small fishes, including top minnows, mud-minnows, sunfishes, and perches. Also snakes, frogs, tadpoles, salamanders, leeches, slugs, crayfish, insects (mainly Odonata and Orthoptera), small mammals (shrews and mice), and vegetable matter

- **Potential Limiting Factors/Threats:**
  - Destruction of wetland habitat
  - Invasion of purple loosestrife and phragmites may alter and degrade marshland habitats
- **Management:**
  - Protect wetland habitats, particularly large (>10 ha), shallow wetlands with dense growth of robust, emergent vegetation

PIED-BILLED GREBE *(Podilymbus podiceps)*
(Poole 2005, Seattle Audubon Society 2009)

- **Associated Species:**
  - Sora, black-crowned night heron, king rail, common tern
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: southern Canada and most of the central states down to Arizona and northern Texas, through southern Ohio and most of the Northeast states.
  - Wintering: Northern Idaho, Washington, Arizona, southern California, west coast of Mexico, and Middle America to Panama.
- **Habitat:**
  - During breeding season they are found at low elevations in ponds, lakes, and marshes.
  - During the winter they are found on both fresh and salt water, although more likely to be found on fresh water.
  - Wetlands used have relatively intricate shoreline edge, greater areas of aquatic bed vegetation, and emergent vegetation.
- **Nesting:**
  - Built in shallow water in a marsh, either floating or built up from the bottom.
  - Dense mat of plant material anchored to emergent vegetation. The nest can be approached from under water.
- **Food:**
  - Insects, fish, and other aquatic creatures
  - Bills are adapted to crushing large crustaceans, but also prey on a wide variety of aquatic creatures including fish
- **Potential Limiting Factors/Threats:**
  - Habitat loss
  - Disturbed nests / human impact
- **Management:**
  - Preserve relatively large (>10 ha) wetlands with a mixture of dense, robust emergents, subemergent vegetation, and open water.
  - Periodically reverse vegetative succession and open up extensive stands of emergent vegetation while maintaining suitable habitats nearby to serve as alternative nesting areas during wetland manipulation

AMERICAN BLACK DUCK (*Anas rubripes*)
(Poole 2005)

- **Associated Species:**
  - Canvasback, greater yellowlegs

- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: northeast, with the greatest concentration of birds between New England and Nova Scotia. From there, it breeds across Ontario and Quebec, and even as far north as the Hudson Bay in Manitoba.
  - Wintering: along the Atlantic coast as far south as Florida, but also west to the Mississippi and points between.
- **Habitat:**
  - Nesting: Palustine emergent, broad-leaved deciduous forested and broad leaved deciduous scrub-shrub types.
  - Foraging: Ephemeral pools, streams with sandy or stony bottoms interspersed with invertebrate-rich detrital patches.
  - Brood-rearing: Palustrine emergent, scrub-shrub and deciduous forested wetlands. In Maine, they prefer emergent wetlands over evergreen scrub-shrub wetlands;
  - Brood habitat: Emergent and floating leaved aquatics with abundant invertebrates; females with broods use entire surfaces of shallow, relatively permanent wetlands with emergents (e.g., reed grasses [Calamagrostis spp.], sedges [Carex spp.]), floating-leaved plants (e.g., cow lily [Nuphar spp.], pondweeds [Potamogeton spp.]), or scrub-shrub vegetation (leatherleaf [Chamaedaphne calyculata], sweet gale [Myrica gale]) that support abundant invertebrates.
- **Nesting:**
  - Nests on ground, well-concealed in diverse upland sites.
  - Composed of vegetation available on side. Materials (grass, twigs, leaves, stems, conifer needles) are added during egg-laying
- **Food:**
  - Seeds, roots, tubers, stems, and leaves of moist soil and aquatic plants. Eats corn or other grains when available.
  - Animal food includes aquatic insects, crustaceans, mollusks, and fish, especially in marine habitats.
- **Potential Limiting Factors/Threats:**
  - Hybridization with mallards
  - Acid rain
  - Loss of habitat to development
  - Overhunting
- **Management:**
  - Careful monitoring regarding the hunting of this popular game bird to determine future hunting needs

BLUE-WINGED TEAL *(Anas discors)*

(Poole 2005, Seattle Audubon Society 2009)

- **Associated Species:**
  - Canvasback, greater yellowlegs
- **Seasonal Use of Refuge:**
  - Breeding,migration
- **Distribution:**
  - Breeding: over a large portion of North America but occurs irregularly or at low densities in many portions of range. Highest breeding densities occur in mixed-grass

prairie and parklands of north central U.S. and Prairie Provinces of Canada, where species is often the most abundant breeding duck.
    - Wintering: Winters on the coast of California along the lower Colorado River in southeast Arizona, in southern New Mexico (lower Rio Grande and lower Pecos Rivers), in central and southern Texas, the southern half of Louisiana, along the Mississippi River north to southwestern Tennessee. Throughout all of Mexico into Central America and throughout Florida.
- **Habitat:**
    - Marshes, shallow ponds, and lakes.
    - Seasonal and permanent wetlands
- **Nesting:**
    - On the ground in prairies, coastal meadows, and other open areas. Nests are usually near water, but may be several hundred yards away.
    - In a shallow depression with some grass or weeds, lined with down and usually well concealed by vegetation.
- **Food:**
    - Vegetative parts of aquatic plants (algae, duckweeds, pondweeds, etc.), seeds (sedges, pondweeds, grasses, etc.), and large amounts of aquatic invertebrates found in shallowly flooded wetlands
- **Potential Limiting Factors/Threats:**
    - Exposed to harmful pesticides used in their wintering areas (Central and South America)
    - Wetland degradation
    - Disturbance at nest and roost sites
- **Management:**
    - Breeding-pair abundance is greater in areas with a high proportion of restored grasslands than in areas with a high proportion of agricultural cropland
    - Nest success higher in areas where Conservation Reserve Program (CRP) and grassland cover is abundant.

MALLARD *(Anas platyrhynchos)*
(Poole 2005)

- **Associated Species:**
    - Canvasback, greater yellowlegs
- **Seasonal Use of Refuge:**
    - Breeding, migration
- **Distribution:**
    - Breeding: northwestern Canada to southeastern Canada, throughout all of the United States besides for the very southern borders of the country.
    - Wintering: all of US including the southern borders of the country and into Mexico
- **Habitat:**
    - Nests in a wide variety of situations with dense cover, including grasslands, marshes, bogs, floodplains, dikes, roadside ditches, pastures, cropland, shrubland, fencelines, rock piles, forests, and fragments of cover around farmsteads.
    - Shallow wetlands such as marshes, small ponds, flooded basins, flooded alluvial plains, and flooded agricultural fields.
- **Nesting:**

  - Nest found in depression scraped in the ground. Lined with vegetation and down from female's breast
  - Prefer to nest in grass fields where the residual vegetation is > 1 ft tall and dense enough to provide overhead cover, must have some lateral and/or overhead cover
  - May nest side-by-side, nests are usually scattered throughout fields at densities ranging from 1 to 8 nests per 40 acres.
  - Also nest over water on muskrat houses and clumps of cattails if they are available.
- **Food:**
  - During breeding season, eats mostly animal foods, including insects such as midge larvae and other Diptera, dragonflies, and caddisfly larvae, aquatic invertebrates such as snails and freshwater shrimp, and terrestrial earthworms.
  - Outside of breeding season, diet predominately seeds from moist-soil plants, acorns, aquatic vegetation, and cereal crops, and wheat.
  - Agricultural foods dominate diet during autumn migration and often during winter, depending on relative availability of natural versus agricultural foods.
- **Potential Limiting Factors/Threats:**
  - Hunting
  - Pesticides and other contaminants/toxins
  - Ingestion of lead
  - Degradation of habitat
  - Disturbance of nest and roost sites
- **Management:**
  - Conservative hunting regulations during population declines
  - Enhancement of nesting cover. Used to increase nesting success by establishing dense nesting cover on previously cultivated lands
  - Controlling wetland levels or cover by cutting, tilling, blasting, or burning vegetation

NORTHERN PINTAIL *(Anas acuta)*

(Poole 2005, Ducks Unlimited 2009)

- **Associated Species:**
  - Other waterfowl
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Alaska, the central Canadian Arctic, and western Greenland south to the western and central USA.
  - Wintering: Central Valley of California, but some continue south to the west coast of Mexico. Pintails using the Central Flyway winter in the Texas Panhandle and the Gulf Coast of Texas and western Louisiana. The majority of pintails using the Mississippi Flyway winter in Louisiana with smaller numbers wintering in Arkansas, Tennessee, Mississippi, and Alabama.
- **Habitat:**
  - Nests in open country with shallow, seasonal, or intermittent wetlands and low vegetation. Nests on islands in shallow basins or, in Alaska, on coastal barrier islands, but most nests are on mainland
  - Prairie Pothole Region, pairs prefer shallow ephemeral to semi-permanent wetlands with emergent vegetation and low upland cover
  - Males are commonly found on large, shallow marshes with extensive emergent and submersed vegetation that provide abundant cover, food and minimal disturbance

- Spring and fall migration, use shallow wetlands when not frozen, larger lakes and reservoirs, and various estuarine and riverine wetlands.

- **Nesting:**
  - Nests in open country with shallow, seasonal wetlands and low vegetation.
  - Bowl of grasses or other vegetative materials from around nest
  - May use old burrows or natural depressions; completed nest may be flush with or below ground level.
  - In emergent wetland vegetation, may build up bowl on layer of dead vegetation from immediate area.
- **Food:**
  - Grain (rice, wheat, corn, barley), moist-soil and aquatic plant seeds, pond weeds, aquatic insects, crustaceans, and snails.
- **Potential Limiting Factors/Threats:**
  - Degradation of habitat
  - Disturbance at nest and roost sites
- **Management:**
  - Preserve wetlands to ensure proper nesting areas

ATLANTIC-SOUTHERN JAMES BAY CANADA GOOSE *(Branta canadensis)*
(Bellrose, 1978, Poole 2005)

- **Associated Species:**
  - Other waterfowl
- **Seasonal Use/Refuge Habitats:**
  - Migration
- **Distribution:**
  - Breeding: southern James Bay
  - Wintering: Ontario, eastern Michigan, Ohio, Indiana, Kentucky, Tennessee and Alabama
- **Habitat:**
  - Breed in coastal areas along a gradient of soil moisture, salinity, and drainage from coastline to more elevated inland areas. Most geese nest in elevated inland areas, including banks of tidal rivulets in lower intertidal zone dominated by goose grass, seaside plantain and sea-milkwort; along edges of pools in mid- and upper intertidal zone dominated by sea-milkwort and red fescue and emergent species such as mares-tail and marsh spike-rush
  - breed in or near impoundments in refuges and other managed habitats
  - habitat for spring and fall migration include: Lakes, slow-moving rivers, freshwater marshes, coastal salt marshes, bays, extensive mud and sand tidal flats, sand and gravel bars, shallow brackish ponds, upland heath, grassy fields, pastures, and agricultural fields
  - wintering In coastal areas, inhabits mudflats, shallow tidal waters, and salt-water marshes with extensive beds of bulrush and cord grass near or adjacent to agricultural fields of grain or cover crops; inland, on wet grasslands, freshwater marshes, lakes, reservoirs, and rivers within easy flying distance of agricultural fields
- **Nesting:**
  - Atlantic and Southern James Bay Canada Geese do not breed on Iroquois NWR
- **Food:**

  - grasses, sedges, or other green monocots during periods of increase in lean body mass
  - stems and leaves *of Carex mackenziei* and spike-rush, sea-lyme grass, leaves of burreed, and seeds and berries of black crowberry and mountain cranberry
- **Potential Limiting Factors/Threats:**
  - Unfavorable weather conditions in northern nesting grounds cause poor annual production of young
  - Low survival rate caused largely by hunting pressures
- **Management:**
  - In U.S., identification of critical habitats, population objectives, and approaches to harvest regulation are recommended through a series of population-management plans for most populations

LEAST SANDPIPER *(Calidris minutilla)*

(Poole 2005, Seattle Audubon Society 2009, whatbird.com 2009)

- **Associated Species:**
  - Other shorebirds
- **Seasonal Use of Refuge:**
  - Migration
- **Distribution:**
  - Breeding: Alaska to Labrador and, in the east, south to Nova Scotia and, recently, Massachusetts.
  - Wintering: southern U.S. to central South America and the West Indies.
- **Habitat:**
  - Breeds in mossy or wet grassy tundra, occasionally in drier areas with scattered scrubby bushes.
  - Migrates and winters in wet meadows, mudflats, flooded fields, shores of pools and lakes, and, less frequently, sandy beaches.
- **Nesting:**
  - Least Sandpipers do not breed on Iroquois NWR
- **Food:**
  - fly larvae and other insects.
  - On the coast, they eat small crustaceans, snails, and other marine creatures.
- **Potential Limiting Factors/Threats:**
  - Habitat destruction; migratory staging areas and wintering areas are concentrated
- **Management:**
  - Create optimal shorebird habitat for foraging

PECTORAL SANDPIPER *(Calidris melanotos)*

(Poole 2005, Seattle Audubon Society 2009)

- **Associated Species:**
  - Other shorebirds
- **Seasonal Use of Refuge:**
  - Migration
- **Distribution:**
  - Breeding: tundra of North America and Siberia
  - Wintering: southern South America.
- **Habitat:** (Bird Web)

  - During migration they can be found in fresh- and saltwater marshes, on mudflats, or drying lakes and wet meadows.
  - Breed in dry edges of well-vegetated wetlands
  - Winter in grasslands
- **Nesting:**
  - Pectoral Sandpipers do not breed on Iroquois NWR
- **Food:**
  - Eat flies and fly larvae, spiders, and seeds.
  - During migration, they eat small crustaceans and other aquatic invertebrates, although insects may still be the major food.
- **Potential Limiting Factors/Threats:** (Cornell Lab of Ornithology online)
  - Loss of tail grass prairie and the draining of seasonal pools in the Great Plains
  - Loss or degradation of varied migratory stopover habitat in North America, the Caribbean, and in South America
  - Climate change affects high arctic tundra breeding area
- **Management:**
  - Management of wetland and agricultural units that maintain shallowly flooded fields (1–15 cm deep) during migratory periods provide good foraging sites

SEMIPALMATED SANDPIPER (*Calidris pusilla)*
(Poole 2005)

- **Associated Species:**
  - Other shorebirds
- **Seasonal Use of Refuge:**
  - Migration
- **Distribution:**
  - Breeding: Low arctic from Alaskan coast across Canada to northern Quebec, central Baffin Island and northern Labrador
  - Wintering: northern and central coasts of South America, primarily Suriname and French Guiana. Fewer in West Indies, Pacific coast of Central America, and very few in southern South America and Florida
- **Habitat:**
  - Breed in low and sub-arctic tundra, near water, drained upland tundra with low vegetation near small ponds, lakes, and streams; moist or wet sedge-grass or heath tundra; sandy areas along rivers; and pond-dotted sand dunes
  - Stage (flock in preparation for migration) in areas of shallow fresh or salt water and little vegetation, muddy intertidal zones, or along edges of lakes, usually on soft silt/clay mudflats, or at junction of short-grass marsh and tidal flats
  - Winter in areas of shallow lagoons with dead mangroves; also low tidal zone of mudflats, on wet or dry mud
- **Nesting:**
  - Semipalmated Sandpipers do not breed on Iroquois NWR
- **Food:**
  - Benthic invertebrates (small arthropods, mollusks, and annelids) in fresh or salt water, also some terrestrial invertebrates (insects and spiders).
- **Potential Limiting Factors/Threats:**
  - Habitat degradation
- **Management:**
  - Preserve nesting habitat

SOLITARY SANDPIPER *(Tringa solitaria)*

(Poole 2005, Seattle Audubon Society 2009)

- **Associated Species:**
  - Other shorebirds
- **Seasonal Use of Refuge:**
  - Migration
- **Distribution:**
  - Breeding: From central Canada through northern Canada and Alaska
  - Wintering: From southern Texas, Tamaulipas on the Atlantic slope of Mexico, southern Zacatecas and from Sinaloa on the Pacific slope south through Middle America, and virtually throughout South America, including Netherlands Antilles, Trinidad.
- **Habitat:**
  - Breeds in taiga, nesting in trees in deserted songbird nests.
  - winter found along freshwater ponds, stream edges, temporary pools, flooded ditches and fields, more commonly in wooded regions, less frequently on mudflats and open marshes.
- **Patch/Territory Size:**
  - Males defend territories against conspecifics, particularly other males, chasing away intruders.
  - May be territorial all year.
  - Territory can be large; up to 0.5 sq. km.
- **Nesting:**
  - Solitary Sandpipers do not breed on Iroquois NWR
- **Food:**
  - Aquatic and terrestrial invertebrates are the most common food of the Solitary Sandpiper. These include insects and insect larvae, spiders, worms, and tadpoles.
- **Potential Limiting Factors/Threats:**
  - Loss of habitat
- **Management:**
  - Maintain good habitat for migration

WILSON'S SNIPE *(Gallinago gallinago)*

(Poole 2005, Seattle Audubon Society 2009)

- **Associated Species:**
  - Other shorebirds
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: All of Canada and part of the Northern United States
  - Wintering: central and southern US, Mexico, and Central America
- **Habitat:**
  - Breed in sedge bogs, fens, willow and alder swamps, and marshy edges of ponds, rivers, and brooks. Requires soft organic soil rich in food organisms just below surface, with clumps of vegetation offering both cover and good view of approaching predators. Avoids marshes with tall, dense vegetation

  - Winter in marshes (including cattails), swamps, wet meadows, wet pastures, wet fallow fields, and marshy edges of streams and ditches.
- **Nesting:**
  - Shallow depression lined with moss, leaves, and grass, sometimes with plants from above woven in a canopy.
- **Food:**
  - Eats mostly larval insects, but also takes crustaceans, earthworms, and mollusks. Also eat leaves and seeds
- **Potential Limiting Factors/Threats:**
  - Loss of wetlands continues to reduce available habitat
- **Management:**
  - Preserve wetlands to ensure proper breeding habitat

BALD EAGLE *(Haliaeetus leucocephalus)*
(Poole 2005)

- **Associated Species:**
  - Osprey
- **Seasonal Use/Refuge Habitats:**
  - Breeding, migration, winter
- **Distribution:**
  - Breeding: Associated with aquatic habitats (coastal areas, rivers, lakes, and reservoirs) with forested shorelines or cliffs in North America. Extensive breeding populations in Alaska, and Canada. Extensive breeding populations along the Atlantic Coast from Florida (extending south to Florida Keys). Extensive breeding populations in Great Lakes states (Michigan, Wisconsin, and Minnesota) and Pacific Northwest (n. California, Oregon, and Washington). Breeds in all other contiguous U.S. states except Rhode Island and Vermont.
  - Wintering: Majority of wintering population located in lower 48 states, coastal Canada and Alaska.
- **Habitat:**
  - Breeds in forested areas near large bodies of water.
  - Winters in coastal areas, along large rivers, and large unfrozen lakes.
- **Nesting:**
  - Associated with fishable waters
  - River nests sites are close to the shores of rivers with large aquatic areas and little forest edge.
  - Lake nest sites are near water, had superdominant trees, and little overall human disturbance.
  - Large nests of sticks lined with finer woody materials. Reused over many years. Placed in large trees, usually the largest in the area. Rarely nests are found on ground or cliff.
- **Food:**
  - Uses birds and mammals often as carrion, especially in winter.
  - Eats a great variety of aquatic and terrestrial mammals, including muskrats and hares, reptiles and amphibians, crustaceans, and a variety of birds, including many species of waterfowl, gulls, and even Great Blue Herons
- **Potential Limiting Factors/Threats:**
  - Degradation of habitat: breeding and wintering
- **Management:**

- Limit human disturbance.

Bottomland Hardwood Forest *High-Priority Habitat*

WOOD DUCK *(Aix sponsa)*
(USGS 2009)

- **Associated Species:**
  - Prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker, bats, river otter
- **Seasonal Use/Refuge Habitats:**
  - Breeding, migration
- **Distribution:**
  - Breeding: The Wood Duck breeds in western North America from southern British Columbia and southwestern Alberta south to central California and western Montana; in eastern North America from east-central Saskatchewan east to Prince Edward Island and Nova Scotia south (east of the Rockies) to central and southeastern Texas and the Gulf Coast.
  - Wintering: In the East, winters primarily in the southern parts of the breeding range. Wintering Birds are increasingly found in n. Mexico, extending south to central Mexico, sporadically south to Veracruz and Yucatán Peninsula.
- **Habitat:**
  - Wide variety of habitats: creeks, rivers, overflows, bottomlands, swamps, marshes, beaver and farm ponds. Although swamps, marsh, and overflow areas may provide better habitat than streams, the extensive distribution of streams creates the single most important habitat for breeding birds. Current data suggest that structure and use of habitats are similar among seasons. Freshwater wetlands with an abundance of vegetative cover are important habitats in all seasons.

  - Wood ducks nest in woodland areas along lakes, rivers, and vegetated wetland areas. During the winter months, wood ducks inhabit bottomland hardwood wetlands, beaver ponds and flowages, river oxbows, meanders and backwaters, and other inland freshwater forested wetland areas. Habitat areas chosen by wood ducks are commonly used by other waterfowl species such as black ducks, hooded mergansers, and ring-necked ducks. High-quality wood duck habitat is intricately linked to preservation and management of old growth timber along river corridors and availability of nesting sites.
- **Nesting**
  - Cavity nester, but does not excavate cavity; instead uses preformed cavities. In forested areas, female selects nest sites near canopy openings. Rarely nests on ground.
  - Mature forests are needed for development of trees with suitable cavities. Birds prefer sites close to or over water and near good brood-rearing areas; depending on availability of cavities, will use nest sites within 2 km of water. Most cavities (> 60%) suitable for Wood Ducks develop when branches break and permit subsequent heart rot of the trunk. Abandoned woodpecker cavities (e.g., Pileated Woodpecker) are used infrequently. Trees species providing nest cavities include various oaks,

maples, and ashes, quaking aspen (Populus tremuloides), sycamore (Platanus occidentalis, American beech (Fagus grandifolia), American elm (Ulmus americana), bald cypress (Taxodium distichum), tupelo, and black gum.

- **Food:**
  - Wood Duck is an omnivore with a broad diet. Seeds, fruits, and aquatic and terrestrial invertebrates are main foods taken (similar to many dabbling ducks). Food for young birds and adults differs dramatically.

  - The early diet of ducklings consists largely of insects, aquatic invertebrates, small fish, and other high-protein animal material. After six weeks of age, the young switch to plant foods until their diet consists of approximately 90 percent vegetative material, primarily aquatic plants such as algae, watermeal, watershield, sago pondweed, and duckweed. Adult wood ducks feed on a variety of nuts and fruits, aquatic plants and seeds, and aquatic insects and other invertebrates. Insects and aquatic invertebrates are particularly important food items of adult hens during egg laying in spring. Acorns and other forest mast are important fall and winter foods. Wood ducks feed primarily in shallow water areas, but will also forage on the forest floor for seeds, acorns, and nuts.
- **Potential Limiting Factors/Threats:**
  - Not enough natural nesting sites, loss of habitat, and over hunting.
- **Management:**
  - Natural cavities are scarce in some areas, and nest boxes have been used widely to supplement natural cavities.
  - Recommend habitat management measures include: (1) eliminate stream channelization; (2) establish greenways of timber and shrubs along stream banks that would reduce erosion and provide food, cover, and nest sites; (3) reduce drainage of wooded wetlands and bottomland forests; (4) control water levels by levees and weirs to enhance food availability of moist soil plants and mast in bottomland hardwoods in fall and winter; (5) encourage development of beaver and farm ponds; and (6) establish predator-resistant nest houses where food and cover resources warrant this approach.

CERULEAN WARBLER *(Dendroica cerulea)*

(Poole 2005)

- **Associated Species:**
  - Prothonotary warbler, Baltimore oriole, rusty blackbird, northern flicker, bats, river otter
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Southeastern Nebraska across the southern Great Lakes region to southern Ontario, southwestern Quebec, and western New England, south to northern Texas, Arkansas, northern Alabama, and northern Georgia
  - Wintering: Primarily on the eastern slopes of the Andes from Colombia and Venezuela through Ecuador to Peru. Relatively few are found elsewhere during the winter, though a small population can be found in the tepui region of Venezuela.
- **Habitat:**
  - Large, contiguous forest tracts, composed of structurally matured hardwoods with a high variably closed canopy. Establish territories near interior forest gaps.

  - Tree size is important, both height and diameter at breast height (DBH). Almost always found above the midpoint of a tall tree, often in the canopy and are usually found in the stands where most trees fall into the larger DBH classes.
  - Specific forest types vary throughout the species' range and include bottomland hardwood and riparian forests (especially with tall sycamores or cottonwoods), dry ridgetops with mature oaks and hickories, mesic cove forests with tulip-polar and other southern hardwoods, red-maple swamps, and lake margins.
- **Nesting:**
  - The nest is usually placed 6-25 feet from the bole of a large tree, saddled on a large, lateral branch and sometimes attached to a small protruding twig. Most nests are located from 10-40 feet high and can range to over 65 feet.
  - Nests are most often found in oaks, elms and American sycamore.
  - The shallow cup is constructed by a female of finely woven grass, plant stems/fibers, tree bark, mosses, and lichens. The entire structure is bound together on the outside with spider silk. The cup is lined with plant fibers and moss.
- **Food:**
  - Includes adult and immature insects such as; wasps, beetles, weevils, caterpillars, ants, sawflies, and locusts.
- **Potential Limiting Factors/Threats:**
  - Because of its small overall range and population, its dependence on mature bottomland and ridgetop forests and rapid deforestation on its tropical wintering grounds causes conservation concerns.
  - Sensitive to forest fragmentation
- **Management:**
  - Need a better understand of precise habitat requirements, area sensitivity and response to land-use practices and how these vary geographically.
  - Identify and protect important breeding sites and habitat.

Grasslands *Moderate-Priority Habitat*

BOBOLINK (*Dolichonyx oryzivorous*)
(Poole 2005)

- **Associated Species:**
  - Eastern meadowlark, horned lark, sedge wren
- **Seasonal Use/Refuge Habitats:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Breeds in U.S. and Canada from British Columbia and Alberta in west to w. Newfoundland in east, and as far south as West Virginia. Breeds more or less continuously throughout this range wherever suitable habitat exists; distribution is patchy in western and southern portions of breeding range.
  - Winter: In s. South America east of Andes principally from e. Bolivia and sw. Brazil south through Paraguay and ne. Argentina to Buenos Aires. Small numbers also occur along the coast of Peru, and as far south as n. Chile. Full winter range may include broader area, but principal wintering area as described above.
- **Habitat:**
  - Short and tall, particularly graminoid cover
  - Chose sites with increased tall gaminoid, tall forb, and blueberry cover and reduced tall shrub cover

  - Prefers a mixture of grasses and broad-leaved forbs.
  - Densities significantly higher in fields with relatively low amounts of total vegetative cover, low alfalfa cover, and low total legume cover. These vegetative characteristics occur in hay fields ≥ 8 yr old.
- **Nesting:**
  - Nests are often placed beneath forbaceous growth, which provides shading and temperature modulation.
  - On ground; outer wall of dead grass with central lining of fine grass or sedges. May have canopy of dead grass hanging over top.
- **Food:**
  - Breeding season: weed seeds, a variety of larval and adult insects, spiders, harvestmen.
  - Migration and winter periods: wild and domesticated rice, oats, other small grains, corn, tassels, weed seeds, occasional insects. Young are fed exclusively invertebrates.
- **Potential Limiting Factors/Threats:**
  - Loss of habitat, predation and human disturbance
- **Management:**
  - Fields should be mowed annually to maintain breeding habitat, but mowing should be delayed until early Jul to minimize impacts on fledglings. Even later mowing would allow fledging of birds in renesting situations.
  - Natural prairies can be managed by prescribed burning, but this should be done after one nesting season or at least several weeks prior to arrival of adults in spring.

GRASSHOPPER SPARROW *(Ammodramus savannarum)*

(Poole 2005)

- **Associated Species:**
  - Eastern meadowlark, horned lark, sedge wren
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Mostly in central and eastern United States.
  - Wintering: South eastern lower states of US and Mexico.
- **Habitat:**
  - Generally prefers moderately open grasslands and prairies with patchy bare ground; selects different components of vegetation, depending on grassland ecosystem. More likely to occupy large tracts of habitat than small fragments.
  - Dry grassy fields, hayfields, overgrown pastures and cultivated fields. Prefers habitat that is not extensively brushy.
- **Nesting:**
  - Cup of grass stems and blades, very well concealed on the ground. Usually has a dome made of overhanging grasses, with a side entrance.
- **Food:**
  - Insects, including grasshoppers (staple), beetles, caterpillars, and crickets; spiders, earthworms, snails, weed seeds, grass seeds, waste grain.
- **Potential Limiting Factors/Threats:**
  - Declining throughout range from habitat loss, fragmentation, and degradation.
- **Management:**

- Three primary management techniques have been used and are recommended for this species: prescribed burning, grazing, and mowing. Each has different impacts depending on the type of grassland ecosystem.
- Mowing: Early-season mowing of hayfields and other agricultural lands is generally responsible for major nest failure of grassland birds, including Grasshopper Sparrows. In general, contemporary farming practices cut hayfields more frequently, and the first cuttings occur 1–3 wk earlier in spring than they did 50 yr ago; these practices have had significant negative impacts on nesting success of grassland birds. Deferred mowing on publicly owned lands would provide improved breeding opportunities for Grasshopper Sparrows and other grassland birds. Incentives to encourage private farmers to defer mowing should be developed.
- Grazing: In more lush grassland habitats, i.e., tallgrass prairie and eastern hayfields, light to moderate grazing is generally beneficial to Grasshopper Sparrow.
- Prescibed Burning: Grasshopper Sparrow generally prefers large, recently burned grassland tracts >1 yr after fire.

HENSLOW'S SPARROW *(Ammodramus henslowii)*

(Poole 2005)

- **Associated Species:**
  - Eastern meadowlark, horned lark, sedge wren
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Breeding range is shrinking in many areas (especially Northeast) and apparently increasing in others (mostly West). Minnesota; Wisconsin; Michigan; Ontario, but declining and now much reduced New York: almost throughout, except Adirondack Mtns., and Long Island regions; Nebraska; Kansas; Oklahoma; Iowa; Missouri; Arkansas; Illinois; Indiana; Ohio; Kentucky; W. Virginia; Pennsylvania; Maryland; N. Carolina; Virginia.
  - Wintering: Given secretive habits, winter range not precisely known, but appears to winter largely in se. U.S. Winter range includes e. Texas, s. Louisiana, s. Mississippi, s. Alabama, Florida (except for southern tip), s. Georgia, e. South Carolina, and se. North Carolina. Northern limit unclear, but extends north at least to s. Arkansas.
- **Habitat:**
  - Habitat can be characterized as relatively large fields consisting of tall, dense grass, a well-developed litter layer, standing dead vegetation, and sparse or no woody vegetation. Habitat also usually dominated by grasses and has scattered forbs for singing perches.
- **Nesting:**
  - An open bowl of loosely woven dry grasses, placed in layer of grass litter just off the ground.
  - Nests typically placed among layers of thick litter about 2 - 4 cm off ground. In areas with little litter, nests generally placed within large clumps of grass close to ground. Deep litter may contribute to higher nesting success.
- **Food:**
  - Insects, mostly grasshoppers and beetles.
- **Potential Limiting Factors/Threats:**
  - Pesticides and/or herbicides used in habitat

- Degradation of breeding habitats
- Human disturbance; ill-timed mowing/haying

- **Management:**
  - Declining in the northeastern portion of its range, and apparently increasing in some other parts, the Henslow's Sparrow has been identified as the highest priority for grassland bird conservation in eastern and midwestern North America by Partners in Flight (PIF), a cooperative effort of many organizations dedicated to bird conservation. Henslow's Sparrow does not have federally protected status in the United States, but is listed as Endangered in seven states, as well as Canada. PIF is promoting establishment of large grassland conservation areas for this and other species. The Conservation Reserve Program (CRP), a program of the U.S. Department of Agriculture that assists farmers in setting aside qualifying land for conservation, has apparently successfully contributed to local population increases in isolated cases.

Shrublands *Moderate-Priority Habitat*

FIELD SPARROW *(Spizella pusilla)*

(Poole 2005)

- **Associated Species:**
  - Brown thrasher, song sparrow, willow flycatcher, black-billed cuckoo, American woodcock
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Mid-west and eastern US
  - Wintering: Lower mid-west and eastern US; Kansas, Missouri, Illinois, s. Michigan, n. Ohio, Pennsylvania, and Massachusetts south to se. New Mexico, n. Coahuila, central Nuevo León, n. Tamaulipas, the Gulf Coast, and s. Florida
- **Habitat:**
  - Generally in successional old fields, woodland openings and edges, roadsides and railroads near open fields. Does not breed close to human habitation. Will nest in old fields directly after a burn or within a year of cultivation, but only if there is scattered woody vegetation with elevated perches in the territory. As thickets of trees spread in the habitat, numbers decline. The general trend for old field habitats is that Field Sparrows begin breeding within 1-2 years after human uses stop; population sizes rise for perhaps a decade, then decline. After ~30 yr of old field succession, the habitat is overgrown with trees and shrubs and no longer used for breeding.
  - Breeds in old fields, woodland openings, and edges. Winters in fields and forest edges.
- **Nesting:**
  - Open cup of large grass pieces interwoven with finer grasses. Lined with fine grasses, rootlets, and hair. Placed on or near ground in grass clumps or at base of shrubs.
  - Later nests higher in crotches of shrubs or saplings
- **Food:**
  - Winter: small seeds, primarily grasses.
  - Breeding season: small seeds, adult and larval insects
- **Potential Limiting Factors/Threats:**

  - Sensitivity to disturbance at nests and roost sites
  - Pesticides and other contaminants
  - Degradation of habitat

- **Management:**
  - Management includes protecting existing prairie and successional habitats; avoiding practices that completely remove woody vegetation; burning to prevent the encroachment, but not removal, of woody vegetation; and removing the canopy and thinning shrubs and saplings in forested habitats.

BLUE-WINGED WARBLER *(Vermivora pinus)*

(Poole 2005, USFWS 2009b)

- **Associated Species:**
  - Brown thrasher, song sparrow, willow flycatcher, black-billed cuckoo, American woodcock
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: eastern U.S., northeast through Massachusetts, the southern tip of New Hampshire, and the extreme southern tip of Maine.
  - Wintering: Mexico, Central America, northern South America
- **Habitat:**
  - Early to midsuccession habitats, especially abandoned farmland and forest clearings.
  - Breeds at forest/field edges, often shaded by large trees.
- **Nesting:**
  - Open cup of grasses, bark and dead leaves. Leaves may form cap over eggs. Usually on or near ground.
  - Forest-field ecotones, often shaded by large trees. Nests also along edge of deer trails. Most nests 30 m outside forest edge.
  - Nests usually placed at base of goldenrod (Solidago spp.) or berry bushes (Rubus spp.); sometimes built in a clump of grass or sedge (Carex spp.). Most well concealed by leafy material.
  - Nest sites similar to those of Golden-winged Warbler.
- **Food:**
  - Arthropods, especially Lepidoptera larvae, small orthopterans (crickets and grasshoppers), and arachnids (spiders).
- **Potential Limiting Factors/Threats:**
  - Loss of breeding habitat is accelerating because of suburban expansion.
  - Populations may be declining in some parts of range because of decreased abandonment of farmland, increased succession of forests, and conversion of old fields to suburbs.
- **Management:**
  - Dependence on successional habitat and regional patterns of forestry and farmland abandonment may lead to continued range expansion and contraction. As with all Neotropical migrants, should be monitored continuously because of threats posed by increased human consumption of land (e.g., television and cellular-phone towers, suburban sprawl, agriculture, and tropical deforestation).

GOLDEN-WINGED WARBLER *(Vermivora chrysoptera)*

(Poole 2005)

- **Associated Species:**
  - Brown thrasher, song sparrow, willow flycatcher, black-billed cuckoo, American woodcock
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Northeastern and north-central U.S. and southern Ontario
  - Wintering: Central and northern South America
- **Habitat:**
  - Breeds in patchy shrubland and forest edge, such as shrubby fields, marshes, and bogs. Winters in canopy of tropical forests.
- **Nesting:**
  - Open cup of grasses, bark, and dead leaves. Leaves may form cap over eggs. Usually on or near ground.
  - Nest usually on the ground, often at the base of a cluster of leafy plant material. Base of supporting plants often above the nearby ground level, with leafy material quite thick and obscuring the nest, especially later in the growing season. Most nests include a taller, thicker stem in the supporting basal material, which adults grasp when arriving at the nest.
- **Food:**
  - Insects and spiders.
- **Potential Limiting Factors/Threats:**
  - Possible but unknown if invading Blue-winged Warblers directly cause the extinction of local populations of Golden-winged Warblers.
  - Nest parasitism by the Brown-headed Cowbird.
  - Loss of habitat.
- **Management:**
  - Increase habitat

Upland Forests *Moderate-Priority Habitat*

WOOD THRUSH *(Hylocichla mustelina)*

(Poole 2005, Smithsonian Migratory Bird Center 2009)

- **Associated Species:**
  - Rose-breasted grosbeak, scarlet tanager
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: south from southern Canada to northern Florida and west from the Atlantic coast to the Missouri River and the eastern regions of the Great Plains.
  - Wintering: Mexico and Central America, mostly in the lowlands along the Atlantic and Pacific coasts from Mexico to Panama.
- **Habitat:**
  - Breed in the Interior and edges of deciduous and mixed forests, especially well-developed, upland, mesic ones.

  - Winters in interior understory of tropical primary, closed-canopy, semi-evergreen, broad-leaved, and mixed palm forests
- **Nesting:**
  - In trees or shrubs, usually in crotch or saddled over horizontal branch at fork or where twigs provide support and where some concealment exists.
  - First material is dead grass, stems, or leaves or piece of pliable, pale plastic or paper, often draped over support; sometimes extends noticeably below the nest. Similar materials form enlarged base and walls. Wall woven by placing material at edge of base, lifting loose part up and inward and tucking it into bottom. Mud added and molded inside cup, followed by rootlet lining.
- **Food:**
  - Some arboreal insects, snails, and small salamanders
  - Soil invertebrates; use of fruit greater in late summer, fall, and late winter
  - Larval and adult insects, millipedes, and isopods.
  - Fruits in diet include spicebush, fox grape, blueberry, holly, elderberry, jack-in-the-pulpit, Virginia creeper, pokeweed, dogwood, black cherry, and black gum.
- **Potential Limiting Factors/Threats:**
  - Forest fragmentation may cause lower reproductive success
  - Loss of Central American primary and old second-growth forest on lower slopes threatens winter survival
- **Management:**
  - Protection of primary and old, secondary broad-leaved tropical forests

BLACK-BILLED CUCKOO *(Coccyzus erythropthalmus)*
(Poole 2005)

- **Associated Species:**
  - Rose-breasted grosbeak, scarlet tanager
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Upper mid-west and eastern US
  - Wintering: Mexico and South America
- **Habitat:**
  - They inhabit extensive areas of upland woods that provide a variety of trees, bushes and vines. Streamside woods and moist thickets in overgrown pastures and orchards are preferred; however, they are also found in brushy pastures, hedgerows, open woodlands, orchards, thickets and along wooded roadsides.
- **Nesting:**
  - Nest typically saddled on or placed between horizontal branches; sometimes in crotch against main trunk. Few nests built over water. Nests generally well concealed by overhanging branches and leaf clusters.
  - The nest is a platform, typically four to six feet above the ground, constructed out of loosely woven twigs and lined with grasses and roots.
- **Food:**
  - Primarily of caterpillars, especially tent caterpillars, but they also feed on other insects, spiders, small mollusks, fish and wild fruits and berries.
- **Potential Limiting Factors/Threats:**
  - May be susceptible to habitat fragmentation
  - May be poisoned by catapillars sprayed by pesticides

- **Management:**
  - Maintain mature hardwood forest.

CERULEAN WARBLER

- See discussion in Bottomland Hardwood Forest section above

AMERICAN WOODCOCK (*Scolopax minor*)

(Sepik et al., 1994)

- **Associated Species:**
  - Rose-breasted grosbeak, scarlet tanager
- **Seasonal Use of Refuge:**
  - Breeding, migration
- **Distribution:**
  - Breeding: Throughout the eastern half of U.S., north of Gulf Coast State.
  - Wintering: Southern states from Louisiana east, and is limited in northern extent by snow cover and ground frost.
- **Habitat:**
  - Singing Ground: Range from less than 1 acre to over 100 acres. Is usually an abandoned field, forest openings, clear-cuts, dirt roads, blueberry fields, new tree plantations, and pastures and abandoned farmlands.
  - Daytime Male Habitat: Close to singing grounds and have moist, rich soils with plenty of earthworms and dense overhead cover of young alders, aspen, or birch.
  - Daytime Feeding: Predominately second-growth (15-30 year-old) hardwood or mixed woods with shrubs, bottomland hardwoods, and upland mixed pine-hardwoods. Dense alder thickets < 20 years of age and young aspen and birch stands.
  - Nesting: Young, open second growth deciduous forests with well-drained soils. Dense deciduous sapling or conifer cover including young open woodlands, low shrubby cover, old fields, tall herbage bordering clearings, thickets, scrub oaks or pins, open woodland with dead leaf cover on ground, and flat bottomlands near water.
  - Roosting: Large fields (similar or the same as singing grounds).
  - Brood Rearing: Similar to nesting cover.
- **Nesting:**
  - Nests are often within 100 yards of an occupied singing ground.
  - Nest consists of a shallow depression lined with a few leaves and occasionally small twigs placed around the edges.
- **Food:**
  - Earthworms make up 50 to 90 percent of their diet.
  - Other foods include beetles and fly larvae.
- **Potential Limiting Factors/Threats:**
  - Hunting
  - Habitat loss on both breeding and wintering grounds
- **Management:**
  - Stands of alder and similar shrub species should be encouraged and maintained by strip-cutting on a 20 year rotations.
  - Block or strip cuts on a 40 -50 year rotations to provide a continuous supply of young growth.

- Shelterwood and seed trees that are often left over in partial timber harvests help to retain a patchy structure.
- Singing Ground: Create openings where few are present adjacent to feeding habitat. Clearings should be at least 0.5 acres where surrounding trees are taller than 25 feet. Openings with shorter surrounding vegetation can be as small as .25 acres.
- Roosting cover: Clearcuts.

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New York Natural Heritage Report on Rare Animals, Rare Plants, and Significant Ecological Communities

of IROQUOIS NATIONAL WILDLIFE REFUGE

Prepared February, 2006 from the Biodiversity Databases of the New York Natural Heritage Program, NYS DEC, 625 Broadway, Albany, NY, 12233-4757.

	COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*
Iroquois National Wildlife Refuge				
	Documented on the Refuge since 1985			
Birds	Pied-billed Grebe	*Podilymbus podiceps*	Threatened	S3
	Least Bittern	*Ixobrychus exilis*	Threatened	S3
	Great Blue Heron	*Ardea herodias*		S5
	Ruddy Duck	*Oxyura jamaicensis*		S1
	Black Tern	*Childonias niger*	Endangered	S2
	Bald Eagle	*Haliaeetus leucocephalus*	Threatened**	S2S3
	Upland Sandpiper	*Bartramia longicauda*	Threatened	S3
	Short-eared Owl	*Asio flammeus*	Endangered	S2
	Sedge Wren	*Cistothorus platensis*	Threatened	S3
	Prothonotary Warbler	*Protonotaria citrea*		S2
	Henslow's Sparrow	*Ammodramus henslowii*	Threatened	S3
Plants				
	Smooth Bur-marigold	*Bidens laevis*	Threatened	S2
	Georgia Bulrush	*Scirpus georgianus*	Endangered	S1
Ecological Communities				
	Deep Emergent Marsh			S5
	Hemlock-Northern Hardwood Forest			S4
	Other Species and Community Types Documented near the Refuge since 1985			
Birds	King Rail	*Rallus elegans*	Threatened	S1B
	Northern Harrier	*Circus cyaneus*	Threatened	S3B,S3N
Dragonflies				
	American Rubyspot	*Hetaerina americana*		S2S3
Freshwater Mussels				
	Threeridge	*Amblema plicata*		S1
	Wabash Pigtoe	*Fusconaia flava*		S2
	Wavyrayed Lampmussel	*Lampsilis fasciola*	Threatened	S1
	Pocketbook	*Lampsilis ovata*		S2S3

	COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*
	Fragile Papershell	*Leptodea fragilis*		S3
	Black Sandshell	*Ligumia recta*		S2S3
	Kidneyshell	*Ptychobranchus fasciolaris*		S2
	Rainbow	*Villosa iris*		S2S3
Plants				
	Harbinger-of-spring	*Erigenia bulbosa*	Endangered	S1
	Heartleaf Plantain	*Plantago cordata*	Threatened	S3
	Nodding Trillium	*Trillium flexipes*	Endangered	S1
	Nodding Pogonia	*Triphora trianthophora*	Endangered	S2
Ecological Communities				
	Rich hemlock-hardwood peat swamp			S2S3

Documented from "Tonawanda Swamp" at unknown date at unknown location.

Plants	Eastern Prairie Fringed Orchid	*Plantanthera leucophaea*	Endangered**	SH

Documented near the Refuge before 1975; current status unknown.

Butterflies				
	Karner Blue	*Lycaeides melissa samuelis*	Endangered**	S1
Plants				
	Pink Wintergreen	*Pyrola asarifolia* ssp. *asarifolia*	Threatened	S2

* Rarity in NYS as ranked by NY Natural Heritage Program on a 1 to 5 scale:
S1 = Critically imperiled; S2 = Imperiled; S3 = Rare or uncommon;
S4 = Abundant and apparently secure; S5 = Demonstrably abundant and secure;
SH = Historical records only; no recent information available;
SU = Not yet ranked.

** Also Federally Listed.

Natural community occurrences in this report are all ranked as being of excellent quality, and therefore are considered significant from a statewide perspective. By meeting specific, documented significance criteria, the NY Natural Heritage Program considers this occurrence to have high ecological and conservation value.

Appendix D

John Mosesso Jr./NBII

Eastern Box Turtle

Wildlife and Plant Common and Scientific Names

Wildlife and Plant Common and Scientific Names

Common Name	Scientific Name
Swans, Geese and Ducks	
American Black Duck	*Anas rubripes*
American Wigeon	*Anas americana*
Black Scoter	*Melanitta nigra*
Blue-winged Teal	*Anas discors*
Brant	*Branta bernicla*
Bufflehead	*Bucephala albeola*
Cackling Goose	*Branta hutchinsii*
Canada Goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Cinnamon Teal	*Anas cyanoptera*
Common Goldeneye	*Bucephala clangula*
Common Merganser	*Mergus merganser*
Gadwall	*Anas strepera*
Greater Scaup	*Aythya marila*
Greater White-fronted Goose	*Anser albifrons*
Green-winged Teal	*Anas crecca*
Hooded Merganser	*Lophodytes cucullatus*
Lesser Scaup	*Aythya affinis*
Long-tailed Duck	*Clangula hyemalis*
Mallard	*Anas platyrhynchos*
Mute Swan	*Cygnus olor*
Northern Pintail	*Anas acuta*
Northern Shoveler	*Anas clypeata*
Red-breasted Merganser	*Mergus serrator*
Redhead	*Aythya americana*
Ring-necked Duck	*Aythya collaris*
Ruddy Duck	*Oxyura jamaicensis*
Snow Goose	*Chen caerulescens*
Surf Scoter	*Melanitta perspicillata*
Tundra Swan	*Cygnus columbianus*
White-winged Scoter	*Melanitta fusca*
Wood Duck	*Aix sponsa*
Gallinaceous Birds	
Northern Bobwhite	*Colinus virginianus*
Ring-necked Pheasant	*Phasianus colchicus*
Ruffed Grouse	*Bonasa umbellus*

Wild Turkey	*Meleagris gallopavo*
Loons	
Common Loon	*Gavia immer*
Grebes	
Horned Grebe	*Podiceps auritus*
Pied-billed Grebe	*Podilymbus podiceps*
Red-necked Grebe	*Podiceps grisegena*
Comorants	
Double-crested Cormorant	*Phalacrocorax auritus*
Bitterns, Herons, and Egrets	
American Bittern	*Botaurus lentiginosus*
Black-crowned Night-Heron	*Nycticorax nycticorax*
Great Blue Heron	*Ardea herodias*
Great Egret	*Ardea alba*
Cattle Egret	*Bubulcus ibis*
Green Heron	*Butorides virescens*
Least Bittern	*Ixobrychus exilis*
New World Vulture	
Turkey Vulture	*Cathartes aura*
Osprey, Hawks and Eagles	
Bald Eagle	*Haliaeetus leucocephalus*
Broad-winged Hawk	*Buteo platypterus*
Cooper's Hawk	*Accipiter cooperii*
Golden Eagle	*Aquila chrysaetos*
Northern Goshawk	*Accipiter gentilis*
Northern Harrier	*Circus cyaneus*
Osprey	*Pandion haliaetus*
Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
Rough-legged Hawk	*Buteo lagopus*
Sharp-shinned Hawk	*Accipiter striatus*
Falcon	
American Kestrel	*Falco sparerius*
Peregrine Falcon	*Falco peregrinus*
Rails	
American Coot	*Fulica americana*
Common Moorhen	*Gallinula chloropus*
King Rail	*Rallus elegans*
Sora	*Porzana carolina*
Virginia Rail	*Rallus limicola*
Yellow Rail	*Coturnicops noveboracensis*

Cranes	
Sandhill Crane	*Grus canadensis*
Plovers	
American Golden-Plover	*Pluvialis dominica*
Black-bellied Plover	*Pluvialis squatarola*
Killdeer	*Charadrius vociferus*
Semipalmated Plover	*Charadrius semipalmatus*
Sandpipers and Phalaropes	
American Woodcock	*Scolopax minor*
Dunlin	*Calidris alpina*
Greater Yellowlegs	*Tringa melanoleuca*
Hudsonian Godwit	*Limosa haemastica*
Least Sandpiper	*Calidris minutilla*
Lesser Yellowlegs	*Tringa flavipes*
Long-billed Dowitcher	*Limnodromus scolopaceus*
Pectoral Sandpiper	*Calidris melanotos*
Red-necked Phalarope	*Phalaropus lobatus*
Ruddy Turnstone	*Arenaria interpres*
Semipalmated Sandpiper	*Calidris pusilla*
Short-billed Dowitcher	*Limnodromus griseus*
Solitary Sandpiper	*Tringa solitaria*
Spotted Sandpiper	*Actitis macularia*
Stilt Sandpiper	*Calidris himantopus*
Upland Sandpiper	*Bartramia longicauda*
White-rumped Sandpiper	*Calidris fuscicollis*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe	*Gallinago delicata*
Gulls and Terns	
Black Tern	*Chlidonias niger*
Bonaparte's Gull	*Larus philadelphia*
Caspian Tern	*Sterna caspia*
Common Tern	*Sterna hirundo*
Great Black-backed Gull	*Larus marinus*
Herring Gull	*Larus argentatus*
Ring-billed Gull	*Larus delawarensis*
Pigeons and Doves	
Mourning Dove	*Zenaida macroura*
Rock Pigeon	*Columba livia*
Cuckoos	
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Yellow-billed Cuckoo	*Coccyzus americanus*

Owls	
Barn Owl	*Tyto alba*
Barred Owl	*Strix varia*
Eastern Screech-Owl	*Megascops asio*
Great Horned Owl	*Bubo virginianus*
Long-eared Owl	*Asio otus*
Northern Saw-whet Owl	*Aegolius acadicus*
Short-eared Owl	*Asio flammeus*
Snowy Owl	*Bubo scandiacus*
Night Jars	
Common Nighthawk	*Chordeiles minor*
Whip-poor-will	*Caprimulgus vociferus*
Swifts	
Chimney Swift	*Chaetura pelagica*
Hummingbirds	
Ruby-throated Hummingbird	*Archilochus colubris*
Kingfishers	
Belted Kingfisher	*Ceryle alcyon*
Woodpeckers	
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*
Pileated Woodpecker	*Dryocopus pileatus*
Red-bellied Woodpecker	*Melanerpes carolinus*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Yellow-bellied Sapsucker	*Sphyrapicus varius*
Tyrant Flycatchers	
Acadian Flycatcher	*Empidonax virescens*
Alder Flycatcher	*Empidonax alnorum*
Eastern Kingbird	*Tyrannus tyrannus*
Eastern Phoebe	*Sayornis phoebe*
Eastern Wood-Pewee	*Contopus virens*
Great Crested Flycatcher	*Myiarchus crinitus*
Least Flycatcher	*Empidonax minimus*
Willow Flycatcher	*Empidonax traillii*
Shrikes	
Northern Shrike	*Lanius excubitor*
Vireos	
Blue-headed Vireo	*Vireo solitarius*
Philadelphia Vireo	*Vireo philadelphicus*
Red-eyed Vireo	*Vireo olivaceus*

Warbling Vireo	*Vireo gilvus*
Yellow-throated Vireo	*Vireo flavifrons*
Crows and Jays	
American Crow	*Corvus branchyrhynchos*
Blue Jay	*Cyanocitta cristata*
Larks	
Horned Lark	*Eremophila alpestris*
Swallows	
Bank Swallow	*Riparia riparia*
Barn Swallow	*Hirundo rustica*
Cliff Swallow	*Petrochelidon pyrrhonota*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Purple Martin	*Progne subis*
Tree Swallow	*Tachycineta bicolor*
Titmice and Chickadees	
Black-capped Chickadee	*Poecile atricapillus*
Tufted Titmouse	*Baeolophus bicolor*
Nuthatches	
Red-breasted Nuthatch	*Sitta canadensis*
White-breasted Nuthatch	*Sitta carolinensis*
Creepers	
Brown Creeper	*Certhia americana*
Wrens	
Carolina Wren	*Thryothorus ludovicianus*
House Wren	*Troglodytes aedon*
Marsh Wren	*Cistothorus palustris*
Sedge Wren	*Cistothorus plantensis*
Winter Wren	*Troglodytes troglodytes*
Kinglets	
Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Regulus calendula*
Old World Warblers	
Blue-gray Gnatcatcher	*Polioptila caerulea*
Thrushes	
American Robin	*Turdus migratorius*
Eastern Bluebird	*Sialia sialis*
Gray-cheeked Thrush	*Catharus minimus*
Hermit Thrush	*Catharus guttatus*
Swainson's Thrush	*Catharus ustulatus*
Veery	*Catharus fuscescens*
Wood Thrush	*Hylocichla mustelina*

Mimic Thrashers	
Brown Thrasher	*Toxostoma rufum*
Gray Catbird	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
Starlings	
European Starling	*Sturnus vulgaris*
Pipits	
American Pipit	*Anthus rubescens*
Waxwings	
Bohemian Waxwing	*Bombycilla garrulus*
Cedar Waxwing	*Bombycilla cedrorum*
Warblers	
American Redstart	*Setophaga ruticilla*
Bay-breasted Warbler	*Dendroica castanea*
Black-and-white Warbler	*Mniotilta varia*
Blackburnian Warbler	*Dendroica fusca*
Blackpoll Warbler	*Dendroica striata*
Black-throated Blue Warbler	*Dendroica caerulescens*
Black-throated Green Warbler	*Dendroica virens*
Blue-winged Warbler	*Vermivora pinus*
Canada Warbler	*Wilsonia canadensis*
Cape May Warbler	*Dendroica tigrina*
Cerulean Warbler	*Dendroica cerulea*
Chestnut-sided Warbler	*Dendroica pensylvanica*
Common Yellowthroat	*Geothlypis trichas*
Golden-winged Warbler	*Vermivora chrysoptera*
Hooded Warbler	*Wilsonia citrina*
Magnolia Warbler	*Dendroica magnolia*
Nashville Warbler	*Vermivora ruficapilla*
Northern Parula	*Parula americana*
Northern Waterthrush	*Seiurus noveboracensis*
Orange-crowned Warbler	*Vermivora celata*
Ovenbird	*Seiurus aurocapilla*
Palm Warbler	*Dendroica palmarum*
Pine Warbler	*Dendroica pinus*
Prairie Warbler	*Dendroica discolor*
Prothonotary Warbler	*Protonotaria citrea*
Tennessee Warbler	*Vermivora peregrina*
Wilson's Warbler	*Wilsonia pusilla*
Yellow Warbler	*Dendroica petechia*
Yellow-breasted Chat	*Icteria virens*

Yellow-rumped Warbler	*Dendroica coronata*
Tanagers	
Scarlet Tanager	*Piranga olivacea*
Sparrows and Towhees	
American Tree Sparrow	*Spizella arborea*
Chipping Sparrow	*Spizella passerina*
Dark-eyed Junco	*Junco hyemalis*
Eastern Towhee	*Pipilo erythrophthalmus*
Field Sparrow	*Spizella pusilla*
Fox Sparrow	*Passerella iliaca*
Grasshopper Sparrow	*Ammodramus savannarum*
Henslow's Sparrow	*Ammodramus henslowii*
Lapland Longspur	*Calcarius lapponicus*
Savannah Sparrow	*Passerculus sandwichensis*
Snow Bunting	*Plectrophenax nivalis*
Song Sparrow	*Melospiza melodia*
Swamp Sparrow	*Melospiza georgiana*
Vesper Sparrow	*Pooecetes gramineus*
White-crowned Sparrow	*Zonotrichia leucophrys*
White-throated Sparrow	*Zonotrichia albicollis*
Cardinals, Grosbeaks and Allies	
Indigo Bunting	*Passerina cyanea*
Northern Cardinal	*Cardinalis cardinalis*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Blackbirds and Orioles	
Baltimore Oriole	*Icterus galbula*
Bobolink	*Dolichonyx oryzivorus*
Brown-headed Cowbird	*Molothrus ater*
Common Grackle	*Quiscalus quiscula*
Eastern Meadowlark	*Sturnella magna*
Red-winged Blackbird	*Agelaius phoeniceus*
Rusty Blackbird	*Euphagus carolinus*
Finches	
American Goldfinch	*Carduelis tristis*
Common Redpoll	*Carduelis flammea*
Evening Grosbeak	*Coccothraustes vespertinus*
House Finch	*Carpodacus mexicanus*
Pine Grosbeak	*Pinicola enucleator*
Pine Siskin	*Carduelis pinus*
Purple Finch	*Carpodacus purpureus*
Old World Sparrows	

House Sparrow	*Passer domesticus*
Accidentals	
American Avocet	*Recurvirostra americana*
American White Pelican	*Pelecanus erythrorhynchos*
Baird's Sandpiper	*Calidris bairdii*
Barnacle Goose	*Branta leucopsis*
Black-legged Kittiwake	*Rissa tridactyla*
Eared Grebe	*Podiceps nigricollis*
Eurasion Wigeon	*Anas penelope*
Forster's Tern	*Sterna forsteri*
Fulvous Whistling-Duck	*Dendrocygna bicolor*
Glaucous Gull	*Larus hyperboreus*
Glossy Ibis	*Plegadis falcinellus*
Gyrfalcon	*Falco rusticolus*
Lesser Black-backed Gull	*Larus fuscus*
Lincoln's Sparrow	*Melospiza lincolnii*
Little Blue Heron	*Egretta caerulea*
Loggerhead Shrike	*Lanius ludovicianus*
Marbled Godwit	*Limosa fedoa*
Merlin	*Falco columbarius*
Orchard Oriole	*Icterus spurius*
Red Crossbill	*Loxia curvirostra*
Red Knot	*Calidris canutus*
Red-throated Loon	*Gavia stellata*
Ross's Goose	*Chen rossii*
Sanderling	*Calidris alba*
Snowy Egret	*Egretta thula*
Summer Tanager	*Piranga rubra*
Three-toed Woodpecker	*Picoides dorsalis*
Western Sandpiper	*Calidris mauri*
Whimbrel	*Numenius phaeopus*
White-eyed Vireo	*Vireo griseus*
White-winged Crossbill	*Loxia leucoptera*
Willet	*Catoptrophorus semipalmatus*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Mammals	
Beaver	*Castor canadensis*
Big Brown Bat	*Eptesicus fuscus*
Bobcat	*Lynx rufus*
Coyote	*Canus latrans*
Deer Mouse	*Peromyscus manicultatus*

Eastern Chipmunk	*Tamias striatus*
Eastern Cottontail	*Sylvilagus floridanus*
Eastern Gray Squirrel	*Sciurus carolinensus*
Eastern Pipistrelle	*Pipistrellus subflavus*
Gray Fox	*Urocyon cinereoargenteus*
Hairytail Mole	*Parascalops breweri*
Hoary Bat	*Lasiurus cinereus*
House Mouse	*Mus musculus*
Keen Myotis	*Myotis keeni*
Little Brown Myotis	*Myotis lucifugus*
Longtail Weasel	*Mustela frenata*
Masked Shrew	*Sorex cinereus*
Meadow Jumping Mouse	*Zapus hudsonius*
Meadow Vole	*Microtus pennsylvanicus*
Mink	*Mustela vison*
Muskrat	*Ondatra zibethicus*
Northern Flying Squirrel	*Glaucomys sabrinus*
Norway Rat	*Rattus norvegicus*
Porcupine	*Erethizon dorsatum*
Raccoon	*Procyon lotor*
Red Bat	*Lasiurus borealis*
Red Fox	*Vulpes fulva*
Red Squirrel	*Tamiasciurus hudsonicus*
River Otter	*Lutra canadensis*
Shorttail Shrew	*Blarina brevicauda*
Shorttail Weasel	*Mustela erminea*
Silver-Haired Bat	*Lasionycteris noctivagans*
Small-footed myotis	*Myotis subulatus*
Snowshoe Hare	*Lepus americanus*
Southern Flying Squirrel	*Glaucomys volans*
Starnose Mole	*Condylura cristata*
Striped Skunk	*Mephitis mephitis*
Virginia Opossum	*Didelphis marsupialis*
White-footed Mouse	*Peromyscus leucopus*
Whitetail Deer	*Odocoileus virginianus*
Woodchuck	*Marmota monax*
Woodland Jumping Mouse	*Napaeozapus insignis*
Fish	
Banded Killifish	*Fundulus diaphanus*
Black Crappie	*Pomoxis nigromaculatus*
Bluegill	*Lepomis macrochirus*

Bluntnose Minnow	*Pimephales notatus*
Brown Bullhead	*Ameiurus nebulosus*
Central Mudminnow	*Umbra limi*
Common Carp	*Cyprinus carpio*
Golden Shiner	*Notemigonus crysoleucas*
Goldfish	*Carassius auratus*
Grass Pickerel	*Esox americanus*
Largemouth Bass	*Micropterus salmoides*
Northern Pike	*Esox lucius*
Pumpkinseed	*Lepomis gibbosus*
Tadpole Madtom	*Noturus gyrinus*
White Sucker	*Catostomus commersoni*
Yellow Perch	*Perca flavescens*
Reptiles and Amphibians	
Allegheny Dusky Salamander	*Desmognathus ochrophaeus*
Black Rat Snake	*Elaphe o. obsoleta*
Blue-spotted Salamander	*Ambystoma laterale*
Bullfrog	*Rana catesbeiana*
Common Snapping Turtle	*Chelydra s. serpentina*
Eastern American Toad	*Bufo a. americanus*
Eastern Box Turtle	*Terrapene c. carolina*
Eastern Garter Snake	*Thamnophis s. sirtalis*
Eastern Milk Snake	*Lampropeltis t. triangulum*
Green Frog	*Rana clamitans melanota*
Jefferson Salamander	*Ambystoma jeffersonianum*
Midland Painted Turtle	*Chrysemys picta marginata*
Northern Brown Snake	*Storeria d. dekayi*
Northern Dusky Salamander	*Desmognathus f. fuscus*
Northern Gray Treefrog	*Hyla versicolor*
Northern Leopard Frog	*Rana pipiens*
Northern Redbelly Snake	*Storeria o. occipitomaculata*
Northern Slimy Salamander	*Plethodon glutinosus*
Northern Spring Peeper	*Pseudacris c. crucifer*
Northern Two-lined Salamander	*Eurycea bislineata*
Northern Water Snake	*Nerodia s. sipedon*
Redback Salamander	*Plethodon cinereus*
Red-spotted Newt	*Notophthalmus viridescens*
Smooth Green Snake	*Liochlorophis vernalis*
Spotted Salamander	*Ambystoma maculatum*
Spotted Turtle	*Clemmys guttata*
Western Chorus Frog	*Pseudacris triseriata*

Wood Frog	*Rana sylvatica*
Wood Turtle	*Clemmys insculpta*
Trees	
American Basswood	*Tilia americana*
American Beech	*Fagus grandifolia*
American Chestnut	*Castanea dentata*
American Elm	*Ulmus americana*
American Hornbeam	*Carpinus caroliniana*
Apple	*Pyrus malus*
Balsam Fir	*Abies balsamea*
Big-toothed Aspen	*Populus grandidentata*
Black Cherry	*Prunus serotina*
Black Locust	*Robinia pseudoacacia*
Black Walnut	*Juglans nigra*
Black Willow	*Salix nigra*
Box-elder	*Acer negundo*
Bur Oak	*Quercus macrocarpa*
Butternut	*Juglans cinerea*
Chestnut Oak	*Quercus prinus*
Choke-cherry	*Prunus virginiana*
Colorado Blue Spruce	*Picea pungens*
Common Pear	*Pyrus communis*
Cottonwood	*Populus deltoides*
Crack Willow	*Salix fragilis*
Cucumber Tree	*Magnolia acuminata*
Douglas Fir	*Pseudotsuga menziesii*
Eastern Hemlock	*Tsuga canadensis*
Eastern Hophornbeam	*Ostrya virginiana*
Eastern White Pine	*Pinus strobus*
European Mountain Ash	*Sorbus aucuparia L.*
Flowering Dogwood	*Cornus florida*
Gray Birch	*Betula populifolia*
Green Ash	*Fraxinus pennsylvanica*
Hawthorn	*Crataegus sp.*
Horse-chestnut	*Aesculus hippocastanum*
Northern Catalpa	*Catalpa speciosa*
Northern Red Oak	*Quercus rubra*
Norway Spruce	*Picea abies*
Pignut Hickory	*Carya glabra*
Pin Cherry	*Prunus pensylvanica*
Pussy Willow	*Salix discolor*

Quaking Aspen	*Populus tremuloides*
Red Maple	*Acer rubrum*
Red Pine	*Pinus resinosa*
Red Spruce	*Picea rubens*
Scotch Pine	*Pinus sylvestris*
Shag-bark Hickory	*Carya ovata*
Silver Maple	*Acer saccharinum*
Slippery Elm	*Ulmus rubra*
Staghorn Sumac	*Rhus typhina*
Sugar Maple	*Acer saccharum*
Swamp White Oak	*Quercus bicolor*
Sweet Cherry	*Prunus avium*
Sycamore	*Platanus occidentialis*
Shadbush Tree	*Amelanchier arborea*
Tamarack	*Larix laricina*
Tulip Tree	*Lirodendron tulipifera*
Weeping Willow	*Salix babylonica*
White Ash	*Fraxinus americana*
White Oak	*Quercus alba*
White Spruce	*Picea glauca*
Witch Hazel	*Hamamelis virginiana*
Yellow Birch	*Betyla luta*
Other Plants	
Abor Vitae	*Thuja occidentalis*
Alder Buckthorn	*Rhamnus frangula*
Alfalfa	*Medicago sativa*
Alpine Violet (Dog violet)	*Viola labradorica*
Alyssum Hoary	*Berteroa incana*
American Wild Mint	*Mentha arvensis var. glabrata*
Arrow-leaved Tear-thumb	*Polygonum sagittatum*
Asparagus	*Asparagus officinalis*
Aster Heart-leaved	*Aster cordifolius*
Barnyard Grass	*Echinochloa crusgalli var. crusgalli*
Barren strawberry	*Waldsteinia*
Bedstraw Rough	*Galium asprellum*
Beech-drops	*Epifagus virginiana*
Biennial Wormwood	*Artemisia biennis*
Bindweed Hedge	*Convolvulus sepium*
Birdfoot Trefoil	*Lotus corniculatus*
Bitter Nightshade	*Solanum dulcamara*
Black Medic	*Medicago lupulina*

Black-eyed Susan	*Rudbeckia hirta var. pulcherrima*
Bladder Campion	*Silene cucubalus*
Bladder Sedge	*Carex intumescens*
Bloodroot	*Sanguinaria canadensis*
Blue Cohosh	*Caulophyllum thalictroides*
Blue Flag Iris	*Iris veriscolor*
Blue Meadow Violet	*Viola papilionacea*
Bonest	*Eupatorium perfoliatum*
Bottle-brush Grass	*Hystrix patula*
Bouncing Bet	*Saponaria officinalis*
Breaded Short-husk	*Brachyelytrum erectum*
Bristly Greenbrier	*Smilax hispida*
Brittons Agrimony	*Agrimonia striata*
Broad-leaved Arrowhead	*Sagittaria latifolia*
Broad-leaved Cat-Tail	*Typha latifolia*
Broad-leaved Dock	*Rumex obtusifolius*
Broad-leaved Plantain	*Plantago major*
Brookweed	*Samolus floribundus*
Broomsedge	*Androopogon virginicus*
Brown Knapweed	*Centaurea jacea*
Buckwheat	*Fagopyrum escilentum*
Bugleweed Virginia	*Lycopus virginicus*
Butter-and-Eggs	*Linaria vulgaris*
Butterfly Milkweed	*Asclepias tuberosa*
Buttonbush	*Cephalanthus occidentails*
Canada Anemone	*Anemone canadensis*
Canada Goldenrod	*Solidago canadensis var. canadensis*
Canada Thistle	*Cirsium vulgare*
Canadian Tick Trefoil	*Desmodium canadense*
Cardinal-flower	*Lobelia cardinalis*
Carpet-weed (Wild Madder) Bedstraw	*Galium mollugo var. mollugo*
Carrion-flower	*Smilax herbacea*
Catnip	*Nepeta cataria*
Chairmakers Rush	*Scirpus americanus*
Charlock	*Brassica kaber*
Cheeses	*Malva neglecta*
Chicory	*Cichorium intybus*
Christmas Fern	*Polystichum acrostichoides*
Clammy Ground Cherry	*Physalis heterophylla var. heterophylla*
Clearweed	*Pilea pumila*
Climbing Bittersweet	*Celastrus scandens*

Climbing False Buckwheat	*Polygonum scandens var. scandens*
Climbing Hempweed	*Mikania scandens*
Clover Alsike	*Trifolium hybridum*
Club-moss Ground-pine	*Lycopodium obscurum*
Cockle-bur (Clotbur)	*Xanthium strumarium*
Coltsfoot	*Tussilago farfara*
Comm. Highbush Blackberry	*Rosa allegheniensis*
Common Beggar-ticks	*Bidens frondosa*
Common Bugle	*Ajuga reptans*
Common Burdock	*Arctium minus*
Common Cinquefoil	*Potentilla simplex*
Common Dandelion	*Taracacum officinale*
Common Groundsel	*Senecio vulgaris*
Common Horsetail	*Equisetum arvense*
Common Knotweed	*Polygonum aviculare*
Common Milkweed	*Asclepias syrauaca*
Common Ragweed	*Ambrosia artemisiifolia*
Common Reed Grass	*Phragmites communis*
Common Rush	*Juncus effusus var. solutus*
Common St. John's-wort	*Hypericum perforatum*
Common Teasel	*Dipsacus sylvestris*
Common Wood (Evergreen) Fern	*Dryopteris austriaca var. intermedia*
Common Yarrow	*Achillea millefolium*
Corn Chamomile	*Anthemis arvensis*
Cow Vetch	*Vicia cracca*
Crab-grass Small	*Leptoloma cognatum*
Cranberry High-Bush	*Viburnum opulus var. americanum*
Creeping Bellflower	*Campanula rapunciloides*
Cress Winter	*Barbarea vulgaris*
Crown Vetch	*Coronilla varia*
Curled Dock	*Rumex crispus*
Curly Pondweed	*Potamogeton crispus*
Daffodil	*Narcissus pseudo-narcissus*
Daisy Fleabane	*Erigeron strigosus*
Dame's Rocket	*Hesperis matronalis*
Dark-green Bulrush	*Scirpus atrovirens*
Day Lily	*Hemeocallis fulva*
Deptford Pink	*Dianthus ameria*
Devil's Paint-brush	*Hieracium aurantiacum*
Ditch Stonecrop	*Penthorum sedoeides*
Dock-leaved Smartweed	*Polygonum lapathifolium*

Dodder	*Cuscuta spp.*
Dogbane Spreading	*Apocynum androsaemifolium*
Dropseed	*Muhlenbegia schreberi*
Duckweed Star	*Leemna trisulca*
Early Goldenrod	*Solidago juncea*
Early Winter Cress	*Barbarea verna*
Eastern Bracken Fern	*Pteridium aquilinum var. latiusculum*
Elm-leaf Goldenrod	*Soldiago ulmifolia*
English Plantain	*Plantago lanceolata*
European Centaury	*Centaurium umbellatum*
European Forget-me-not	*Mysostis scorpioides*
European Strawberry	*Fragaria vesca var vesca*
Evening Lychnis	*Lychnis alba*
Evening Primrose	*Oenothera biennis*
Everlasting Pea	*Lathyrus latifolius*
False Nettle	*Boehmeria cylindrica*
Fennel-leaved Pondweed	*Potamogeton pectinatus*
Fern Autumn Grape	*Botrychium dissectum var. obliquum*
Fern Cinnamon	*Osmunda cinnamomea*
Fern Crested Shield	*Dryopteris cristata*
Fern Marginal	*Dryopteris marginalis*
Field Binweed	*Convolvulus arvensis*
Field Chamomile	*Matricaria arvensis*
Field Peppergrass	*Leersia oryziodes*
Floating Pondweed	*Potamogeton natans*
Foam-Flower	*Tiarella cordifolia*
Foxtail Sedge	*Carex vulpinoidea*
Frost Grape	*Vitis riparia*
Galinsoga ciliata	*Galinsoga ciliata*
Gentian Closed	*Gentiana andrewsii*
Gentian Fringed	*Gentiana crinita*
Giant Bur-reed	*Sparganium eurycarpum*
Gill-over-the-Ground	*Glecoma hederacea*
Goat's-beard	*Tragopogan pratensis*
Golden Dock	*Rumex maritimus*
Golden Ragwort	*Senecio aureus*
Gooseberry Prickly	*Ribes cynosbati*
Grass English Rye	*Lolium perenne*
Grass Hungarian Brome	*Bromus inermis*
Grass Redtop	*Agrostis stolonifera var. major*
Grass Sweet Vernal	*Anthoxanthum ordoratum*

Grass Velvet	*Holcus lanatus*
Gray's Goldenrod	*Soldiago nemoralis*
Great Bulrush	*Scirpus validus*
Greater Bladderwort	*Utricularia valgaris*
Green Amaranth	*Amaranthus retroflexus*
Green Foxtail	*Setaria viridus*
Green-fruited Bur-reed	*Sparganium chlorocarpum*
Ground Cedar	*Lycopodium complanatum var. flabelliforme*
Hairy Willow-herb	*Epilobium hirsutum*
Hairy Wood Lettuce	*Lactuca hirsuta*
Heal-all	*Prunella vulgaris*
Herb Robert	*Geranium robertianum*
Highbush Blueberry	*Vaccinium corymbosum*
Hog Peanut	*Amphicarpa bracteata var. bracteata*
Honeysuckle Smooth-leaved	*Lonicera dioica var dioca*
Hooded Skullcap	*Scutellaria laterofloria*
Hop Sedge	*Carex lupulina*
Hops	*Humulis lupulus*
Horse Balm	*Collinsonia canadiensis*
Horseweed	*Conyza canadiens*
Indian Hemp	*Apocynum cannabinum*
Indian-tobacco Lobelia	*Lobelia inflata*
Jack-in-the-Pulpit	*Arisaema tripyhyllum var. triphyllum*
Japanese Knotwood	*Polygonum cuspidatum*
Jerusalem Artichoke	*Helianthus tuberosus var. tuberosus*
Joe-Pye-Weed	*Eupatorium maculatum*
Juniper Low	*Juniperis communis var. depressa*
King Devil	*Hieracium gronovii*
Lady-Upland Fern	*Athyrium filix-femina var. michauxii*
Lambs Quarters	*Chenopodium album*
Larch European	*Larix decidua*
Large Crab-grass	*Digitaria sanguinalis*
Large-flowered Bellwort	*Uvularia grandiflora*
Large-leaved Aster	*Aster macrophyllus*
Larger Enchanters Night-shade	*Circea quarisulcata var. canadiens*
Late Goldenrod	*Solidago gigantea var. gigantea*
Lesser Swithwort	*Stellaria gramimea*
Lily-of-the-Valley	*Convallaria majalis*
Lily-of-the-Valley False	*Maianthemum candense var. candense*
Live-forever	*Sedum telephium*
Lizard's Tail	*Saururus cernuus*

Long-spurred Violet	*Viola rostrata*
Low Hop Clover	*Trifolium procumbens*
Loweries Aster	*Aster lowrieanus*
Maple-leaved Viburnum	*Viburnum acerifolium*
Marsh Bedstraw	*Galium palustre*
Marsh Fern	*Theypteris palustris var. pubescens*
Marsh Yellow Crest	*Rorippa islandica*
May-apple	*Podophyllum peltatum*
Mayweed	*Anthemis cotula*
Meadow Fescue	*Festuca elatior*
Mild Water Smartweed	*Polygonum hydropiperoides var. hyperpipoides*
Mint Curled	*Mentha crispa*
Monkey Flower	*Mimulus ringens*
Moonseed	*Menispermum canadense*
Morrow's Honeysuckle Tartariam	*Lonicera morrowii*
Motherwort	*Leonurus caridiaca*
Mouse-ear Chickweed	*Cerastium vulgatum*
Multifloria Rose	*Rosa multifloria*
Musk Mallow	*Malva moschata*
Nannyberry Viburnum	*Viburnum lentago*
Narrow-leaved Cat-Tail	*Typha augustifola*
Narrow-leaved Goldenrod	*Solidago graminifolia*
Narrow-leaved Meadow-sweet	*Spiraea alba*
New England Aster	*Aster novae-angliae*
New York Fern	*Thelypterid noveborancensis*
Night-flowering Cathfly	*Silene noctifloria*
Nodding Ladys-tresses	*Spiranthes cernua*
Nodding Sedge	*Carex crinita var. gynandra*
Nodding Sticktight	*Bidens cernua*
Northern White Violet	*Viola pallens*
Northern Willow-herb	*Epilobium ciliatum*
Northern Woodland Sedge	*Carex leptonervia*
Nuttail's Bur-reed	*Sparganium americanum*
Orchard Grass	*Dactylis glomerata*
Orchid Helleborine	*Epipactis helleborine*
Orchids Showy	*Orchis spectabilis*
Ostrich Fern	*Matteuccia struthopteris*
Ox-eye Daisy	*Chrysanthemum leucanthemum*
Pale Touch-me-not	*Impatiens pallida*
Panicled Dogwood	*Cornus stolonifera*
Parsnip Water	*Sium suave*

Partridge-berry	*Mitchella repens*
Path Rush	*Juncus tenius*
Pearly Everlasting	*Anaphalis margaritacea*
Pennsylvania Smartweed	*Polygonum pensylvanicum*
Peppermint	*Mentha piperita*
Periwinkle	*Vinca minor*
Philadelphia Fleabane	*Erigeron philadelphicus*
Pineapple-weed	*Matricaria matrocioides*
Plantain-leaved Sedge	*Carex plantaginea*
Plantain-water	*Alisma plantago-aquatica*
Pointed Broom Sedge	*Carex scoparia*
Pokeweed	*Phytolacca americana*
Prickly Lettuce	*Lactuca serriola var. serriola*
Purple Meadow-rue	*Thalictrum dasycarpum*
Purple or White Lilac	*Syrinca vulgaris*
Purple-stemmed Aster	*Aster puniceus*
Pussy-toes	*Antennaria neglecta var. neglecta*
Quack-grass	*Agropyron repens*
Queen Annes Lace	*Daucus carota*
Red Baneberry	*Actaea rubra*
Red Clover	*Trifolium pratense*
Red Currant	*Ribes sativum*
Red Raspberry	*Rosa strigosus*
Red Trillium	*Trillium erectum*
Reddish Bulrush	*Scirpus lineatus*
Reed Canary Grass	*Phalaris arundinacea*
Rough Cinquefoil	*Potentilla norvegica*
Rough-leaved Goldenrod	*Soldiago patula*
Royal Fern	*Osmunda regalis var. spectabilis*
Rush Tall Scouring	*Equisetum hyemale var. psudohyemale*
Rush Variegated Scouring	*Equisetum variegatum*
Rye	*Secale cereale*
Sensitive Fern	*Onoclea sensibilis*
Shaggy Mane Mushroom	*Coprinus comatus*
Sharp-lobed Hepatica	*Hepatica acutiloba*
Shepherd's Purse	*Capsella bursa-pastoris*
Shin leaf	*Pyrola elliptica*
Showy Sunflower	*Helianthus laetiflorus*
Sickle Sedge	*Carex crinita var. crinita*
Sidebells Wintergreen (One-sided pyrola)	*Orthilia secunda*
Silky Dogwood	*Cornus amomum*

Small Forget-me-not	*Mysostis laxa*
Small Solomons-seal	*Polygonatum biflorum*
Small-flowered Buttercup	*Ranunculus abortivus*
Smartweed Swamp	*Polygonum coccineum*
Smooth Aster	*Aster laevis*
Smooth Rose	*Rosa blanda*
Smooth Yellow Violet	*Viola ericorcarpa*
Soft Agrimony	*Agrimonia pubescens*
Soft Willow-herb	*Epilobium strictum*
Solomons-seal False	*Smilacina stellara*
Sorrel Sheep	*Rumex acetosella*
Spearmint	*Mentha spicata*
Spicebush	*Lindera benzoin*
Spike-rush Bald	*Eleocharis erythropoda*
Spinulose Wood Fern	*Dryopteris austriaca var. spinulosa*
Spiny-leaved Sow-thistle	*Sonchus asper*
Spotted Touch-me-not	*Impatiens biflora*
Spring beauty Broad-leaved	*Claytonia caroliniana*
Spurge Hairy	*Euphorbia vermiculata*
Squill	*Scilla siberica Haw.*
Squirreltail Grass	*Hordeum jubatum*
St. Johns-wort Canadian	*Hypericum canadense*
Starved Aster	*Aster lateriflorus*
Stiff Marsh Bedstraw	*Galium trifidum var. tinctorium*
Straw-colored Cyperus	*Cyperus strigosus*
Sulphury Cinquefoil	*Potentilla recta*
Summer Grape	*Vitis aestivalis var. aestivalis*
Swamp Beggar-ticks	*Bidens laevis*
Swamp Loosestrife	*Decodon verticillatus*
Swamp Milkweed	*Asclepias incarnata*
Sweet Cicely	*Osmorhiza berteroi*
Sweet-scented Bedstraw	*Galium triflorum*
Switch-Grass	*Panicum virgatum*
Tall Goldenrod	*Solidago canadensis var scabra*
Tall Meadow Buttercup	*Ranunculus acris*
Tall Meadow-rue	*Thalictrum polygamum*
Tall Nettle	*Urtica dioica var. procera*
Tall White Aster	*Aster simplex*
Tall Wormwood	*Artemisia campestris ssp. Caudata*
Thimble-weed	*Anemone virginiana*
Three-seeded Mercury	*Acalypha rhomboidea*

Thyme-leaved Speedwell	*Veronica serpyllifolia*
Tick Trefoil Hoary	*Desmodium canescens*
Timothy	*Phleum pratense*
Toothwort Cut-leaved	*Dentaria laciniata*
Toothwort Two-leaved	*Dentaria diphylla*
Torrey's Rush	*Juncus torreyi*
Tradescants Aster	*Aster tradescantii*
Tree Rowan	*Sorbus aucuparia*
Tree Shadbush	*Amelanchier arborea*
Tufted Loosestrife	*Lysimachia thrysiflora*
Turtlehead	*Chelone glabra*
Upright Yellow Wood-sorrel	*Oxalis stricta*
Virginia Creeper	*Parthenocissus quinquefolia*
Virginia Knotweed	*Polygonum virginianum*
Virginia Strawberry	*Fragaira virginiana*
Virginia Wild Rye	*Elymus virginicus*
Virgins Bower	*Clematis virginiana*
Wartweed (Spurge)	*Euphorbia maculata*
Water Cress	*Nasturtium officinale*
Water Dock	*Rumex verticillatus*
Water Hemlock	*Cicuta maculata*
Water Hemlock Bulb-bearing	*Cicuta bulbifera*
Water Perslane	*Ludwugia palustris var. americana*
Water Smartweed	*Polygonum hydropiper*
Water Speedwall	*Verbascum thapus*
Water-weed	*Anarcharis candensis*
White Avens	*Geum canadense*
White Baneberry	*Actaea alba*
White Heath Aster	*Aster ericoides*
White Snakeroot	*Eupatorium rugosum*
White Sweet Clover	*Melilotus alba*
White Tall Flat-topped Aster	*Aster umbellatus*
White Trillium	*Trillium grandiflorum*
White Wood Aster	*Aster divaricatus*
White-top Slender	*Erigeron annus*
Wild Basil	*Satureja vulgaris*
Wild Bergamot	*Monarda fistulosa*
Wild Cucumber	*Echinocystis lobata*
Wild Leek	*Allium tricoccum*
Wild parsnip	*Pastinaca sativa*
Wild Sarsaparilla	*Aralia nudicaulis*

Willow-leaved Aster	*Aster praealtus*
Witch-grass	*Panicum capillare var campestre*
Witch-grass Gattingers	*Panicum capillare var. campestre*
Witch-grass Spreading	*Panicum dichotomiflorum*
Woodreed	*Cinna arundinacea*
Wool Grass	*Scirpus cyperinus*
Wrinkled Goldenrod	*Soldiago rugosa var. aspera*
Yellow Adder's-tongue	*Erythronium americanum*
Yellow Hop Clover	*Trifolium agrarium*
Yellow Iris	*Iris pseudacorus*
Yellow Nut Grass Cyperus	*Cyperus esculentus*
Yellow Sedge	*Carex flava*
Yellow Sweet-clover	*Melilotus officinalis*
Zigzag Goldenrod	*Solidago flexicaulis*

Appendix E

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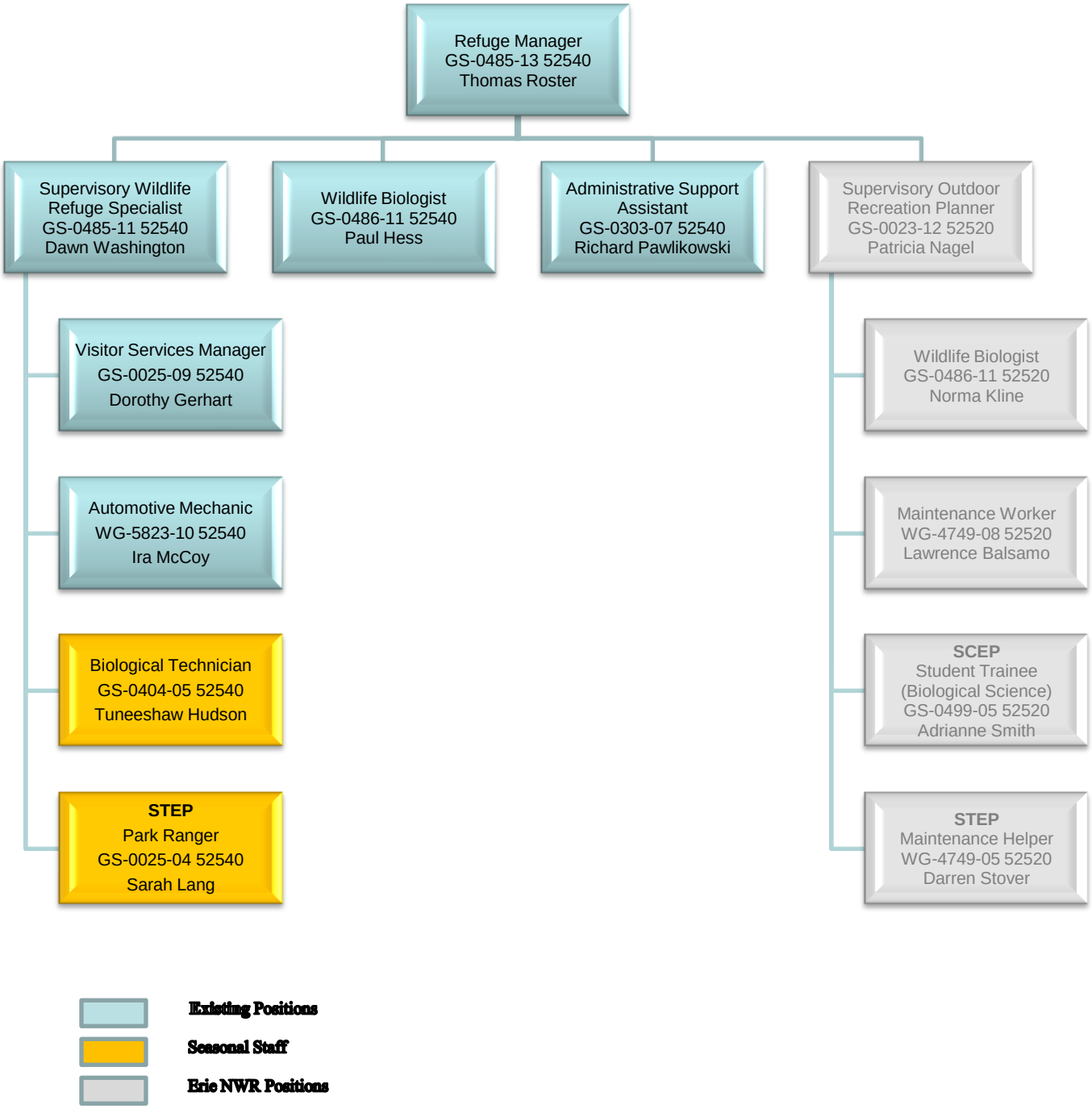
Swallow Hollow Kiosk

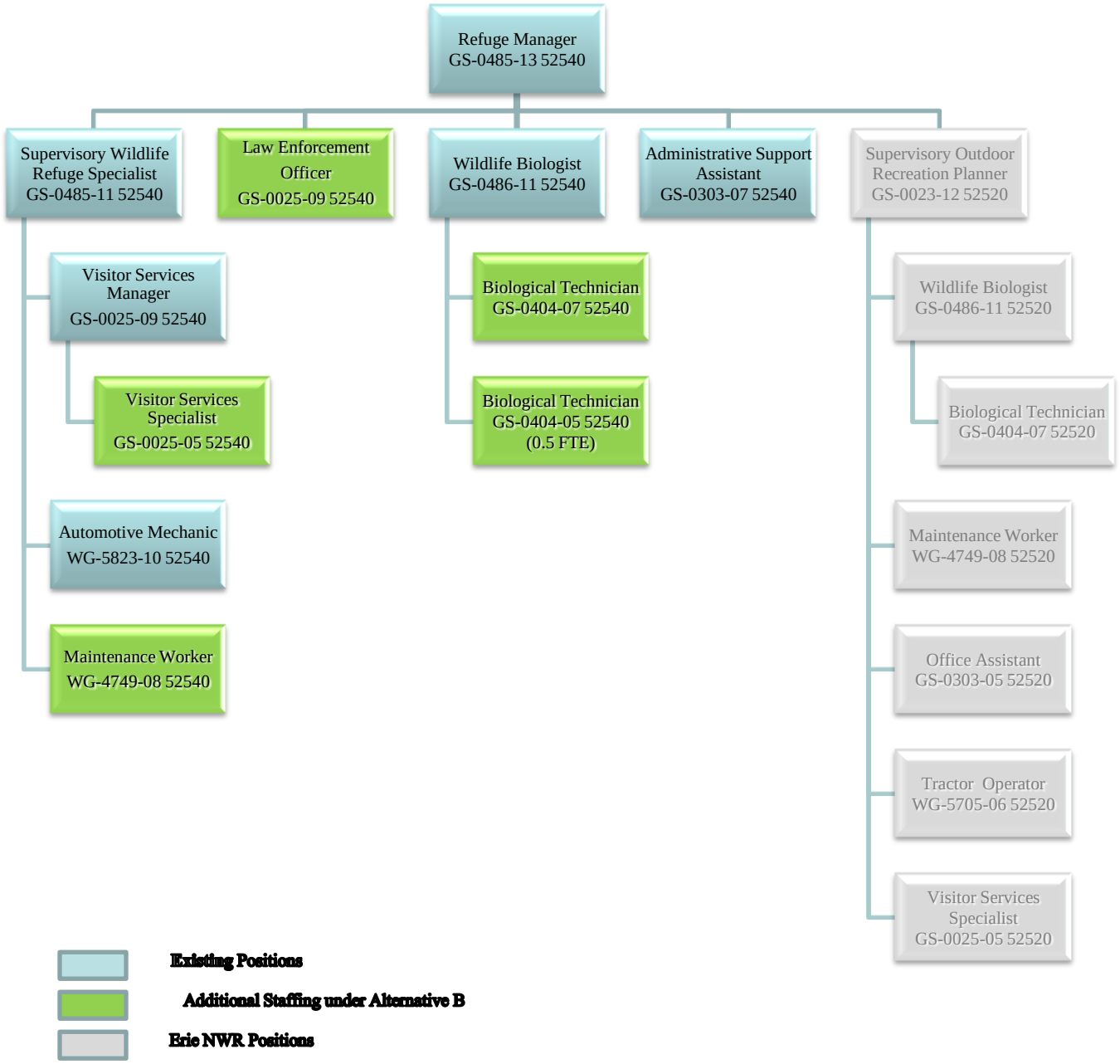
Refuge Staffing Charts

- Current Staffing Chart
- National Staffing Model Chart

Iroquois and Erie National Wildlife Refuge
Current Staffing Chart



Iroquois and Erie National Wildlife Refuge Staffing According to the National Staffing Model



Appendix F

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Blue-winged Teal

Refuge Operating Needs (RONS) & Service Asset Maintenance Management Systems (SAMMS)

- RONS Projects
- SAMMS Projects

Budget and RONS Projects by Alternative for Iroquois NWR

Refuge Rank	Project No.	Project Description	Staffing FTE	Alternative A			Alternative B			Alternative C		
				Total First Year	One-Time Costs	Recurring Base	Total First Year	One-Time Costs	Recurring Base	Total First Year	One-Time Costs	Recurring Base
		Current Staffing (FY 2010)	6			490			490			490
		Current Management Capability (FY 2010)				181			181			181
1	3473	Provide Resource, Factility and Visitor Protection (Law Enforcement)	1				150		150	150		150
2	3781	Maintain Mission Critical Habitat Structures and Facilities	1				78		78	78		78
3	3784	Conduct Monitoring of Migratiory Bird Species Of Concern	1				80		80	80		80
4	4722	Implement Invasive Species Plant Control Measures		56	20	18	56	20	18			
5	3953	Conduct Wetland Habitat Monitoring for Breeding Marsh Birds	0.5				28		28	28		28
6	3871	Implement Vistior Services Programs	1				65		65	65		65
7	5062	Assess Refuge Conservation Easements		45	7	6						
8	3726	Enhance 1073 acres of Refuge Warm and Cool Season Grasslands		76	40	18	76	40	18			
9	4701	Establish Visitor Contact Station Trail		53	30	5	53	30	5			
		Bathymetry (A1.1)(B1.*)		10	10		10	10				
		Flora and Fauna Inventory of Rare Communities (A2.2)(B2.2)(C2.2)		25	25		25	25		25	25	
		Complete Evaluation of Outreach Techniques Effectiveness (A4.2) (B4.2)		10	10		10	10				
SAMMS		Standard Design Refuge Visitor Contact Station and Administration Building (B.*)(C.*)		3500		50	3500		50	3500		50
		Develop a Comprehensive GIS Wildlife and Habitat Database (B.*) (C.*)					113	75	20	113	75	20
SAMMS		Oneida - Mohawk Pool Restoration Project (B1.1)					750		10			
		Feasibility and Removal of Northeast Seneca Pool Dike (B1.8)					93	70	5	93	70	5

Develop a Index of Biological Integrity for Oak Orchard Creek (B2.2)				25	25				
Complete Forest Resources Assessement and Establish Long Term Forest Vegetation Monitoring Program (B3.3)				68	25	25	68	25	25
Restoration of Conifer Plantations to Native Forest Communities (B3.4)(C3.4)				80	20	45	80	20	45
Restoration of Conifer Plantations to Native Shrub Communities (B3.4)(C3.4)				48	25	5	48	25	5
Reverting Grasslands to Shrub/Forest (C3.1)							50	10	40
Contract Refuge Visitor Demographics Study (B4.1)				25	25		25	25	
Revamp Visitor Services Exhibits (B4.1)	180	175	5	180	175	5	180	175	5
Develop an Accessible Photo/Hunting Blind (B4.4)	77	75	2	77	75	2	77	75	2
Develop One Canoe Launch Site (B4.4)				85	80	5			
Develop Onondaga Loop Trail (C4.4)							50	30	5
Develop and Accessible Fishing Pier (B5.2)				55	50	5	55	50	5
Partners for Wildlife Program and Easement Management (B6.1)(C6.1)				50	20	30	50	20	30
Totals:	4032	392	775	5780	800	1320	4815	625	1309

Estimates are in todays dollars

Service Asset Maintenance Management Systems (SAMMS) projects for Iroquois NWR

Project No.	Project Title*	Costs ($1,000)	Refuge Rank
EXISTING FACILITIES			
2005219253	R5 RRP Iroquois NWR FY07 PE Rehab Feeder Road (Rte 100)	$5.0	4
2005219282	R5 RRP Iroquois NWR FY07 PE Rehab Cayuga Parking Area (Rte 901)	$5.0	4
2005219311	R5 RRP Iroquois NWR FY07 PE Rehab Sour Spring North Parking Area (Rte. 906)	$5.0	4
2005219613	R5 RRP Iroquois NWR FY07 PE Rehab HQ Parking Area (Rte. 900)	$5.0	4
2005219635	R5 RRP Iroquois NWR FY07 PE Rehab Sour Spring South Parking Area (Rte. 908)	$5.0	4
2005219651	R5 RRP Iroquois NWR FY07 PE Rehab Mallard Overlook Parking Area (Rte. 905)	$5.0	4
2005219664	R5 RRP Iroquois NWR FY07 PE Rehab Schoolhouse Overlook Parking Area (Rte. 904)	$5.0	4
2005219689	R5 RRP Iroquois NWR FY07 PE Rehab Onondaga Parking Area (Rte. 907)	$5.0	4
2005219721	R5 RRP Iroquois NWR FY07 PE Rehab Ringneck Overlook Parking Area (Rte. 903)	$5.0	4
2005219724	R5 RRP Iroquois NWR FY07 PE Rehab Kanyoo Parking Area (Rte. 902)	$5.0	4
2005220882	R5 RRP Iroquois NWR CN Rehab Feeder Road (Rte 100) FHWA	$240.0	4
2005220883	R5 RRP Iroquois NWR FY11 CN Rehab Cayuga Parking Area (Rte 901)	$17.5	4
2005220887	R5 RRP Iroquois NWR FY11 CN Rehab Sour Spring North Parking Area (Rte. 906)	$17.5	4
2005220889	R5 RRP Iroquois NWR FY11 CN Rehab HQ Parking Area (Rte. 900)	$17.5	4
2005220890	R5 RRP Iroquois NWR CN Rehab HQ Parking Area (Rte. 900) FHWA	$17.5	4
2005220891	R5 RRP Iroquois NWR FY11 CN Rehab Sour Spring South Parking Area (Rte. 908)	$17.5	4
2005220893	R5 RRP Iroquois NWR FY11 CN Rehab Mallard Overlook Parking Area (Rte. 905)	$17.5	4

2005220894	R5 RRP Iroquois NWR CN Rehab Mallard Overlook Parking Area (Rte. 905) FHWA	$17.5	4
2005220895	R5 RRP Iroquois NWR FY11 CN Rehab Schoolhouse Overlook Parking Area (Rte. 904)	$17.5	4
2005220896	R5 RRP Iroquois NWR CN Rehab Schoolhouse Overlook Parking Area (Rte. 904) FHWA	$17.5	4
2005220897	R5 RRP Iroquois NWR FY11 CN Rehab Onondaga Parking Area (Rte. 907)	$17.5	4
2005220899	R5 RRP Iroquois NWR FY11 CN Rehab Ringneck Overlook Parking Area (Rte. 903)	$17.5	4
2005220901	R5 RRP Iroquois NWR FY11 CN Rehab Kanyoo Parking Area (Rte. 902)	$17.5	4
2005225063	R5 RRP Iroquois NWR FY09 CE Rehab Feeder Road (Rte 100)	$5.0	4
2005225064	R5 RRP Iroquois NWR FY09 CE Rehab Feeder Road (Rte 100) FHWA	$5.0	4
2005225065	R5 RRP Iroquois NWR FY09 CE Rehab Cayuga Parking Area (Rte 901)	$5.0	4
2005225066	R5 RRP Iroquois NWR FY09 CE Rehab Cayuga Parking Area (Rte 901) FHWA	$5.0	4
2005225069	R5 RRP Iroquois NWR FY09 CE Rehab Sour Spring North Parking Area (Rte. 906)	$5.0	4
2005225070	R5 RRP Iroquois NWR FY09 CE Rehab Sour Spring North Parking Area (Rte. 906) FHWA	$5.0	4
2005225071	R5 RRP Iroquois NWR FY09 CE Rehab HQ Parking Area (Rte. 900)	$5.0	4
2005225072	R5 RRP Iroquois NWR FY09 CE Rehab HQ Parking Area (Rte. 900) FHWA	$5.0	4
2005225073	R5 RRP Iroquois NWR FY09 CE Rehab Sour Spring South Parking Area (Rte. 908)	$5.0	4
2005225074	R5 RRP Iroquois NWR FY09 CE Rehab Rehab Sour Spring South Parking Area (Rte. 908) FHWA	$5.0	4
2005225075	R5 RRP Iroquois NWR FY09 CE Rehab Mallard Overlook Parking Area (Rte. 905)	$5.0	4
2005225077	CE Rehab Mallard Overlook Parking Area (Rte. 905)	$5.0	4

2005225078	R5 RRP Iroquois NWR FY09 CE Rehab Schoolhouse Overlook Parking Area (Rte. 904)	$5.0	4
2005225079	R5 RRP Iroquois NWR FY09 CE Rehab Schoolhouse Overlook Parking Area (Rte. 904) FHWA	$5.0	4
2005225080	R5 RRP Iroquois NWR FY09 CE Rehab Onondaga Parking Area (Rte. 907)	$5.0	4
2005225081	R5 RRP Iroquois NWR FY09 CE Rehab Onondaga Parking Area (Rte. 907) FHWA	$5.0	4
2005225082	R5 RRP Iroquois NWR FY09 CE Rehab Ringneck Overlook Parking Area (Rte. 903)	$5.0	4
2005225083	CE Rehab Ringneck Overlook Parking Area (Rte. 903)	$5.0	4
2005225084	R5 RRP Iroquois NWR FY09 CE Rehab Kanyoo Parking Area (Rte. 902)	$5.0	4
2005225085	R5 RRP Iroquois NWR FY09 CE Rehab Kanyoo Parking Area (Rte. 902) FHWA	$5.0	4
2009957056	PE Rehab Feeder Road (Rte 100) FHWA	$35.0	4
2009957057	PE Rehab Cayuga Parking Area (Rte 901) FHWA	$5.0	4
2009957058	PE Rehab Sour Spring North Parking Area (Rte. 906) FHWA	$5.0	4
2009957059	PE Rehab HQ Parking Area (Rte. 900) FHWA	$5.0	4
2009957060	PE Rehab Rehab Sour Spring South Parking Area (Rte. 908) FHWA	$5.0	4
2009957061	PE Rehab Mallard Overlook Parking Area (Rte. 905) FHWA	$5.0	4
2009957062	PE Rehab Schoolhouse Overlook Parking Area (Rte. 904) FHWA	$5.0	4
2009957063	PE Rehab Onondaga Parking Area (Rte. 907) FHWA	$5.0	4
2009957064	PE Rehab Ringneck Overlook Parking Area (Rte. 903) FHWA	$5.0	4
2009957065	PE Rehab Kanyoo Parking Area (Rte. 902) FHWA	$5.0	4
03126457	Rehabilitate Headquarters Building	$73.0	11
87104129	Rehabilitate Visitor Center Fixed Displays	$175.0	26
88104146	Rehabilitate Shallow Hollow Dike	$68.5	33
90104141	Rehabilitate Dike and Oneida Pool Dam #5	$39.0	34
2009943696	Remove Deteriorated Quarters #1 Garage	$5.0	36
87104139	Remove Deteriorated Quarters #1	$27.0	36
00104133	Rehabilitate Onondaga Trail	$45.0	37
90104144	Rehabilitate Seneca Pool Flap Gate	$79.0	41
01112808	Rehabilitate Quarters 152	$26.0	63

2006553897	Replace Roof on Oil/Grain Shed	$3.6	N/A
2007729104	Rehabilitate Cayuga Pool Dike 52540	$5.8	N/A
2007729106	Rehabilitate County Line Dike Surface 52540	$6.2	N/A
2007729116	Rehabilitate Seneca Pool Dike Surface 52540	$8.9	N/A
2007729154	Rehabilitate Sutton's Marsh Dike Surface 52540	$2.8	N/A
2007729165	Rehabilitate Ringneck Marsh Dike Surface 52540	$4.1	N/A
2007729168	Rehabilitate Center Marsh Dike Surface 52540	$4.4	N/A
2007729171	Rehabilitate Oneida Pool Dike Surface 52540	$5.6	N/A
2007729176	Rehabilitate Mohawk Pool Dike Surface - North 52540	$4.0	N/A
2007729187	Rehabilitate Mohawk Pool Dike - West 52540	$2.0	N/A
2007729192	Rehabilitate Mohawk Pool Dike - East (child)	$7.5	N/A
2007729197	Rehabilitate Olsen Marsh Dike Surface 52540	$1.6	N/A
2007729242	Rehabilitate Caldwell's Folly Dike Surface 52540	$1.1	N/A
2007729250	Rehabilitate Schoolhouse Marsh Dike Surface 52540	$1.7	N/A
2007729257	Rehabiltate Galaxie Marsh Dike Surface - South 52540	$0.6	N/A
2007729259	Rehabilitate O'Brien Marsh Dike Surface 52540	$0.9	N/A
2008864022	Replace Water Control Structure U Cayuga Pool	$25.4	N/A
2008864535	Replace Building Storage Williams Barn	$317.0	N/A
2009945530	Rehabilitate Visitor Contact Building	$750.0	N/A
2009957069	PE Swallow Hollow Parking FHWA	$0.0	N/A
	Total	$2,370.7	

Project No.	Project Title*	Costs ($1,000)	Refuge Rank
	NEW PROJECTS		
2007733719	Construct Visititor Contact Station Kiosk	$56.0	N/A
2009928029	Construct Oneida Pool Restoration	$20.0	N/A
	Total	$76.0	

* Project title and ranking may not exactly match current RONS database. They were modified based on goals and objectives developed for Alternative B in this CCP.

Appendix G

USFWS

Bald Eagle

Intra-Service Section 7 Biological Evaluation Form

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Thomas P. Roster
Telephone Number: 585-948-5445
Date: March 26, 2010

I. Region:
Region 5 (Northeast)

II. Service Activity (Program):
The U.S. Fish and Wildlife Service, Region 5, Iroquois National Wildlife Refuge (INWR) is preparing a Comprehensive Conservation Plan (CCP), a document required under the National Wildlife Refuge System Improvement Act of 1997. The final CCP will provide a framework for guiding refuge management decisions for the next 15 years. All aspects of refuge management, including habitat and public use management, are outlined in the CCP.

III. Pertinent Species and Habitat:

A. Listed species potentially present within the action area:

None. Bald eagles (*Haliaeetus leucocephalus*) nest on the refuge but have been delisted. Other Federally-designated endangered and threatened species known to occur, or to have occurred, in Genesee and Orleans Counties (see attached species occurrence information) are not known to currently occur on INWR.

There is no Federally-designated critical habitat within the action area.

B. Proposed species and/or proposed critical habitat within the action area
None

C. Candidate species within the action area:
None

D. Include species/habitat occurrence on a map.
N/A

IV. Geographic area or station name and action:
Iroquois National Wildlife Refuge, Genesee and Orleans Counties, New York. Comprehensive Conservation Plan.

V. Location:
Maps are found in Chapters 1 through 3 of the draft CCP/EA.

A. Ecoregion Number and Name:
Lower Great Lakes Plain

B. County and State:
Genesee and Orleans Counties, New York

C. Section, township, and range (or latitude and longitude):

Alabama and Shelby townships. The Refuge headquarters is located at latitude 43 degrees, 6'44" and longitude -78 degrees, 24'18" (plus or minus 16' GPS error).

D. Distance (miles) and direction to nearest town:
The Refuge is 1 mile north of Alabama, New York.

E. Species/habitat occurrence:

No federally listed endangered species are known to occur on the Refuge. For many years the bald eagle was the primary endangered species upon which the Refuge focused its efforts. Due to successful conservation efforts, the bald eagle is now listed in the least concern category. Two active eagle nests currently occur on the Refuge, and another active nest is on the nearby Oak Orchard State Wildlife Management Area.

The Karner blue butterfly was listed as Federally-endangered in 1992. Its historical range included savanna/barren ecosystems in 12 states from Minnesota to Maine and in the province of Ontario. The lupine flower is a critical component for Karner blue habitat. Lupines grow primarily on sandy soils within oak and pine savanna/barrens communities. In New York, the Karner blue butterfly was once common. The Tonawanda Potential Recovery Unit is one of two units that could form a geographic connection between eastern and western populations (USFWS 2003). Iroquois NWR and Oak Orchard WMA are also being considered for Karner blue reintroduction if a minimum of 100 acres of suitable habitat can be developed. Planting of lupines on the Refuge and Oak Orchard began in 1995-96. For more information and details, please refer to chapter 3, "Affected Environment" of the draft CCP/EA.

VI. Description of proposed action (attach additional pages as needed):
The proposed actions and alternatives selected by the Service are described in Chapter 2 of the draft CCP/EA. This Section 7 consultation does not release INWR from any future Section 7 consultation requirements. If any listed species are discovered on INWR in the future, a Section 7 consultation will be conducted on any action that has an effect on a listed species, not just actions that have the potential to negatively affect a listed species.

VII. Determination of effects:

A. Explanation of effects of the action on species in item III:
None. Refer to Chapter 4 of the draft CCP/EA for more information and details.

B. Explanation of actions to be implemented to reduce adverse effects:
N/A.

VIII. Effect determination and response requested: [* = optional]

A. List species/designated critical habitat:

Determination	**Response requested**
No effect/No adverse modification	*** Concurrence**
May affect, but is not likely to adversely affect species/adversely modify critical habitat	**_____ Concurrence**

May affect, and is likely to adversely affect species/adversely modify critical habitat _____Formal Consultation

_____ _____
Signature **Date**

[Title/office of supervisor at originating station]

IX. Reviewing ESO Evaluation:

A. Concurrence __X__ Nonconcurrence_____

B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

_____ _____
Signature **Date**

[Title/office of reviewing official]

Federally Listed Endangered and Threatened Species and Candidate Species

Genesee and Orleans Counties, New York

This list represents the best available information regarding known or likely County occurrences of Federally-listed and candidate species and is subject to change as new information becomes available.

Common Name	Scientific Name	Status
Bald eagle [1]	*Haliaeetus leucocephalus*	D (G, O)
Bog turtle (*Historic*)	*Clemmys [=Glyptemys] muhlenbergii*	T (G,O)
Eastern massasauga	*Sistrurus catenatus catenatus*	C (G)
Eastern prairie fringed orchid *(Historic)*	*Platanthera leucophea*	T (G,O)
Houghton's goldenrod	*Solidago houghtonii*	T (G)

Status Codes: E=Endangered, T=Threatened, P=Proposed, C=Candidate, D=Delisted.

G=Genesee County, O=Orleans County

[1] The bald eagle was delisted on August 8, 2007. While there are no ESA requirements for bald eagles after this date, the eagles continue to receive protection under the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA), and by the New York State Department of Environmental Conservation (Status: Threatened). INWR will continue to follow the Service's May 2007 Bald Eagle Management Guidelines to avoid impacts under BGEPA for all projects. Information current as of: 3/23/2010

Iroquois National Wildlife Refuge
1101 Casey Road
Basom, NY 14013
Phone: 585/948-5445

http://www.fws.gov/northeast/iroquois/

Federal Relay Service
for the deaf or hard of hearing
1 800/877 8339

U.S. Fish and Wildlife Service Website
http://www.fws.gov

For National Wildlife Refuge System Information:
1800/344 WILD

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